UNIVERSIDADE FEDERAL DE MINAS GERAIS

INSTITUTO DE GEOCIÊNCIAS

PROGRAMA DE PÓS-GRADUAÇÃO EM GEOLOGIA

TESE DE

DOUTORADO

EVOLUÇÃO DE TURBIDITOS E SUA MINERALIZAÇÃO AURÍFERA NO LINEAMENTO CÓRREGO DO SÍTIO E ÁREA CUIABÁ-LAMEGO, SUPERGRUPO RIO DAS VELHAS: GEQUÍMICA, GEOCRONOLOGIA E *IN SITU* LA-ICP-MS EM SULFETOS

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BELO HORIZONTE

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EVOLUÇÃO DE TURBIDITOS E SUA MINERALIZAÇÃO AURÍFERA NO LINEAMENTO CÓRREGO DO SÍTIO E ÁREA CUIABÁ-LAMEGO, SUPERGUPO RIO DAS VELHAS: GEQUÍMICA, GEOCRONOLOGIA E *IN SITU* LA-ICP-MS EM SULFETOS

Tese apresentada ao Programa de Pós-Graduação em Geologia da Universidade Federal de Minas Gerais como requisito parcial à obtenção do título de doutor em geologia.

Área de concentração: Geologia Econômica e Aplicada.

Orientadora: Profa. Dra. Lydia Maria Lobato

Co-orientadora: Rosaline Cristina Figueiredo e Silva

“Uma pessoa que se diz resiliente deve ser capaz de superar os obstáculos e lidar com os problemas, ambas situações que estão presentes sempre na vida do homem e não podem ser evitadas. É sempre hora de levantar-se, mesmo se houver medo de cair de novo”

(...)

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RESUMO

O *Greenstone belt* Rio das Velhas está localizado no distrito metalogenético do Quadrilátero Ferrífero, na extremidade sudeste do Cráton São Francisco, região centro-sul do estado de Minas Gerais. Sequencias turbidíticas típicas de *greenstone belts* arqueanos possuem ampla abrangência regional, sendo representadas pela associação ressedimentada, dominada pela alternância de grauvacas e pelitos, e associadas a diques e *sills* metamáficos, paralelos a discordantes. O estudo da geologia e paragênese do lineamento aurífero Córrego do Sítio foi conduzido, contendo os depósitos Cachorro Bravo, Laranjeiras e Carvoaria como foco principal. Esses três importantes depósitos são descritos para ilustrar as características semelhantes, composição mineralógica e diferenças no tipo de minério ao longo do lineamento. Para o depósito de Cachorro Bravo, o mapeamento geológico inclui duas galerias subterrâneas. Diferentes tipos de veios, compostos por cristais de quartzo, tanto fumê quanto leitoso, carbonato e uma grande variedade de sulfetos e sulfossais, são reconhecidos, mas a geração mais importante volumetricamente é concordante à estrutura S_1. Sulfetos e sulfossais são inter-relacionados nos veios e disseminados nas rochas encaixantes. Fontes ressedimentadas das grauvacas do setor oriental, de composições mista e félsica, gradam para rochas sedimentares pelágicas, já no setor norte, tendo rochas félsicas como fontes principais, transicionam para grauvacas da associação vulcanoclástica. Análises *in situ* de U-Pb e Lu-Hf realizadas em zircão detrítico sugerem que os eventos Rio das Velhas II e Mamona registram as principais épocas fonte de sedimento para ambos os setores. Zircões de idade proterozoica foram identificados intercalados nas sequencias turbidíticas arqueanas. Variações nas análises isotópicas Lu-Hf suportam o modelo que a evolução do embasamento ocorreu envolvendo fontes crustais e mantélicas. Analyses de LA-ICP-MS realizadas *in situ* em cristais de arsenopiritas, piritas e pirrotitas, nos níveis de pelitos carbonosos do lineamento Córrego do Sítio, mostram uma considerável variedade composicional dos elementos traços. Dois estágios hidrotermais são reconhecidos: Cedo hidrotermal, marcado pelo desenvolvimento de sulfetos porosos, durante o qual algum ouro foi precipitado; estágio principal-a-tardio, reconhecido pelo desenvolvimento de sulfetos lisos, onde ocorre o pico do ouro. A concentração dos elementos As, Co, Ni, Te, Pb e Sb nas arsenopiritas porosa e lisa, principal estágio da mineralização aurífera, possui importante implicação para a exploração de depósitos hospedados em turbiditos. A fonte mista para as rochas hospedeiras podem explicar possuir o fato do ouro ter correlação com Se, As, Sb e Te, elementos de filiação sedimentar, assim como Co, Ni, e Pt de filiação máfica-ultramáfica. Arsênio, seguido por Ni e Co, é o elemento tração mais importante nos principais sulfetos auríferos, pirita porosa e lisa (P-Py and S-Py) e arsenopirita porosa e lisa (P-Apy and S-Apy), dos depósitos de Laranjeiras e Cachorro Bravo. Estes elementos provavelemente foram lixiviados durante a alteração hidrotermal, indicando uma fonte local para os metais e fluidos durante a mineralização aurífera.

Palavras-chave: Ouro orogênico, depósitos hospedados em rochas metaturbidíticas, geoquímica, geocronologia U-Pb, análises Lu-Hf, paragênese hidrotermal, associação ressedimentada, *Greenstone belt* Rio das Velhas.

ABSTRACT

The Rio das Velhas greenstone belt is located in the Quadrilátero Ferrífero district, in the southern extremity of the São Francisco Craton, central-southern part of the State of Minas Gerais, SE Brazil. Turbidite sequences of the greenstone stratigraphy are largely distributed in region, and represent resedimented associations dominated by alternating graywackes and pelites, with parallel to discordant metamafic dikes and sills. The Córrego do Sítio lineament in the eastern sector hosts important turbidite gold deposits. On the other hand, similar rocks overlying the area of the Cuiabá-Lamego BIF-hosted gold deposits are loci only to historical diggings and occurrences, in the northern sector of the Quadrilátero region. A study of geology and rocks paragenesis has been conducted at the Córrego do Sítio auriferous lineament, focusing the Cachorro Bravo, Laranjeiras and Carvoaria turbidite-hosted gold deposits, described to illustrate the essentially similar general character of all the deposits of the eastern sector lineament, where, for the Cachorro Bravo deposit, a geological mapping included two underground mine galleries. Different vein types of veins and veinlets are recognized, but the most important volumetrically is a S_1-concordant type characterized by smoky and milky quartz-carbonate-sulfide ± sulfosalts veins. The resedimented mixed and felsic sources of eastern greywackes grade into pelagic sedimentary rocks, while mainly felsic source of northern graywackes are transitional with the volcaniclastic association graywackes. The in situ U–Pb and Lu-Hf detrital zircon analyses suggest the Rio das Velhas II and Mamona events as main periods of sources for both sectors. Proterozoic ages are also identified as zircon sources for the turbidites sequences, intercalated with the Paleoarchean and Archean data. Variations in Lu-Hf isotope analyses support the idea that the evolution of the basement was made by crust-mantle mixing processes. In situ LA-ICP-MS analyses of arsenopyrites, pyrites and pyrrhotites from carbonaceous pelites on Córrego do Sítio lineament, display a considerable range of trace element compositions. Two hydrothermal stages are recognized: Early hydrothermal, marked by the development of porous sulphides, during which some gold precipitation took place; Main to late hydrothermal, recognized by the development of smooth sulphides, with gold peaking its values. The As, Co, Ni, Te, Pb and Sb concentration in porous and smooth arsenopyrite from the main stages of gold mineralization has important implications for the exploration of the deposits. The mixed source for the host rocks may explain why gold correlates correlates to Se, As, Sb and Te of sedimentary affiliation, as well as to the mafic-ultramafic elements Co, Ni, and Pt. Arsenic is the most abundant trace element in Au-bearing porous and smooth pyrite (P-Py and S-Py) and porous and smooth arsenopyrite (P-Apy and S-Apy), of the Laranjeiras and Cachorro Bravo deposits, followed by Ni and Co. These elements were probably leached during hydrothermal alteration indicating a local metal and fluid source during gold mineralization.

Keywords: Orogenic gold, Metaturbidite-hosted gold deposit, geochemistry, U-Pb geochronology, Lu-Hf analyses, hydrothermal paragenesis, resedimented association, Rio das Velhas greenstone belt.

PARTE I – INTRODUÇÃO, CONTEXTO GEOLÓGICO, EVOLUÇÃO DO CONHECIMENTO E APRESENTAÇÃO DA TESE

1 INTRODUÇÃO

A região do Quadrilátero Ferrífero é um polígono irregular, localizado na porção centro-sul do estado de Minas Gerais, imediatamente a sul de Belo Horizonte. Em seu interior estão os complexos granito-gnáissicos arqueanos e proterozoicos, o *greenstone* belt Rio das Velhas (Arqueano), os Supergrupos Minas e Espinhaço, ambos do Proterozoico (Figs. 1.3, 2.1 e 3.1).

A produção de ouro na sequência *greenstone belt* arqueana, na região do Quadrilátero Ferrífero, é importante em nível mundial (*e.g*., Ribeiro-Rodrigues, 1998), sendo os depósitos hospedados em formações ferríferas bandadas (FFB), historicamente entre os mais importantes (Lobato et al., 2001). Estes autores estimaram que apenas 4% de toda a produção de ouro do Supergrupo Rio das Velhas não é relacionada à FFB e ao conjunto rochoso hidrotermal conhecido como lapa seca; essa produção de 4% advém de rochas máficas-ultramáficas, vulcanoclásticas e clásticas em geral.

O Supergrupo Rio das Velhas de idade arqueana, é historicamente dividido nos grupos Nova Lima (base) e Maquiné (topo), em rochas metamorfisadas na fácies xisto verde (e.g., Dorr, 1965, 1969; Ladeira, 1991; Baltazar e Silva, 1996; Zucchetti e Baltazar, 1998; Lobato et al., 2005; Zucchetti e Baltazar, 2000, Baltazar e Zucchetti, 2007). Para fins de facilitar a apresentação do texto, o prefixo meta é subtraído de uma forma geral dos nomes das rochas mencionadas.

A estratigrafia do Supergrupo Rio das Velhas ainda pode ser subdividida em sete associações de litofácies sedimentares, conforme proposta de Baltazar e Zucchetti (2007). Com base nestes autores, Martins et al. (2016) calculou uma espessura aproximada de 5.550 m de sedimentos clásticos, vulcanoclásticos e clasto-químicos, classificando o *greenstone belt* Rio das Velhas como dominantemente sedimentar, o que já fora apontado por Baars (1997).

O lineamento Córrego do Sítio (Ribeiro et al., 2015; Roncato et al., 2015; Lima, 2012), aqui denominado setor leste, representa uma estrutura regional de orientação NE-SW, onde ocorre uma sequência turbidítica com intercalações de grauvacas e pelitos que registram sequências de Bouma incompletas. Esta sequência localmente hospeda importantes depósitos (Figs. 2.2 e 3.1) auríferos com recursos estimados em cerca de 5,12 Moz (Sequetto-Pereira et al., 2013; Roncato et al., 2015) e uma produção média prevista em 140.000 onças por ano, explorados a céu aberto e no subterrâneo pela empresa Anglogold Ashanti Córrego do Sítio Mineração-AGABM.

A área dos depósitos auríferos Cuiabá e Lamego, com suas minas subterrâneas também exploradas pela AGABM, está localizada próxima à cidade de Sabará (Figs. 1.1, 2.1 e 3.1). Neste trabalho, essa

área é referida como setor norte.

O setor leste situa-se a aproximadamente 35 km sudoeste do município de Santa Bárbara e 120 km distante de Belo Horizonte, estado de Minas Gerais. O acesso principal ocorre pelas BR 381 e MG's 381 e 436, resultando em aproximadamente 90 km a partir da capital mineira. O acesso ao setor norte é realizado a partir de Belo Horizonte em direção à cidade de Sabará pela MG-262, distando aproximadamente trinta e cinco quilômetros (Figura 1.1).

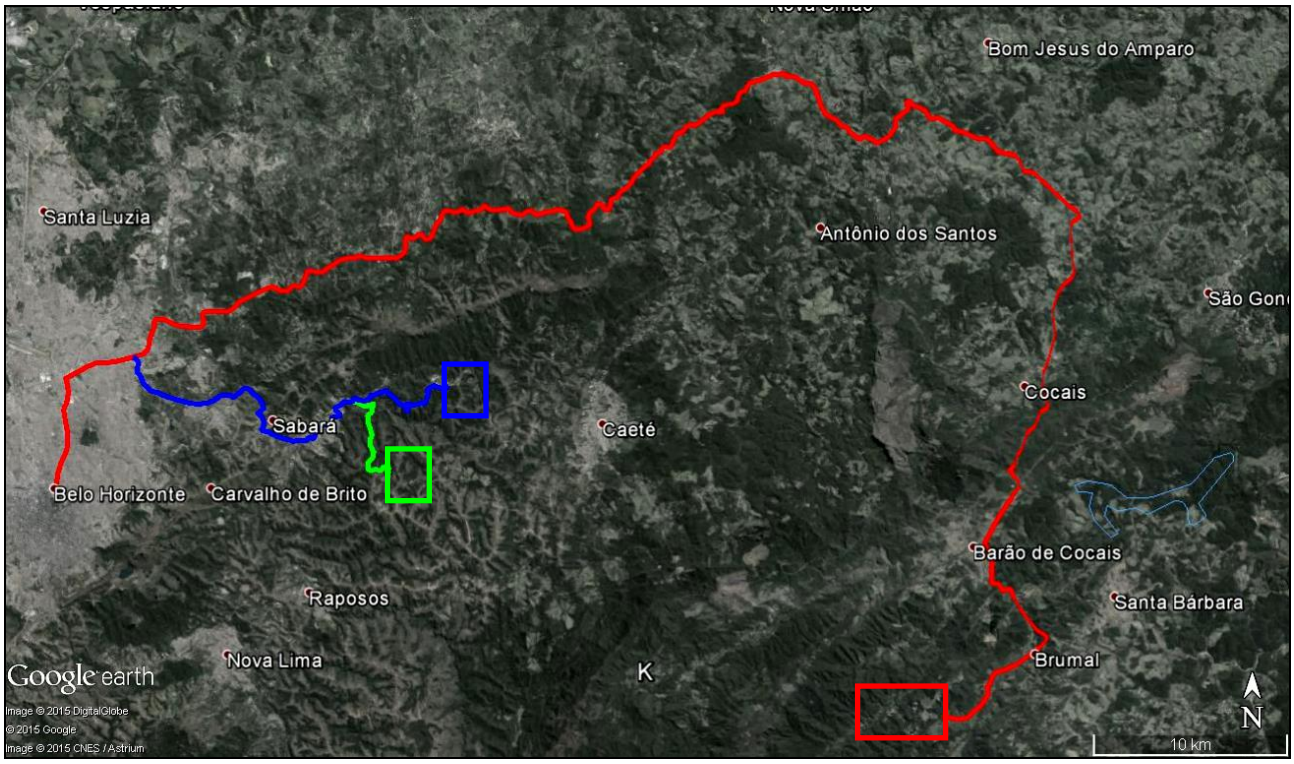


Figura 1.1- Mapa de localização das áreas estudadas e principais vias de acesso. Em vermelho, acesso ao setor leste (minas no lineamento Córrego do Sítio); o acesso ao setor norte é marcado pelas cores azul (Mina de Cuiabá) e verde (Mina de Lamego).

1.1 Objetivos

A linha condutora dessa tese de doutorado é o estudo de rochas da associação ressedimentada (Baltazar e Zucchetti, 2007) do Supergrupo - *greenstone belt* - Rio das Velhas do Quadrilátero Ferrífero, hospedeira de ouro nesse distrito mineral. Para tanto, sequências rochosas turbidíticas foram selecionadas nos setores leste e norte (Fig. 1.1), com objetivo de construir um modelo de evolução para ambos setores, em especial no tocante às implicações para a mineralização aurífera.

No lineamento Córrego do Sítio, setor leste, foco principal deste estudo, fez-se um estudo detalhado da mineralização aurífera e paragênese mineral, associado a dados geológicos, estratigráficos,

estruturais, petrográficos, litoquímicos, geocronológicos, além de análises de ablação a *laser in situ ICP-MS* em sulfetos das jazidas Laranjeiras e Cachorro Bravo. Para o cumprimento desses objetivos, o mapeamento inicial visou esclarecer relações estratigráficas e estruturais, com foco em dois diferentes níveis da jazida Cachorro Bravo, além de um entendimento petrográfico e paragenético dos depósitos do lineamento aurífero.

Como parâmetro de comparação, no setor norte foram realizados estudos petrográficos, litoquímicos e geocronológicos nas rochas turbidíticas da associação ressedimentada. Com isso, caracterizam-se diferenças geoquímicas e isotópicas, bem como proveniência e a idade de suas diferentes áreas fonte, entre os setores leste e norte. Busca-se assim um melhor entendimento desse conjunto de rochas sedimentares arqueanas da associação ressedimentada na região do Quadrilátero Ferrífero, e seu possível impacto na exploração para depósitos auríferos, já que essa sequência clástica hospeda mineralizações no setor leste e registra ocorrências históricas no setor norte.

1.2 Trabalhos anteriores e evolução dos conhecimentos

1.2.1 Depósitos auríferos

Depósitos auríferos tipo *lode* são descritos por Groves e Foster (1993) como característicos do Arqueano, mais especificamente por volta de 2,65 Ga. São típicos de zonas metamórficas em orógenos compressionais. Estes depósitos foram classificados de diferentes formas ao longo da história, sendo a classificação adotada por Groves e Foster (1993) e utilizada neste trabalho, onde os depósitos são classificados pela profundidade e associados a diferentes fácies metamórficas. Groves et al. (1998) adotam o termo orogênico para depósitos auríferos em regime variando de compressional a transpressional, em profundidades que variam desde 15 km até aproximadamente 3 km sob a superfície (Poulsen et al., 2000; Goldfarb et al., 2005; Robert et al., 2005; Dubé e Gosselin, 2007; Groves e Santosh, 2015, Goldfarb e Groves, 2015).

A associação de grandes depósitos mundiais de ouro, responsáveis pela maioria da produção desse metal, vem de domínios de fácies xisto verde médio a superior, cuja transição rúptil-dúctil é característica (*e.g.*, Sibson et al., 1988). As profundidades relativas aos depósitos são classificadas como epizonal, quando rasos e (< 6 km), mesozonal (6 a 12 km) e hipozonal (> 12 km).

Greenstone belts com depósitos auríferos de variados potenciais são distribuídos de forma irregular por todo o mundo. Quando os depósitos são comparados através do tempo geológico, ocorre uma concentração de mineralizações conhecidas entre 2800-2550 Ma, 2100-1800 Ma e 600-50 Ma (Goldfarb et al., 2005). Torna-se evidente uma intensa mineralização aurífera no Neoarqueano, na

faixa de 2.65 ± 0.5 Ga. Os depósitos mais jovens são menos comuns, pois ainda estão gradualmente sendo formados ou expostos (Goldfarb et al., 2005), não existindo depósitos gigantes mais jovens que 50 Ma (Goldfarb e Groves, 2015).

Mineralizações auríferas em ambiente orogênico são associadas comumente a zonas de cisalhamento, e são regidas por variações nos regimes de tensão regional e pela competência, e/ou, pelo contraste de competências, entre as diferentes rochas hospedeiras (Sibson et al., 1988). Esta característica pode ser facilmente notada pela intensa ocorrência de mineralizações em contatos entre rochas de diferentes reologias. Alguns depósitos podem apresentar canais preferenciais associados a zonas de cisalhamento e outras zonas planares (Sibson et al., 1988).

1.2.2 Mineralizações auríferas em rochas sedimentares

Pouco conhecidos no Brasil, depósitos auríferos em rochas sedimentares arqueanas são conhecidos em orógenos paleozoicos, *e.g.* Lachlan *fold belt*, província de Vitória (Bierlein et al., 1998), Austrália; e arqueanos (*e.g.*, Quetico *metasedimentary belt*; *e.g.*, Li et al., 1998). Segundo dados da Goldoz Australian (https://www.goldoz.com.au/), o principal depósito desta província, Bendigo, ocupa o segundo lugar na produção de ouro do país. Porto (2008) e Bierlein et al. (1998, 2001) citam outros depósitos mesotermais de ouro hospedados em rochas turbidíticas: Otago Goldfield (Nova Zelândia); Salsigne (França); Cariboo District e Meguma Terrane (Canadá); Sabie-Pilgrim's Rest Goldfield, Transval (África do Sul), Muruntau (Uzbequistão) e Clontibret (Irlanda).

Sucessões turbidíticas em sequências vulcanossedimentares tipo *greenstone* ocorrem nos crátons arqueanos Pilbara e Yilgarn (Austrália), Slave e Superior (Canadá) (Sawyer 1986, Fontaine et al., 2015, Beauchamp et al., 2015). Esses turbiditos estão seguidos localmente por vulcanismo félsico, e foram depositados anteriormente ou sincronicamente ao primeiro evento deformacional (Anhaeusser, 2014).

No cráton Slave, Canadá, as sequências sedimentares arqueanas hospedam pequenos prospectos, como os depósitos de ouro Randalls e Karnilbinia, hospedados em horizontes de FFB subordinados da formação Mount Belches (Sawyer, 1986). Turbiditos são importantes produtores de ouro, onde os depósitos do Quetico *metasedimentary belt* (Sawyer, 1986) e o depósito Roberto, de classe mundial (Fontaine et al., 2015), são exemplos. A descoberta do depósito Roberto em 2004 aumentou consideravelmente o interesse de empresas de mineração nessa província (Beauchamp et al., 2015).

No terreno granito-*greenstone* de Pilbara (Austrália), alguns dos mais importantes depósitos de ouro

aparecem nas sequências turbidíticas do grupo De Grey (idade ca 3000–2940 Ma), sendo os mais conhecidos os distritos auríferos das formações Mosquito Creek e Mallina (Huston et al., 2001). Os principais minérios associam-se com zonas de cisalhamento e contatos falhados entre unidades de rochas contrastantes. Idades modelo Pb-Pb entre 2950±5 e 2900±10 Ma foram obtidas para a mineralização do grupo De Grey, sugerindo dois eventos de mineralização (Huston et al., 2001). Segundo os mesmos autores, o depósito *lode gold* Withnell é o principal deste cráton, e o seu minério compreende quartzo, carbonato, sericita e feldspato com quantidades variáveis de pirita, clorita, arsenopirita, rutilo, calcopirita, galena e esfalerita. Esta paragênese é muito semelhante à das jazidas do lineamento Córrego do Sítio, setor leste.

No cráton Zimbábue, depósitos associados a turbiditos estão no grupo Shamvaim do *greenstone belt* Bindura Shamva. São parecidos em idade, composição e posição estratigráfica com os do *greenstone belt* da Província Superior do Canadá (Beauchamp et al., 2015).

As unidades litológicas supracitadas são similares às unidades que contêm a mineralização aurífera dos depósitos no lineamento Córrego do Sítio e às unidades que recobrem os depósitos Cuiabá e Lamego, nos setores leste e norte, respectivamente.

1.2.3 Exemplos de depósitos auríferos no *greenstone belt* Rio das Velhas

Dentre as diferentes sete litofácies sedimentares de Baltazar e Zucchetti (2007), a associação ressedimentada é importante hospedeira de mineralização aurífera no lineamento Córrego do Sítio (Ribeiro et al., 2015, Roncato et al., 2015, Lima, 2012). Também registra ocorrências históricas na área de Cuiabá-Lamego (*e.g.*, Vial et al., 2007)

No setor leste do QF são reconhecidos lineamentos regionais NE-SW (Martins Pereira et al., 2007, Porto, 2008, Lima, 2012), contendo depósitos de ouro com recursos da ordem de 5,12 Moz (Sequetto-Pereira et al., 2013; Roncato et al., 2015). Estes representam os mais importantes depósitos de ouro hospedados em turbiditos no distrito do QF, com ou sem FFB associada. As ocorrências em turbiditos nesses lineamentos foram descobertas na década de 1980, e produziram ouro em operações a céu aberto entre 1990-2001. Em 2002, a extração subterrânea teve início, operada até o momento pela AngloGold Ashanti Córrego do Sítio Mineração (Porto, 2008, Sequetto Pereira et al., 2013). Os depósitos de ouro na sequência turbidítica do lineamento Córrego do Sítio representam os mais importantes em rochas clásticas do Arqueano do QF. São dezesseis escavações e depósitos, incluindo Cachorro Bravo, Laranjeiras e Carvoaria (Figs. 2.2, 3.1; Roncato et al., 2015). O depósito Cachorro Bravo é o mais produtivo, com teor de 7,65 g/t, seguido por Carvoaria

(6,69 g/t) e Laranjeiras (6,32 g/t), representando 25%, 18%, e 37% das reservas totais, respectivamente. O depósito São Bento hospedado em FFB está localizado no limite NE do lineamento, com uma produção histórica de 56,2 toneladas de 1986 a dezembro de 2006 (Martins Pereira et al., 2007).

O depósito aurífero *world-class* Cuiabá (*e.g.* Ribeiro-Rodrigues et al., 2007, Lobato et al., 2005) contém 150 toneladas de ouro (5 Moz produzido até 2015 e mais 7 Moz em recursos minerais; AGA, comunicação pessoal). O depósito de ouro orogênico Lamego (reservas aproximadas de 1,3 milhões de onças contidos em 7,26 g/t Au; Martins et al., 2016) está localizado na extremidade sudoeste da área Cuiabá-Lamego (Fig. 1.1).

Os depósitos do setor norte são hospedados em rochas das associações vulcano-química e clasto-química, com vulcânica máfica, *chert* e FFB, pelitos carbonoso e micáceo (*e.g.*, Martins et al., 2016). No caso de Cuiabá-Lamego, rochas da associação ressedimentada recobrem toda a área dessas duas minas. Embora nenhum depósito importante de ouro tenha operado em rochas dessa associação do setor norte, uma série de escavações antigas é historicamente conhecida, como as minas Descoberto de Cuiabá e Biquinha (Vial et al., 2007). Pode-se também mencionar outras ocorrências importantes como Viana, São José, Cristais, Herberth Martins, Capão, Brumado, Enforcado e Galinha.

Outras ocorrências de ouro hospedadas em turbiditos são também descritas, incluindo Engenho de Baixo, Sobradinho, Engenho Velho e Serra do Paraíso. O lineamento estrutural Paciência ainda hospeda as ocorrências de Olhos d'agua e Crista (Figs. 2.1 e 3.1).

1.3 Geologia da região do Quadrilátero Ferrífero

O QF localiza-se no extremo sudeste do Cráton São Francisco (Figs. 1.2; tabela 1.1), e compreende três grandes domínios tectono-estratigráficos: terrenos granito-gnaissicos-TTG; seqüência do tipo *greenstone belt*-Supergrupo Rio das Velhas (Fig. 1.3; tabela 1.1); e sequências supracrustais, sedimentares clásticas e químicas, englobando o Supergrupo Minas, o Grupo Sabará, o Grupo Itacolomi e o Supergrupo Espinhaço (Eschwege, 1922; Dorr, 1965, 1969; Ladeira, 1991; Baltazar e Silva, 1996; Zucchetti e Baltazar, 1998; Lobato et al., 2001, 2005; Zucchetti e Baltazar, 2000, Baltazar e Zucchetti, 2007).

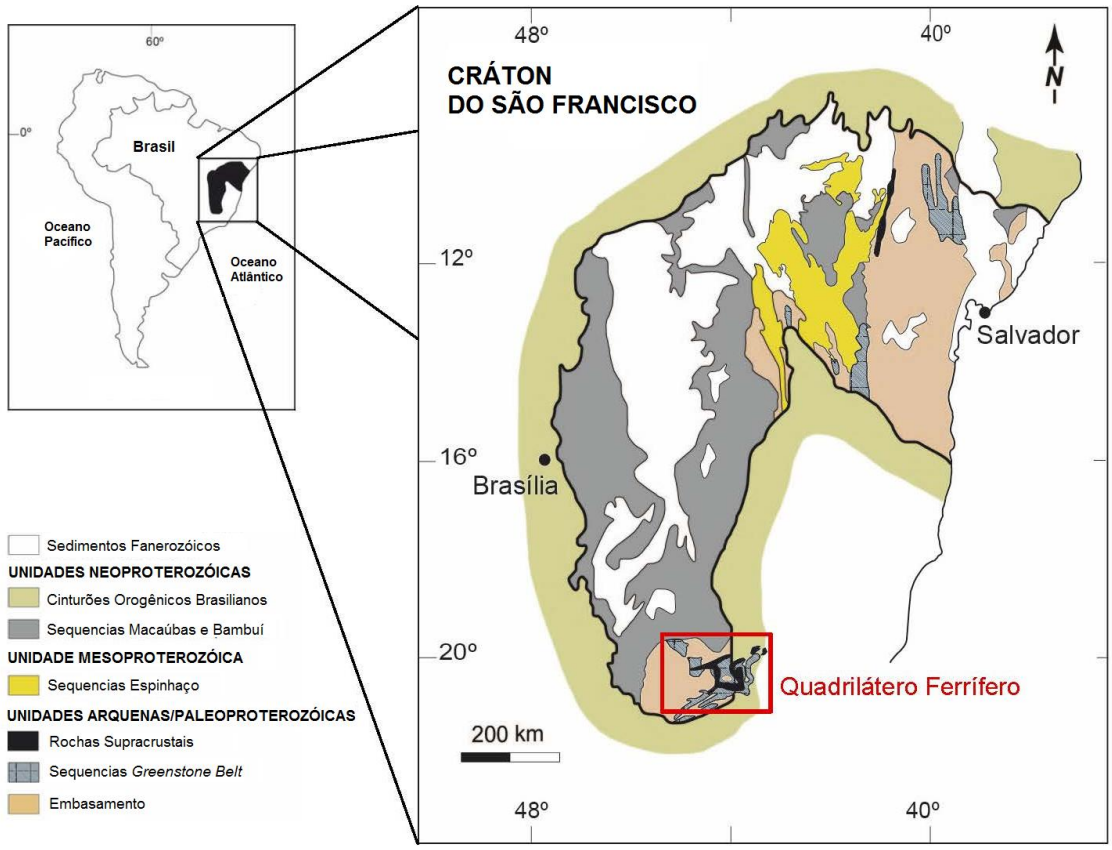


Figura 1.2. Localização do Quadrilátero Ferrífero no extremo sul do Cráton do São Francisco. Modificado de Alkmin e Martins-Neto, 2012.

Dorr et al. (1969) realizaram mapeamento em escala 1:25.000 da região do QF. Estes dados foram posteriormente compilados em escala 1:150.000 pelos mesmos autores, no âmbito do convênio DNPM / USGS. Recentemente, alguns trabalhos sintetizaram e apresentaram novas propostas de entendimentos sobre a região, onde um mapa de compilação foi publicado por Lobato et al. (2005).

O Supergrupo Rio das Velhas (Fig. 1.3; tabela 1.1), unidade focalizada neste trabalho, representa a sequência metavulcanossedimentar hospedeira das principais jazidas de ouro de Minas Gerais (Lobato et al., 2001; 2005).

Zucchetti e Baltazar (2000) dissertam sobre o Grupo Nova Lima, o qual é representado em sua unidade basal por um magmatismo máfico-ultramáfico (*e.g.*, Schorscher, 1982), quimicamente compatível com basaltos modernos tipo NMORB (*normal mid-ocean ridge basalt*); basaltos komatiíticos; e ultramáficas com texturas *spinifex* e cumuláticas. Rochas sedimentares químicas, espessas ocorrências de pelitos carbonosos e rochas sedimentares clásticas compõem as unidades intermediária e superior, ocorrendo de forma ampla nas áreas amostradas neste estudo.

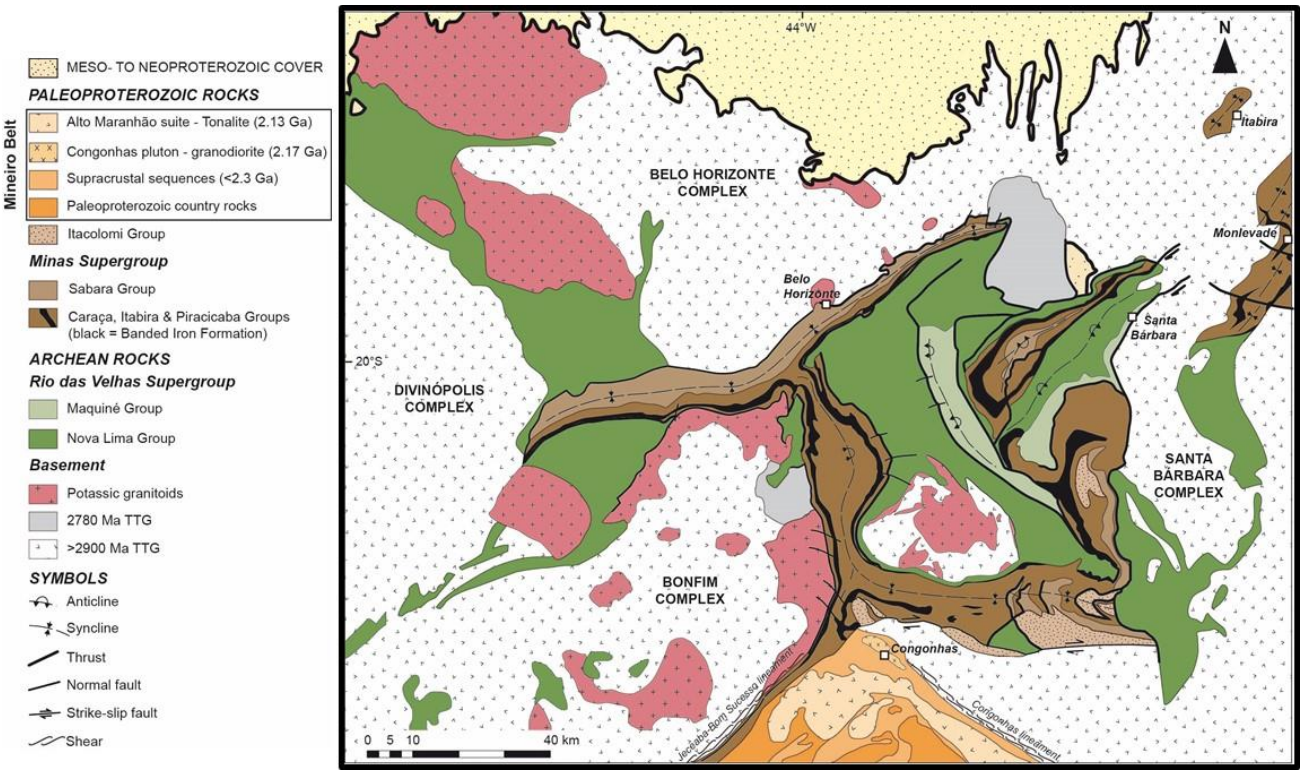


Figura 1.1. Mapa geológico do Quadrilátero Ferrífero. Modificado de Alkmim and Marshak (1998) e Farina (2015).

As sequências sedimentares discutidas por Zucchetti e Baltazar (2000) registram rochas vulcanoclásticas representadas por tufos e aglomerados dacíticos, além de lavas cálcio-alcalinas. Rochas sedimentares vulcanogênicas, piroclásticas e epiclásticas possuem ocorrência restrita. Localmente ocorrem rochas sedimentares de fonte mista, representadas por pelitos, psamitos, grauvacas e raros registros de paraconglomerado, em sequência turbidítica (Ladeira, 1991). Detalhamentos sobre a geologia regional do QF e, principalmente do Supergrupo Rio das Velhas, foco desta tese, são descriminados nos itens 2.2, 2.3, 3.2 e 3.3.

O embasamento cristalino é constituído por gnaisses de idade entre 3,0 e 2,6 Ga, retrabalhado entre 2,22 e 2,05 Ga pela orogênese Riaciana (Brito Neves, 2011). Este evento formou os domos que interceptaram as sequências supracrustais mais recentes (Machado et al., 1989; Alkmin e Marshak, 1998). As rochas do Supergrupo Rio das Velhas são englobadas nos Grupos Nova Lima e Maquiné. O Grupo Nova Lima é composto por rochas com idade de 2,77 Ga (Tabela 1.1; Machado et al., 1989).

A sequência paleoproterozoica é representada pelo Supergrupo Minas, composto por rochas sedimentares de plataforma, sobrepondo em contato discordante o Supergrupo Rio das Velhas

(Dorr, 1969). Os grupos Caraça, Itabira, Piracicaba e Sabará subdividem o Supergrupo Minas (Dorr, 1969; Tabela 1.1). Em discordância erosiva com o Grupo Piracicaba, o Grupo Sabará possui idade Riaciana (zircão detrítico; Machado et al., 1989) de 2,13 Ga, aproximadamente. Os sedimentos Sabará são representados por uma sequência *flysch* (grauvacas, pelitos, diamictitos, conglomerados e rochas vulcânicas félsicas a intermediárias (Tabela 1.1; Dorr, 1969).

1.3.1 Associações de Litofácies Sedimentares

O estudo integrado das rochas vulcânicas e sedimentares do Supergrupo Rio das Velhas possibilitou o agrupamento de diversas litofácies identificadas em associações, características de ambientes de deposição típicos de terrenos *greenstone belts* por Zucchetti e Baltazar (2000).

Os autores, além de Baltazar e Zucchetti (2007), sugerem a subdivisão das rochas do Supergrupo Rio das Velhas em sete associações de litofácies, separadas pela sucessão estratigráfica e geneticamente relacionadas, conforme aqui descritas da base para o topo:

- Associação de rochas vulcânicas máficas a ultramáficas;
- Associação sedimentar vulcânica e química;
- Associação sedimentar clástica química;
- Associação vulcanoclástica com quatro litofácies (monomítica e polimítica, brechas e conglomerados, grauvacas, grauvacas-arenitos, grauvacas-argilitos);
- Associação ressedimentada (detalhada no item 1.3.1.1) incluindo três sequências de grauvacas a argilitos (na porção norte do QF as rochas predominam na fácies metamórfica xisto verde, enquanto ao sul na fácies anfibolito);
- Associação costeira com quatro litofácies (arenitos com estratificação de média a grande escala, arenitos com *ripple-marks*, arenitos com estratificação cruzada acanalada, arenitos e siltitos)*;*
- Associação não-marinha com litofácies de conglomerados e arenitos, arenitos de granulação grossa, arenitos de granulação fina a média.

Tabela 1.1. Coluna estratigráfica e geocronológica simplificada e modificada de Ladeira (1980), Machado et al. (1996) e Lima (2012).

Idade	Supergrupo	Grupo	Formação	Litotipos
	Espinhaço			Rochas sedimentares clásticas marinhas.
2.06 Ga		Itacolomi		Orto e protoarenitos, conglomerados. Fácies Santo Antônio: pelitos, arenito, conglomerado.
Discordância erosiva e angular profunda				
2,12 Ga		Sabará	Indiviso	Grauvacas, xistos cloríticos, pelito, rochas vulcânicas, conglomerados, arenitos e subordinadas lentes de formação ferrífera.
Discordância erosiva local				
	Supergrupo Minas		Barreiro	Pelitos e pelitos grafitosos.
			Taboões	Ortoarenitos
			Fecho do Funil	Pelito dolomítico e quartzoso, dolomitos silicosos.
		Piracicaba	Cercadinho	Arenito ferruginoso, aenito, pelitos, pelito ferruginoso, subordinadas lentes de conglomerados e dolomitos.
2,42 Ga		Itabira	Gandarela	Dolomito e subordinadas lentes de calcários, itabirito dolomítico, pelito dolomítico.
2,50 Ga			Cauê	Itabiritos quartzozos, dolomíticos e anfibolíticos; subordinadas lentes de pelitos e dolomitos.
2,66 Ga		Caraça	Batatal	Pelitos, pelito grafitoso, subordinadas lentes de chert, e FFB rica em óxidos de Fe.
			Moeda	Ortoarenitos, *grit*, conglomerados, pelitos, arenitos sericíticos, pelitos, protoarenitos.
Discordância erosiva e angular				
	Supergrupo Rio das Velhas	Maquiné	Casa Forte	Protoarenitos, conglomerado, subordinadas lentes de pelitos e subgrauvacas.
			Palmital	Pelitos, pelito quartzoso, protoarenito, grauvaca, subordinadas lentes de conglomerado na base.
2,77 Ga		Nova Lima	Sub-unidade Superior	Grauvacas e pelitos carbonosos, arenitos imaturos, quartzo pelitos e subordinadas lentes de conglomerados.
			Sub-unidade Intermediária	Pelitos carbonosos, cloríticos e tufáceos com inúmeras lentes de FFB.
2,78 Ga			Sub-unidade Inferior	Xistos verdes, basaltos espilitizados, xistos tufáceos, rochas ultramáficas.
		Quebra Ossos	Indiviso	Lavas komatiíticas e toleiíticas, sedimentos clásticos, químicos, vulcânicos e vulcanoclásticos
3,2 Ga	Complexo TTG – domos granito-gnaisse-migmatíticos			

1.3.1.1 Associação de litofácies ressedimentada (Zucchetti e Baltazar, 2000)

A associação ressedimentada, detalhada neste item, possui a maior área de ocorrência dentro no *greenstone belt* Rio das Velhas, dentre todas as demais associações (Fig. 1.4), sendo representada pelas unidades mapeadas até então como: Córrego do Sítio, Mindá, Catarina Mendes, Fazenda Velha e Córrego da Paina. Esta associação será também particularizada nos itens 2.2, 2.3, 3.2 e 3.3.

A associação ressedimentada contém camadas com espessuras variando de subcentimétricas até 50 cm, gradação granodecrescente dentro de cada ciclo, com granulometria de areia grossa com grânulos, na base, até argila carbonosa, no topo, sendo os contatos bruscos entre os ciclos. As estruturas primárias são estratificação horizontal plano-paralela e cruzada tabular, de pequeno porte, sendo essas características bem expostas no setor leste da área de estudo.

Também se caracteriza por apresentar ciclicidade, gradação interna dos ciclos e contatos abruptos entre si. É interpretada como resultante de deposição por correntes de turbidez, com identificação inclusive de divisões incompletas do ciclo de Bouma (1962). Resulta de deposição por correntes de turbidez de alta e baixa densidades, sendo que os conglomerados da região sul teriam se depositado em águas profundas, podendo se originar da erosão de conglomerados depositados previamente por fluxos hiperconcentrados.

Na porção sul do QF (unidades Catarina Mendes, Córrego da Paina e Fazenda Velha), a associação ressedimentada difere das demais áreas, sendo composta essencialmente por grauvacas carbonáticas, com intercalações comuns de rochas cálcio-silicáticas e corpos expressivos de marga. São verificados, também, níveis espessos de conglomerado polimítico, com clastos estirados, em sua maioria de rochas vulcânicas ácidas.

Baltazar e Zucchetti (2007) propõem uma evolução para o *greenstone belt* Rio das Velhas, sugerindo ciclos tectono-estratigráficos em suas associações de litofácies:

(*i*) 2,8 – 2,78 Ba: Fase distensional com derrame de lava basáltica durante o desenvolvimento do assoalho oceânico;

(*ii*) 2,78 – 2,76 Ba. Início da fase de subducção. Complexos Caeté e Bonfim;

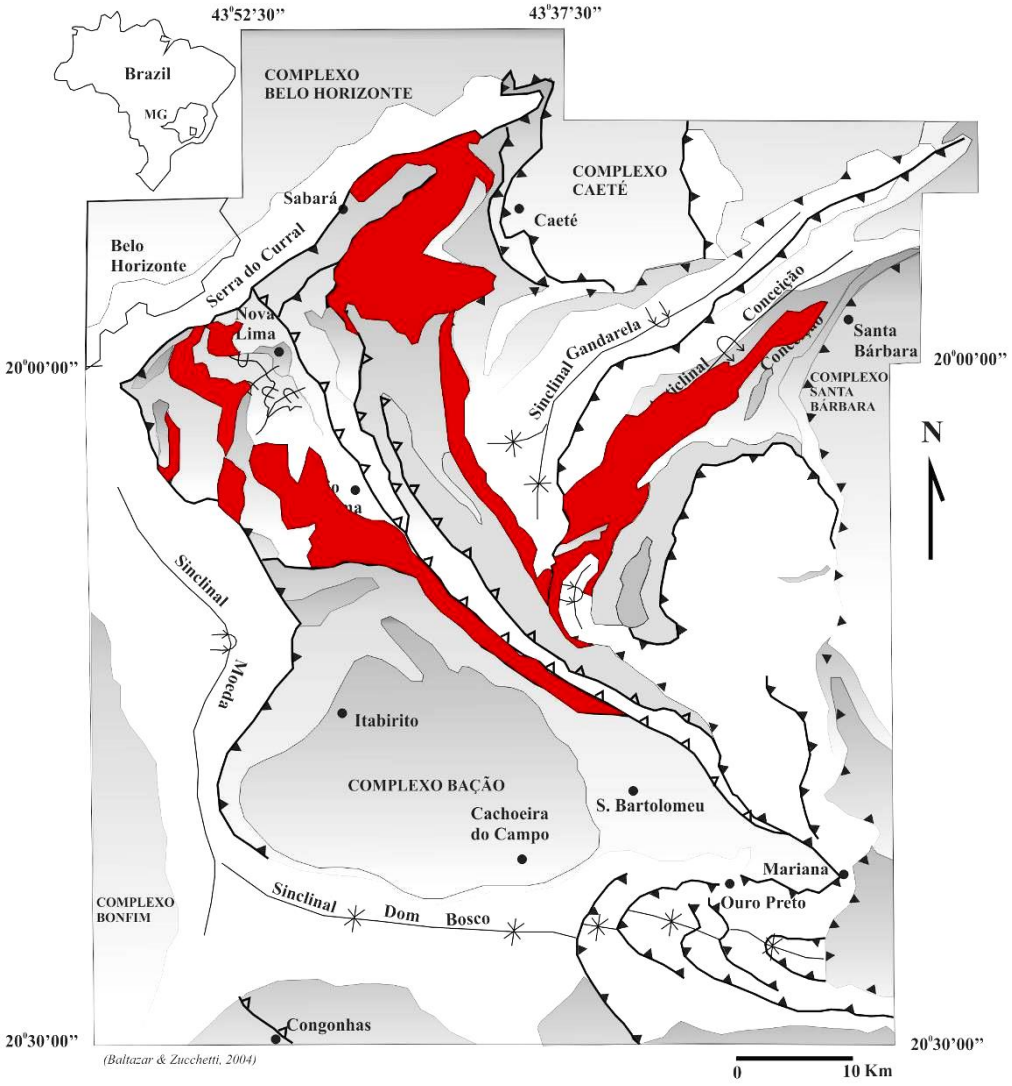


Figura 1.4. Ocorrência da associação ressedimentada, em vermelho, na região do Quadrilátero Ferrífero, segundo Zucchetti e Baltazar (2000) e Baltazar e Zucchetti (2007).

(*iii*) 2,76 – 2,75 Ba. Continuação da fase de subducção com vulcanismo félsico e deposição sedimentar de arenitos em margem continental estável distal e deposição de turbiditos próximos às zonas de subducção (Fig. 1.5);

(*iv*) 2,75 – 2,67 Ba. Fase de subducção avançada e colisão. Deposição de turbiditos em trincheiras e bacias de retro-arco. Deposição de sedimentos aluvio-fluviais em bacias de antepaís; mineralização aurífera. Posicionamento do Complexo Belo Horizonte.

(v) 2.60 – 2,67 Ba. Posicionamento dos corpos graníticos e granodioríticos em torno do QF, representando o último episódio de magmatismo no Neoarqueano;

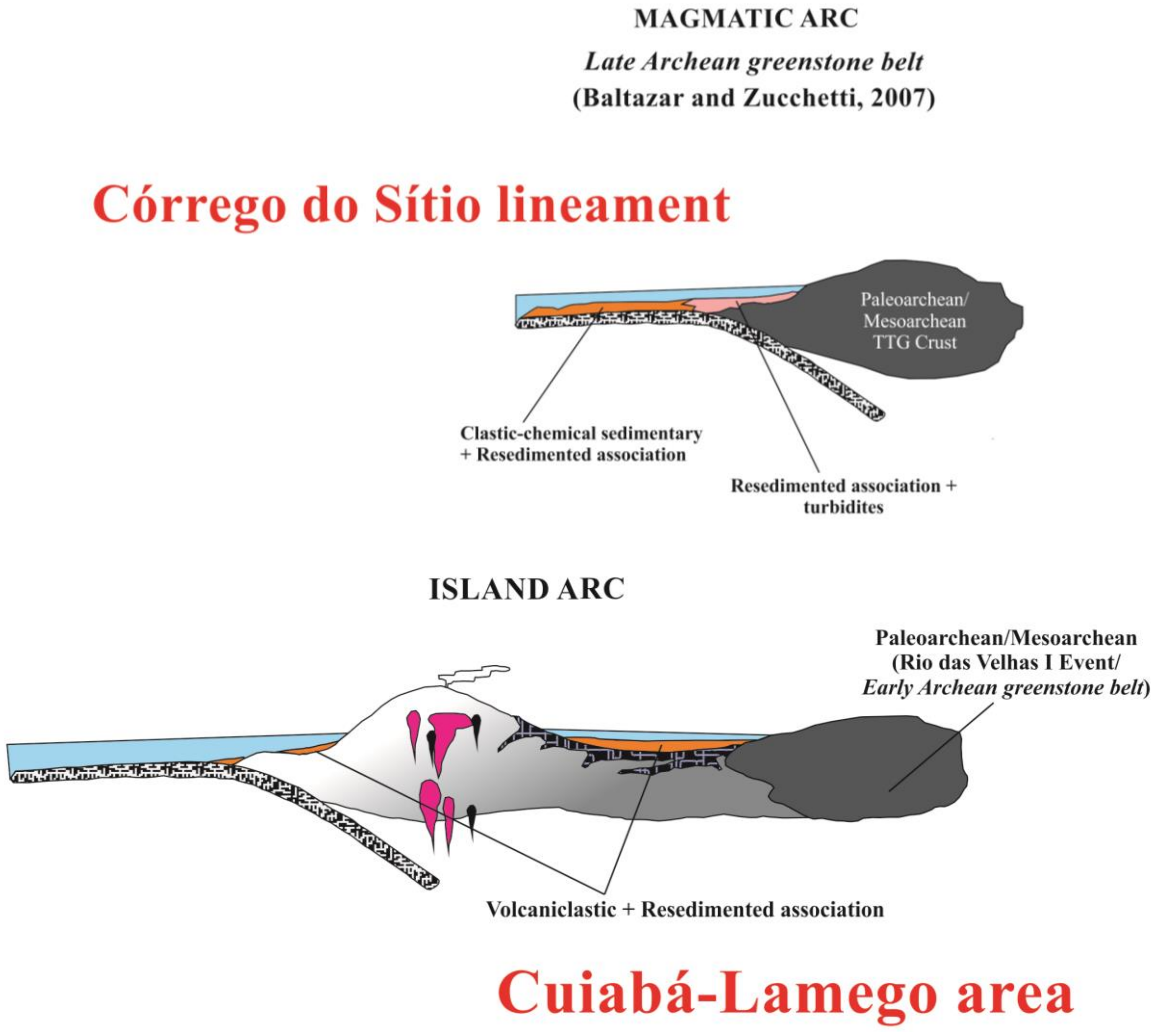


Figura 1.5. Ambiência geotectônica dos setores leste e norte, da associação ressedimentada (Roncato et al., submetido, item 3.10 dessa tese).

1.3.2 Lineamento Aurífero Córrego do Sítio – Setor Leste

A porção leste do QF (Figs. 1.3, 2.1 e 3.1) caracteriza-se pelo predomínio de unidades sedimentares, principalmente clásticas, químicas e vulcanoclásticas definidas pelas unidades Santa Quitéria, Córrego do Sítio e Mindá (Zucchetti et al., 1998; Zucchetti e Baltazar, 2000) do Grupo Nova Lima, essencialmente clásticas, além das rochas TTG migmatíticas do Complexo Santa Bárbara.

O Complexo Santa Bárbara encontra-se em contato tectônico com rochas do Supergrupo Rio das Velhas e do Supergrupo Minas (Figs. 1.3, 2.1 e 3.1), sendo interpretado como uma falha de empurrão de leste para oeste, cavalgando sobre os supergrupos Rio das Velhas e Minas (Alkmim et al., 1998; Ladeira, 1991; Noce et al., 1998).

Segundo Dorr (1969), a Unidade Quebra Ossos (*e.g.* Schorscher, 1982) ocorre numa faixa de direção NE-SW no segmento leste do lineamento, em contato tectônico a leste com o Complexo Santa Bárbara e a oeste com as outras unidades mais novas do Grupo Nova Lima. Na parte, sua direção inflete para NNW-SSE e aparece em contato tectônico também com arenitos do Grupo Maquiné, Supergrupos Rio das Velhas e Minas (Figs. 1.3, 2.1 e 3.1; Tabela 1.1).

A Unidade Santa Quitéria contém pelitos carbonosos e sericíticos, associados a faixas contínuas de FFB onde situam-se as minas Pilar, São Bento e Santa Quitéria (Lima, 2012, Roncato et al., 2015). Os contatos da unidade Santa Quitéria com as outras unidades do Supergrupo Rio das Velhas são predominantemente tectônicos, por falhas de empurrão.

Regionalmente observa-se a diminuição dos níveis de FFB e um predomínio de sequências turbidíticas com pelitos e grauvacas preservadas na Unidade Córrego do Sítio (Zucchetti e Baltazar, 2000), em contato transicional, que se posiciona estratigraficamente acima dessa unidade. Essa é a unidade com maior distribuição do Grupo Nova Lima em todo QF, constituída por espessa sequência turbidítica com acamamento gradacional de pelitos e grauvacas (Baltazar e Zucchetti, 2007).

Nesta porção leste do QF, os supergrupos Rio das Velhas e Minas são estruturalmente controlados pelas megaestruturas denominadas Sinclinal Gandarela e Anticlinal Conceição, e são cortados pelos sistemas de falha do Fundão e da Água Quente (Dorr, 1969; Lima, 2012; Sequetto-Pereira, 2013).

Lima (2012) propôs a denominação "lineamento aurífero Córrego do Sítio" para agregar ocorrências e depósitos que no mesmo alinhamento NE-SW e possuem mineralização aurífera com características litoestratigráficas semelhantes. O lineamento aurífero engloba as escavações Sangue de Boi, Descoberta, Santana, Barra Feliz, Anomalia 1 e Santa Quitéria; no sudoeste estão as anomalias geoquímicas Saracura e Serra Redonda, além dos depósitos Cachorro Bravo, explotado a céu aberto e no subterrâneo, Laranjeiras e Carvoaria, explotados somente no subterrâneo (Figs. 2.2 e 3.1).

O lineamento proposto por (Lima, 2012) engloba as zonas de cisalhamento Córrego do Sítio, Cristina e São Bento-Donana. Estes três grandes lineamentos regionais registram as mais importantes ocorrências auríferas hospedadas em turbiditos do distrito do QF. A mineralização desta região se caracteriza por veios de quartzo-carbonato-sulfeto com ouro livre, bertierita ($FeSb_2S_4$), arsenopirita (FeAsS), estibnita (Sb_2S_3), pirrotita ($Fe_{1-x}S$), pirita (Fe_2S), calcopirita ($CuFeS_2$), esfalerita (ZnS), além de traços de outros sulfetos e sulfossais, hospedados em sequências

de grauvacas e pelitos carbonosos (Porto, 2008; Lima, 2012; Sequetto-Pereira et al., 2015; Roncato et al., 2015; Ribeiro et al., 2015).

Lima (2012) propôs a subdivisão da Unidade Córrego do Sítio (Zucchetti e Baltazar, 1998), para suas rochas no lineamento aurífero Córrego do Sítio. São três subunidades, classificadas de oeste para leste, nomeadas Superior, Intermediária e Inferior, detalhadas no item 2.3.

Todos os litotipos do Grupo Nova Lima no setor leste são cortados obliquamente por enxames de diques e *sills* intrusivos máficos, com orientação geral NNE-SSW e mergulho para SE. São denominados por Lima (2012), sem relação cronológica, em três tipos diferentes: máfica incipientemente alterada com piroxênio relicto (MBpx); máfica com alteração clorítica e carbonática (MBcl) e máfica com alteração carbonática e muscovítica (MBcb). As subdivisões sugeridas por Lima (2012) para as a unidade Córrego do Sítio e para as rochas máficas são descritas e caracterizadas no Item 3.3 desta tese. Em trabalho recente, David (2006) obteve uma idade U-Pb (SHRIMP) de 2694±34 Ma em zircões extraídos de rocha máfica.

1.3.3 Área Cuiabá-Lamego – Setor Norte

Importantes mineralizações auríferas do QF se encontram entre os munícipios de Sabará, Nova Lima e Caeté, na área Cuiabá-Lamego (Figs. 1.1; 1.3). Ambos depósitos são hospedados em rochas das associações vulcano-química e clasto-química de Baltazar e Zucchetti (2007).

O depósito *world-class* Cuiabá está encaixado em sequência de rochas vulcânicas e sedimentares que compõem a base do *greenstone belt Rio* das Velhas. A estratigrafia foi definida por Vial (l980), sendo composta na base por rochas vulcânicas, de composição máfica a intermediária, envoltas por uma camada de pelito carbonoso, sobrepostas por um nível de tufos félsicos com intercalações de pelito carbonoso. Os corpos mineralizados são associados à FFB e podem ser maciços ou bandados, tendo pirita como principal sulfeto constituinte do minério, seguido de arsenopirita e pirrotita (Toledo, 1997; Vial et al., 2007).

O depósito Lamego é definido por um pacote concordante, da base para o topo, de basalto, FFB, pelito carbonoso e micáceo, hospedando intensa silicificação que ocorre tanto como massas dispersas, como na forma de veios de quartzo fumê e leitoso. O minério aurífero ocorre em corpos grosseiramente lineares, distribuídos de forma irregular, variando tanto segundo a direção como ao longo do caimento da lineação *(*Martins et al., 2016)

A associação ressedimentada no setor norte do *greenstone belt* Rio das Velhas ficou conhecida historicamente como unidade Morro Vermelho (Zucchetti et al., 1998; Zucchetti e Baltazar, 2000),

sendo caracterizada pelo domínio de rochas vulcânicas máficas a intermediárias, localmente com estruturas *pillow* preservadas, e com grande ocorrência de rochas sedimentares químicas e detríticas intercaladas, representadas por FFB, *chert* e pelitos carbonosos.

As rochas dessa associação, na área Cuiabá-Lamego, são piroclásticas representadas por tufos e rochas epiclásticas representadas por tufos félsicos, com composição variando de dacítica a riolítica. Os tufos estão comumente retrabalhados, observando-se o arredondamento dos grãos de quartzo e o desaparecimento de feldspatos, em relação a variedades de tufos mais proximais, passando a grauvacas com níveis de xisto carbonoso. Os tufos bandados se associam e transicionam para litofácies ressedimentadas, com estratificação gradacional cíclica, centimétrica, granodecrescente de areia a argila, com contatos bruscos entre ciclos, e preservando ainda características de sua derivação vulcanogênica. Fragmentos de derivação juvenil são restritos mostrando-se com mesma composição, porém com texturas devitrificadas (Zucchetti e Baltazar, 2000).

1.4 Evolução geológica e geocronológica do Distrito Mineral Quadrilátero Ferrífero

Dados geocronológicos foram compilados por Lana et al. (2013) a partir de diversos trabalhos na região do QF (Machado et al., 1992, Machado e Carneiro 1992; Romano, 1989; Noce et al., 1998; Romano et al., 2013; Figs. 1.6 e 1.7). Baltazar e Zucchetti (2007) já registravam estes eventos arqueanos como evento Rio das Velhas (2780-2760 Ma). De posse destes dados, Lana et al. (2013) sugerem a divisão do embasamento arqueano em dois estágios distintos:

- Entre 3220 e Ma a 2770 Ma → formação dos complexos TTG, resultando em uma crosta siálica que abrigou diversas ocorrências de *greenstone belt* (Teixeira et al., 1996; Lana et al., 2013);
- Formação de granitoides potássicos entre 2750 Ma e 2600 Ma (Lana et al., 2013; Farina et al., 2015).

1.4.1 Eventos magmáticos no Cráton São Francisco

De acordo com Lana et al., (2013; Fig. 1.7), a crosta TTG preservada consolidou-se em três fases, definidas a partir dos dados geocronológicos U-Pb nos vários complexos cristalinos do entorno do QF:

- **Evento Santa Bárbara (3220-3200 Ma)** – TTGs do Complexo Santa Bárbara, setor leste, cujas rochas são interpretadas como um núcleo paleoarqueano preservado (formado por injeções de magma juvenil TTG em uma crosta máfica-ultramáfica tipo *greenstone belt*).

- **Evento Rio das Velhas I (2930-2900 Ma)** – Edificação da maior parte do embasamento do QF, com sucessivas acreções de arcos de ilha. Presente em quase todos os complexos granito-gnáissicos.
- **Evento Rio das Velhas II (2800-2770 Ma)** – Implantação de arco magmático nas margens do bloco continental formado durante as fases anteriores. Está associada com a extrusão de lavas félsicas datadas em 2792±11, 2773±7 e 2751±9 Ma por Noce et al. (2005; Lana et al., 2013) que, intercaladas com depósitos fluviais e turbidíticos, constituem as unidades superiores do Grupo Nova Lima no Supergrupo Rio das Velhas. Este evento representa terceira e última fase de formação de TTGs definida por Lana et al., (2013).

  Evento Mamona (2760-2680 Ma) – Formação de granitoides potássicos que representam cerca de 30% do embasamento arqueano no QF (Romano et al., 2013). São dois pulsos de formação: entre 2760-2700 Ma em maior abundância, e em torno de 2612 Ma com poucos registros (Moreira et al., 2015; Farina et al., 2015).

  As ocorrências de rochas vulcanoclásticas félsicas do Grupo Nova Lima foram datadas por Noce et al. (2005) em 2792±11, 2773±7 e 2751±9. Hartmann et al. (2006) analisaram pelo método U-Pb SHRIMP duas amostras de grauvacas da associação ressedimentada da Formação Palmital (Tabela 1.1). Os zircões detríticos indicaram duas populações de zircões de idade em torno de 2953±3 e 2759±10 Ma; o zircão mais novo foi datado em 2749±7 Ma e indica a idade máxima de deposição da unidade. Foram também reconhecidos picos de idades em 2774±13, 2852±9 e 2935±12 Ma, com alguns grãos isolados mais antigos entre 3050 e 3307 Ma.

1.5 Métodos

1.5.1 Trabalhos de campo

O trabalho de campo foi executado em um período de oito meses, em dias não consecutivos, totalizando aproximadamente 80 dias, entre janeiro a outubro/2012, em que foram levantados 155 pontos e 843 medidas estruturais. Os resultados do mapeamento geológico-estrutural de duas galerias do depósito Cachorro Bravo são apresentados no capítulo dois desta tese, no artigo denominado "***Metaturbidite-hosted gold deposits, Córrego do Sítio lineament, Quadrilátero Ferrífero, Brazil***". As descrições de 20 furos de sondagem totalizaram 1600 metros. A amostragem teve apoio dos geólogos e técnicos da empresa AngloGold Ashanti Brasil Mineração e os estudos visaram rochas hospedeiras e mineralizadas em ouro nos diferentes graus de alteração hidrotermal.

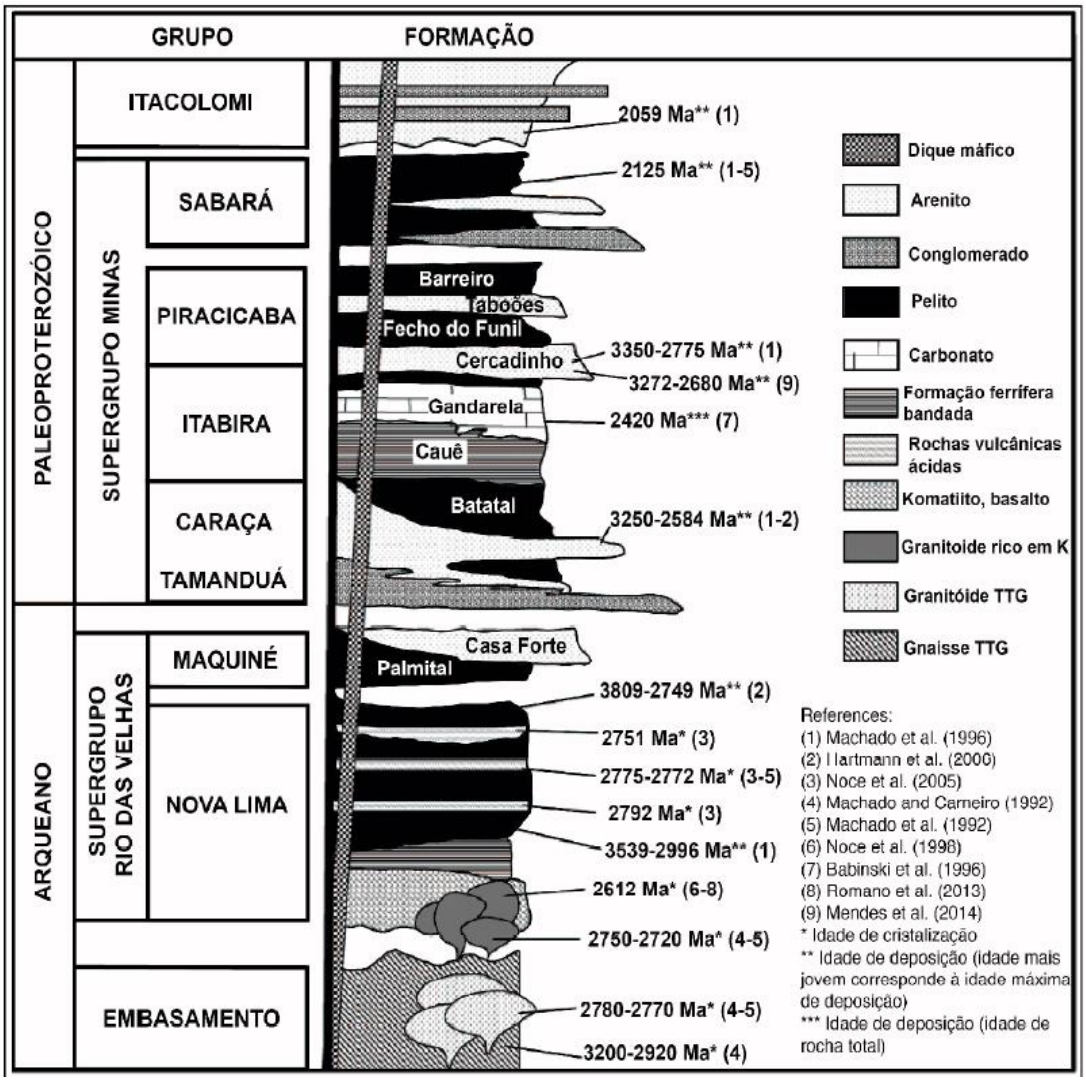


Figura 1.6 Coluna estratigráfica incluindo dados geocronológicos da região do QF (baseada em Dorr, 1969; Alkmim e Marshak, 1998; Romano et al., 2013). As referências para as idades estão indicadas na figura.

1.5.2 Amostragem

Realizada objetivando análises de ablação a *laser in situ* ICP-MS, geoquímicas e geocronológicas. A amostragem de rochas sedimentares foi realizada nas seguintes etapas:

- 1- Setor leste. Minério de alto teor, nos depósitos Cachorro Bravo, Laranjeiras e Carvoaria, para análises de ablação a *laser in situ* ICP-MS, de forma a realizar caracterização paragenética e geoquímica dos sulfetos;
- 2- Setores leste e norte. Coleta de amostras para análises geoquímicas de rocha, U-Pb e Lu-Hf em zircão.

As amostras foram coletadas dentro das áreas das jazidas (Anexo 1), em intervalos determinados de testemunhos de sondagem pré-selecionados, sugeridos e discutidos pela equipe das minas. As amostras selecionadas encontram-se preservadas de alteração intempérica, de forma que a assinatura geoquímica dos exemplares reflita as características primárias dessas rochas.

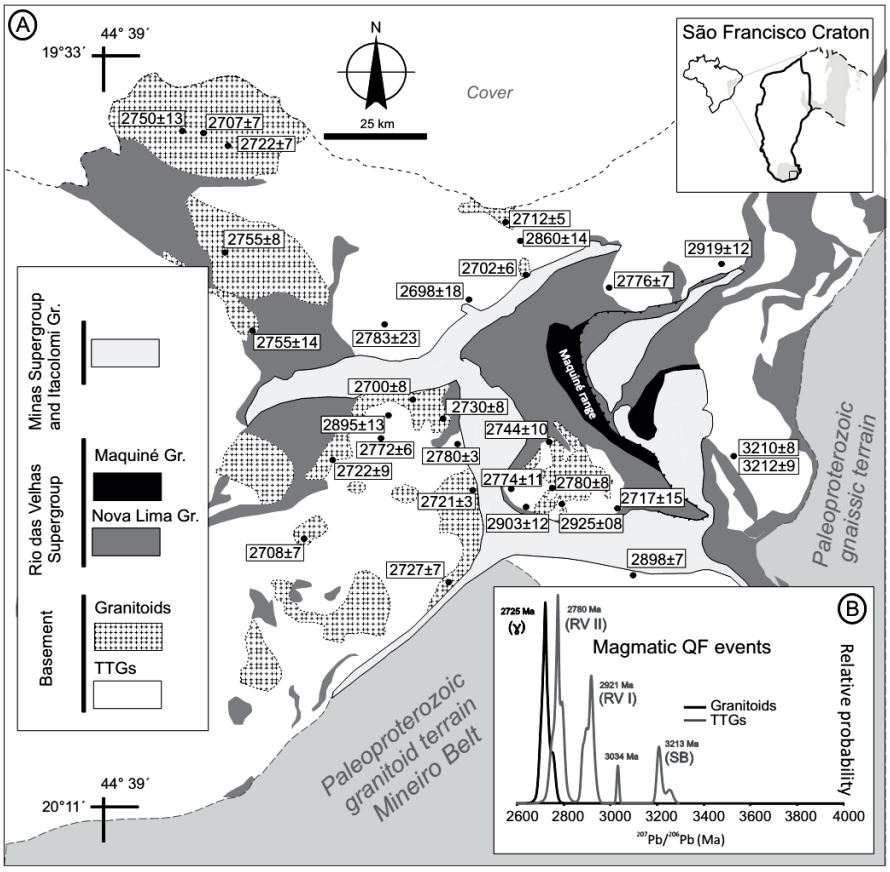
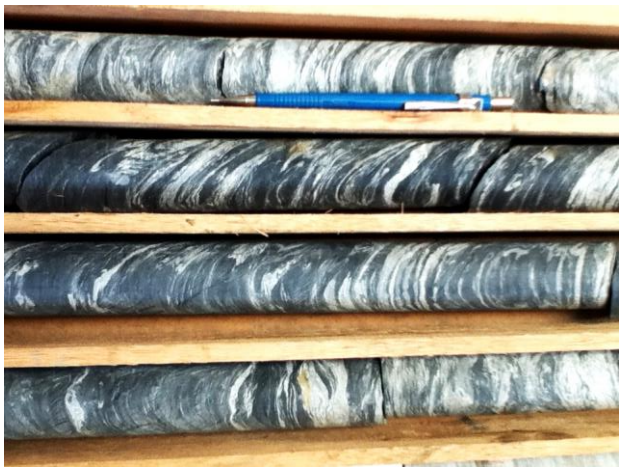


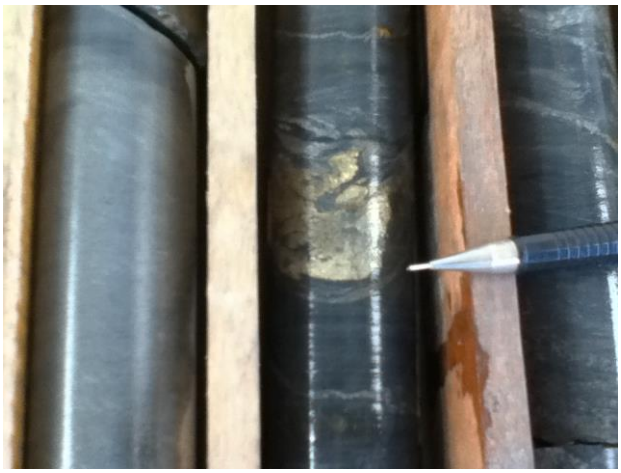
Figura 1.7. A) Mapa geológico do QF, segundo compilação de idades U-Pb publicadas por Lana et al. (2013). B) Diagrama de probabilidade que mostra os principais eventos magmáticos no cráton São Francisco: Rio das Velhas I (RVI); Rio das Velhas II (RV II), Santa Bárbara (SB) e Granitogênese (ɣ) (retirado de Moreira et al., 2015).

1.5.2.1 Análises por (*laser ablation induced coupled plasma mass spectrometry*) - Amostragem no Setor Leste

Rochas sedimentares (grauvacas e pelitos; Fig. 1.8) da subunidade Córrego do Sítio Intermediária, com alto teor de ouro, foram amostradas em testemunhos de sondagem nos depósitos Cachorro Bravo (FCS718) e Laranjeiras (FCS865, FCS910, FCS971), pertencentes à empresa AngloGold Asahnti Brasil Mineração. As descrições dessas amostras e critérios de amostragem encontram-se no artigo apresentado no Capítulo 3.



A



B

Figura 1.8. Intervalos de testemunhos de sondagem constituídos por rocha sedimentar, Depósito Laranjeiras,

As amostras de rochas sedimentares caracterizam-se pela intercalação entre níveis constituídos por grauvacas, pelitos e principalmente pelitos carbonosos, contendo sulfetos em veios e vênulas quartzo-carbonáticas (Fig. 1.8A). Amostras de arsenopirita, pirita e pirrotita (Fig. 1.8B) foram selecionadas em diferentes partes dos depósitos. As amostras selecionadas em testemunho de sondagem têm granulação muito fina a fina, com conteúdo variável de sulfetos e eventuais sulfossais (não analisados neste estudo).

1.5.3 Análises Petrográficas

As análises petrográficas em microscópio óptico de luz transmitida e refletida e captura de fotomicrografias foram realizadas no Laboratório de Metalogenia do CPMTC/UFMG. As análises petrográficas das rochas sedimentares e metamáficas tiveram por objetivo identificar e caracterizar as diferentes fases de sulfetos existentes e suas características morfológicas, bem como toda a paragênese mineralógica, além de se fazer um levantamento da diferenciação entre as grauvacas e pelitos, permitindo, dessa forma, sua classificação mais precisa.

1.5.4 Análises por Microscopia Eletrônica

1.5.4.1 Imageamento e microanálises em sulfetos

Análises de detalhe por microscópio eletrônico de varredura (MEV) foram realizadas em amostras de sulfetos de rochas sedimentares de alto teor de ouro. O microscópio eletrônico de varredura utilizado localiza-se no Centro de Microscopia da Universidade Federal de Minas Gerais, utilizando um Microscópio Eletrônico de Varredura com canhão de emissão por efeito de campo, Quanta 200 -

FEG - FEI – 2006. As condições de trabalho foram: voltagem 200 V a 30 kV; corrente do feixe >100 nA; resolução: 1.6 nm a 30 kV em alto vácuo e modo ESEM™; resolução: 3.5 nm -3 kV em baixo vácuo; distância focal: 3 - 99 mm; aumento 12x (na distância de trabalho mais longa) a 1,000,000x; detector de elétrons secundários; detector de elétrons retro espalhados; detector STEM; detector integrado sistema Pegasus: EDS e EBSD. Antes de serem levadas ao microscópio, as amostras foram recobertas por carbono, para evitar carregamento em sua superfície durante a análise.

Essas análises foram realizadas com o objetivo de observar as feições texturais, identificar poros, fraturas, vazios e inclusões, identificar as fases minerais silicáticas e carbonáticas existentes, com o auxílio de microanálises por EDS e realizar uma varredura de detalhe, de forma a procurar por fases minerais raras e não visíveis ao microscópio óptico. As imagens de elétrons retro-espalhados (*electron backscatter* – BSE) foram utilizadas para preparação das amostras para análise por ablação a *laser in situ* ICP-MS.

1.5.4.2 Imageamento de zircões detríticos

O imageamento de zircões detríticos, extraídos das amostras de rochas sedimentares dos setores norte e leste, são descritos no item *Methods* do artigo "***Geochemistry and U-Pb depositional age of the resedimented association host to gold in the Rio das Velhas greenstone belt, with their sedimentary source constrained by zircon Hf isotopes and in situ LA-ICP-MS on sulfide minerals****",* apresentados no capítulo 3.

As seções embutidas contendo os zircões foram recobertas por grafite e analisadas ao MEV, a qual permite um imageamento da estrutura interna dos cristais de zircão. Esse imageamento é essencial para a identificação de inclusões, descontinuidades e zonas de sobrecrescimento, de forma a orientar, durante as análises geocronológicas (U-Pb e Lu-Hf), os pontos mais propícios para a obtenção dos dados. O imageamento dos zircões detríticos foi realizado no Laboratório de Microscopia Eletrônica do Departamento de Geologia da Universidade Federal de Ouro Preto (DEGEO/UFOP), utilizando-se um MEV JEOL 6510. As imagens encontram-se no Anexo 3.

1.5.5 Geoquímica de Rocha Total

As amostras coletadas nos setores norte e leste foram analisadas de forma a determinar sua composição geoquímica e, dessa forma, obter-se um melhor entendimento sobre os processos envolvidos em suas gêneses e deposição. Um total de vinte amostras foram analisadas para obtenção da composição em elementos maiores, traços e terras raras. São apresentados dados litoquímicos de 20 amostras (Anexo 2).

Os teores de elementos maiores, traços e terras raras foram determinados pela ACME Analytical Laboratories Ltda., em Vancouver, Canadá, via ICP-MS após fusão com metaborato / tetraborato de lítio e digestão com ácido nítrico diluído. A precisão é de 0,01% para a maioria dos óxidos de elementos maiores, de 0,1 ppb para Au e de 0,1 ppm para a maioria dos elementos traços e terras raras. Os teores de metais-base e preciosos foram determinados por digestão em Aqua Regia seguida de análise por ICP-MS. A perda ao fogo (PF ou LOI – *Lost On Ignition*) foi determinada pela diferença de peso após ignição a 1000 °C. Os diagramas litoquímicos foram confeccionados pelos programas MINPET 2.02, ioGAS e Microsoft Excel.

1.5.6 Análises Geocronológicas U-Pb em zircões por LA-ICP-MS

Análises geocronológicas U-Pb foram realizadas em zircões provenientes da associação ressedimentada de Zucchetti e Baltazar (2000) e Baltazar e Zucchetti (2007), nos setores leste e norte (Figs. 1.9, 1.10 e 1.11).

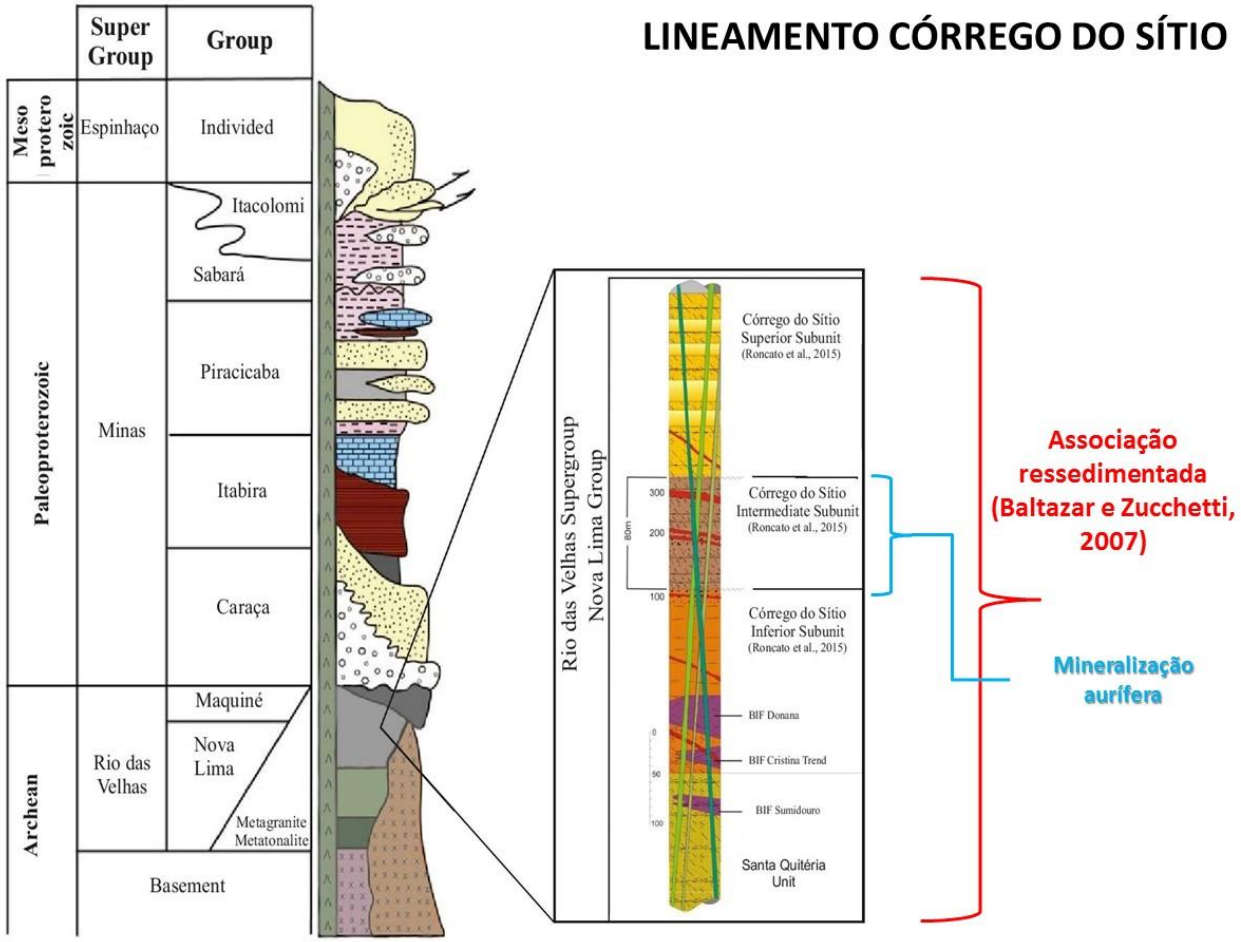


Figura 1.9. Coluna estratigráfica (Dorr, 1969) da região do Quadrilátero Ferrífero, com ênfase na associação ressedimentada do setor leste, lineamento Córrego do Sítio (modificado de Lima, 2012).

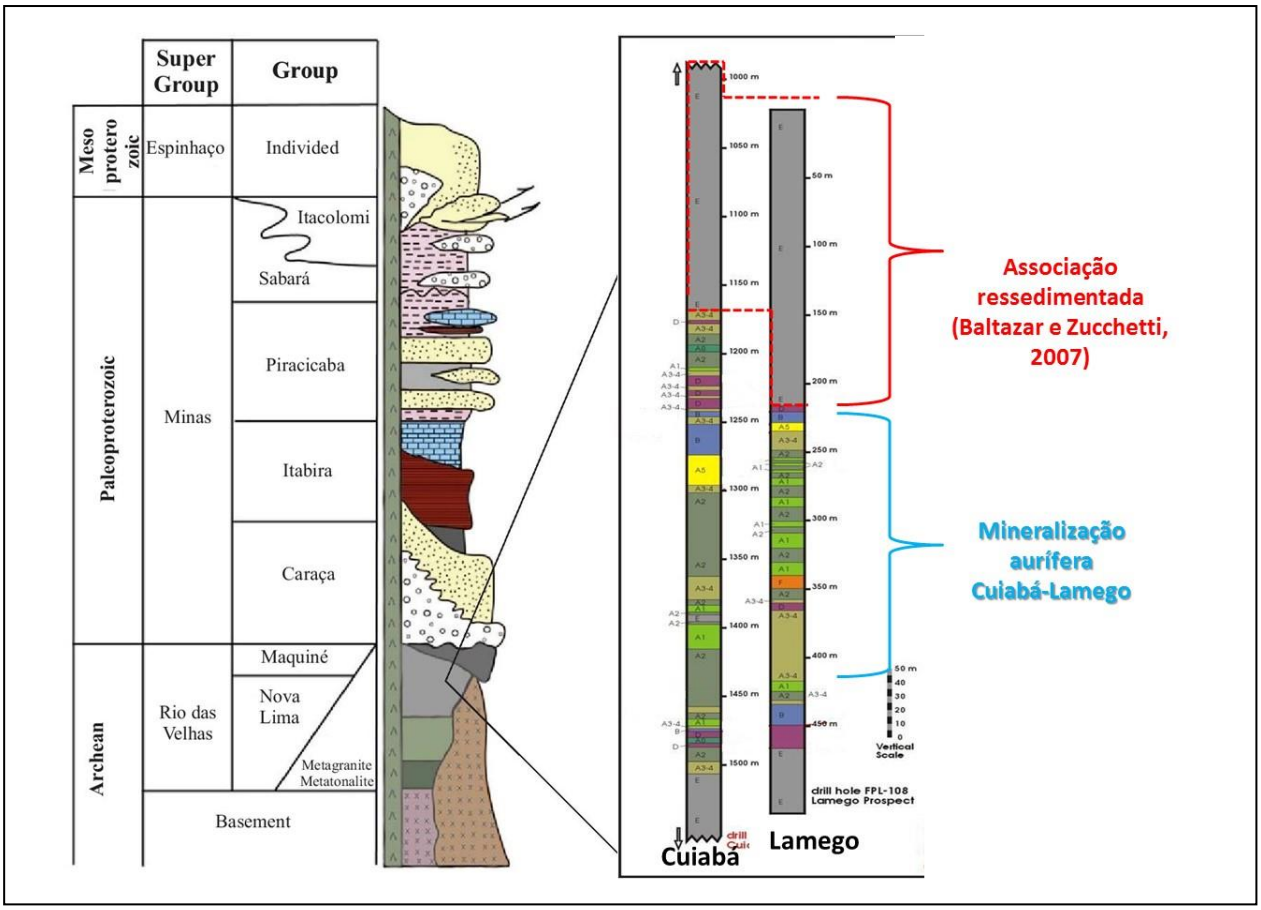


Figura 1.10. Coluna estratigráfica (Dorr, 1969) da região do Quadrilátero Ferrífero, com ênfase na associação ressedimentada do setor norte, área Cuiabá-Lamego .

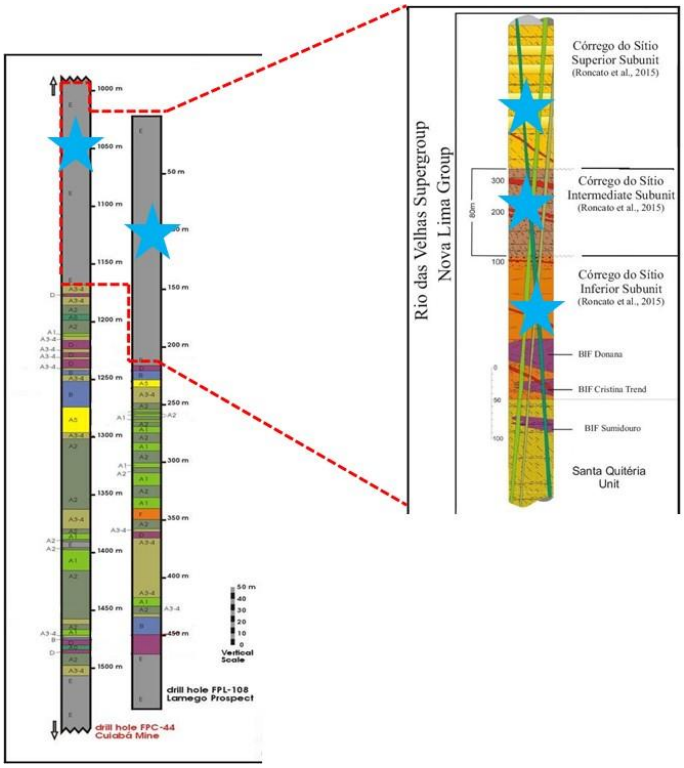


Figura 1.11. Colunas associando, nas mesmas posições estratigráficas, as posições amostradas da associação ressedimentada dos setores norte e leste.

O zircão é amplamente utilizado na geocronologia para o estudo da gênese de rochas magmáticas, metamórficas e sedimentares. Este mineral é portador de quantidades significativas de U, Th e Hf, elementos que formam sistemas isotópicos radiogênicos, e que permitem a determinação da idade de sua rocha hospedeira (Hoskin e Schaltegger, 2003). Estudos geocronológicos de zircões representam uma importante ferramenta para a compreensão dos processos de evolução crustal.

O zircão é utilizado como um geocronômetro baseado no decaimento do U e Th em Pb, sendo que os elevados tempos de meia-vida permitem a datação de rochas consideravelmente antigas no tempo geológico. O ^{235}U decai para ^{207}Pb, com um tempo de meia vida igual a 0,704 Ga; o ^{238}U decai para ^{206}Pb, apresentando um tempo de meia vida igual a 4,47 Ga; o ^{232}Th decai para ^{208}Pb, com um tempo de meia vida igual a 14,01 Ga (valores de Jeffrey et al., 1971, in Dickin, 2005).

As razões $^{206}Pb/^{238}U$ e $^{207}Pb/^{235}U$, em um sistema fechado para a entrada de U e Pb, são plotados dentro de uma curva a qual se estende desde os tempos atuais até a idade de formação do sistema solar e da Terra, há aproximadamente 4,53 Ga, e fornecem valores concordantes de tempo *t*. Quando plotados em um gráfico, esses pontos definem uma curva, chamada de concórdia por Wetherrill (1956a, in Dickin, 2005).

Quando essas razões são plotadas nesse diagrama, e o ponto correspondente é discordante à concórdia, indica que o zircão passou por uma perda episódica de Pb (Wetherrill 1956a, in Dickin, 2005). Segundo esse autor, pontos discordantes apresentam uma tendência linear no diagrama da concórdia, sendo que o intercepto superior dessa reta com a curva da concórdia corresponde à idade de formação dos minerais (t_1), e o intercepto inferior (t_2) corresponde à idade de um evento termal que tenha causado a perda de Pb no mineral datado.

No caso das rochas sedimentares clásticas, análises geocronológicas de zircões detríticos representam uma importante ferramenta no estudo de proveniência dos sedimentos constituintes do protólito dessas rochas e a história deposiconal das mesmas (Košler et al., 2002). Devido à sua elevada resistência aos processos físicos, os zircões detríticos 'sobrevivem' à múltiplos ciclos sedimentares (Košler et al., 2002). Para que um estudo de proveniência sedimentar seja bem embasado, com relação às várias áreas fontes que podem fornecer os sedimentos detríticos para uma bacia sedimentar, é necessária a utilização de um elevado número de zircões (ca. de 80 a 100 grãos, Košler et al., 2002).

A utilização da técnica analítica de ablação a laser, associada a um espectrômetro de massas com plasma indutivamente acoplado (LA-ICP-MS), constitui importante ferramenta para a geocronologia. O feixe de laser de alta potência é focado em uma área diminuta da amostra, resultando na ablação de uma pequena quantidade dessa amostra. O material vaporizado gerado é

transportado por gases carreadores (Ar ou He) até o equipamento de ICP-MS para a quantificação isotópica (Jackson et al., 2004). Esse método permite a datação de cristais individuais e de diferentes zoneamentos presentes no mesmo cristal, fornecendo as idades de diferentes zonas de crescimento em um mineral individual (Fedo et al., 2003).

Essa técnica apresenta várias vantagens, principalmente pelo seu baixo custo e por ser um método rápido para obtenção de dados, uma vez que o feixe incide diretamente em um ponto escolhido do cristal (Jackson et al., 2004). Dessa forma, o LA-ICP-MS representa importante ferramenta não somente para a determinação da idade de cristalização de uma rocha e identificação de eventos subsequentes que resultaram em um zoneamento em sua estrutura, mas também para o estudo de proveniência de sedimentos clásticos, uma vez que permite rápida análise do grande número de zircões requeridos para gerar informações de grande confiabilidade.

As amostras das grauvacas e pelitos foram preparadas e analisadas no LOPAG (Laboratório de Geocronologia e Geoquímica), na Universidade Federal de Ouro Preto (DEGEO/UFOP). A metodologia de preparação das amostras iniciais até a montagem dos embutimentos com os zircões e os parâmetros analíticos utilizados para a obtenção dos dados encontram-se no artigo, apresentados no capítulo 3.

1.5.7 Análises de Isótopos Radioativos Lu/Hf em zircões por LA-ICP-MS

Além da determinação da idade de cristalização de uma rocha através da análise U-Pb em zircões, estudos isotópicos no sistema Lu-Hf fornecem informações complementares acerca da origem e evolução desse zircão, e consequentemente, da diferenciação ocorrida desde a formação do magma que gerou sua rocha hospedeira. Sendo assim, o sistema isotópico Lu-Hf é utilizado no estudo da diferenciação da crosta silicática (BSE – *Bulk Silicate Earth*), que levou à formação do sistema crosta-manto (Matteini et al., 2010). Como supracitado, o zircão apresenta quantidades significativas de Hf, com concentrações no nível de porcentagem (0,5-2,0 % Hf_2O; Hoskin e Schaltegger 2002), e acomoda ainda os produtos do decaimento radioativo desse elemento (Kinny e Mass, 2002). O Lu também apresenta uma afinidade ao zircão, além de outros minerais portadores de ETR (Kinny e Mass, 2002).

O ^{176}Lu é um radionuclídio instável que apresenta decaimento espontâneo para o isótopo estável ^{176}Hf, com emissão $ß^-$ e meia-vida de aproximadamente 35 milhões de anos (Kinny e Mass, 2002). As variações na abundância do ^{176}Hf são expressas em relação ao ^{177}Hf, o qual apresenta concentração constante no sistema. Dessa forma, a equação máfica para o cálculo da idade pelo método Lu-Hf, para um sistema fechado, define-se como:

$$(^{176}Hf/^{177}Hf)_t = (^{176}Hf/^{177}Hf)_{inicial} + (^{176}Lu/1^{77}Hf)_t * (e^{\lambda t} - 1),$$

Onde:

t = tempo decorrido desde o fechamento do sistema;

λ = constante de decaimento do ^{176}Lu

O método se baseia na premissa de que a Terra apresentava, na sua origem, uma razão Lu/Hf inicial semelhante ao condrito. Esse reservatório inicial é referido como CHUR (*Chondritic Uniform Reservoir*), o qual foi modificado progressivamente com o tempo como resultado de fusão parcial do manto superior. Ao gerar magmas basálticos, resultou em depleção do manto residual em Hf em relação ao Lu, uma vez que o último é mais compatível do que o Hf. Consequentemente, durante um evento de geração de crosta juvenil, essa torna-se relativamente mais enriquecida em Hf, enquanto o manto residual torna-se depletado nesse elemento e enriquecido em Lu. Com o passar do tempo, a razão isotópica Lu/Hf do manto depletado em Hf torna-se maior do que a composição condrítica ($Lu/Hf_{manto} > Lu/Hf_{CHUR}$), enquanto que a crosta enriquecida em Hf resulta em uma razão Lu/Hf menor do que a do reservatório condrítico ($Lu/Hf_{crosta} < Lu/Hf_{CHUR}$). O manto residual não fracionado teria razão Lu/Hf igual à do condrito (Kinny e Mass 2002).

Em um tempo t, o desvio da composição isotópica em relação ao condrito é dada por:

$$\varepsilon_{Hf} = [\ (^{176}Hf/^{177}Hf)_t / (^{176}Hf/^{177}Hf)_{condritos} - 1\ ] \times 10^4\ ,$$

sendo que o fator ε_{Hf} constitui um indicativo da fonte magmática formadora da rocha. Amostras que têm razão $^{176}Hf/^{177}Hf$ maior do que o condrito em um tempo t apresentam valores positivos de ε_{Hf}, enquanto que amostras com $^{176}Hf/^{177}Hf$ menor do que o condrito têm ε_{Hf} negativo. O condrito, por sua vez, apresenta $\varepsilon_{Hf} = 0$.

A idade modelo, a qual corresponde ao tempo decorrido desde a separação do magma da fonte mantélica, é dada por:

$$Hf\ T_{DM} = 1/\lambda \times \ln \{(^{176}Hf/^{177}Hf)_{amostra} - (^{176}Hf/^{177}Hf)_{Dm} / (^{176}Lu/^{177}Hf\ )_{amostra} - (^{176}Lu/^{177}Hf)_{DM} + 1\}.$$

A idade TDM para um zircão é calculada a partir de sua composição inicial em Hf, usando uma média crustal da razão Lu/Hf, a qual representa o valor $^{176}Hf/^{177}Hf$ calculado no momento em que o zircão cristalizou, sendo esse correspondente à idade U-Pb obtida no mesmo cristal. A idade modelo indica o tempo de residência crustal para a rocha hospedeira do zircão (Matteini et al. 2010).

Conforme assinalado por Matteini et al. (2010), é fundamental realizar as medições das razões isotópicas de Lu-Hf nas mesmas regiões dos cristais de zircão onde foram realizadas as medições das razões U-Pb, de forma a calcular valores de ε_{Hf} e Hf_{TDM} no momento da cristalização desse zircão. Sendo assim, a técnica LA-ICP-MS torna-se essencial para a realização de análises isotópicas no sistema Lu-Hf em diferentes zonas de intercrescimento em um mesmo grão, e em

porções próximas àquelas analisadas para o sistema isotópico U-Pb. Dessa forma, torna-se possível integrar as informações de idades de diferentes regiões de um mesmo cristal com os valores de ε_{Hf} e Hf_{TDM} correspondentes.

1.5.7.1 Procedimentos analíticos

As medições no sistema isotópico Lu-Hf em zircões foram realizadas no LOPAG (Laboratório de Geocronologia e Geoquímica), na Universidade Federal de Ouro Preto (DEGEO/UFOP) em um MC-ICP-MS Thermo-Finnigan Neptune acoplado a um sistema a laser Photon-Machines 193 nm. Os dados foram coletados no modo estático durante 60 s de ablação, com um feixe de diâmetro igual à 40 µm. Os pontos foram amostrados com uma taxa de repetição igual a 8 Hz.

Nitrogênio foi introduzido ao gás argônio (carregador da amostra) por meio de um sistema de nebulização Aridus. A intensidade típica do sinal foi cerca de 10 V para o ^{180}Hf. Os isótopos ^{172}Yb, ^{173}Yb e ^{175}Lu foram monitorados simultaneamente durante cada etapa analítica de forma a corrigir interferências isobáricas dos isótopos Lu e Yb na massa 176. Os isótopos ^{176}Yb e ^{176}Lu foram calculados utilizando-se a razão $^{176}Yb/^{173}Yb$ igual a 0,796218 (Chu et al., 2002). O fracionamento instrumental de massa para as razões isotópicas de Hf foi corrigido por uma razão $^{179}Hf/^{177}Hf$ igual a 0,7325 (Patchett e Tatsumoto 1980a). A acurácia e reprodutibilidade foram verificadas pelas análises dos zircões GJ-1 ($^{176}Hf/^{177}Hf$ de 0,282015 ± 0,000019; Jackson et al., 2004), Plešovice ($^{176}Hf/^{177}Hf$ 0,282483 ± 0,000017; Sláma et al., 2008), Temora ($^{176}Hf/^{177}Hf$, 0,282683 ± 0,000019; Black et al., 2003; Wu et al., 2006). Os parâmetros analíticos utilizados para a obtenção dos dados encontram-se no artigo apresentados no capítulo 3.

1.6 Apresentação da Tese

Esta tese está estruturada nas Partes I, II, III e IV. A Parte I é composta pelos capítulos introdutórios, onde são apresentados localização, os objetivos do trabalho, trabalhos anteriores e revisão do conhecimento, evolução e geologia regional e dos setores amostrados e os métodos utilizados.

A Parte II apresenta os resultados dos estudos estratigráficos, petrográficos e paragenéticos, além de mapeamento geológico do depósito Cachorro Bravo; realizados no setor leste do QF, lineamento Córrego do Sítio. Estes resultados são apresentados na forma de um artigo revisado após a publicação no Brazilian Journal of Geology (Roncato et al., 2015).

A Parte III compara a associação ressedimentada nos setores leste e norte, isto é, lineamento Córrego do Sítio e área Cuiabá-Lamego, apresentando análises litoquímicas, geocronológicas e de

ablação a *laser in situ ICP-MS* em sulfetos (exclusivas para o lineamento Córrego do Sítio), resultando em um modelo para a associação ressedimentada no âmbito da evolução arqueana do QF. Os dados são apresentados na forma de artigo já submetido ao periódico Precambrian Research.

Na Parte IV da tese são apresentadas as considerações finais do trabalho, além das referências bibliográficas utilizadas e dos anexos, onde se encontram as tabelas com os resultados das análises geoquímicas e isotópicas.

PARTE II – GEOLOGIA DOS DEPÓSITOS AURÍFEROS NO LINEAMENTO CÓRREGO DO SÍTIO

2 METATURBIDITE-HOSTED GOLD DEPOSITS, CÓRREGO DO SÍTIO LINEAMENT, QUADRILÁTERO FERRÍFERO, BRAZIL

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ABSTRACT: A study of the geology and rock paragenesis has been conducted at the Córrego do Sítio auriferous lineament, containing the Cachorro Bravo, Laranjeiras and Carvoaria metaturbidite-hosted lode-gold deposits located in the Quadrilátero Ferrífero Region, Minas Gerais, Brazil. These representative deposits are described to illustrate the essentially similar general character of all the deposits of the lineament as well as the wide compositional and mineralogical differences in the ore of the different deposits, where for the Cachorro Bravo deposit a geological mapping included two underground mine galleries. The Córrego do Sítio unit is a metamorphosed turbidite in an alternating sequence of metagraywackes and phyllites, with parallel to discordant metamafic dikes and sills. The ore zone is predominantly hosted at the stratigraphic break between metasedimentary and metamafic rocks. Four deformation events affected the mine sequence. Mineralized veins and veinlets are considered to have formed within a brittle-ductile shear-zone environment and occurred in multiple episodes. Different vein types are recognized, but the most important volumetrically is a S_1-concordant type characterized by smoky and milky quartz-carbonate-sulfide ± sulfosalts veins. Veins are dominated by quartz, but locally they are characterized by carbonate and a large variety of sulfide and sulfosalt minerals. Pyrite is the most common associated sulfide mineral, followed by arsenopyrite and pyrrhotite. An extensive mineralogical study of polished sections has confirmed different generations of sulfide minerals. The sulfides and sulfosalt minerals are interrelated in the veins and disseminated in the wall rocks. The data are consistent with a genetic models similar to other Archean greenstone belt, lode-gold deposits.

KEYWORDS: lode-gold deposits; orogenic gold; metasedimentary-hosted rocks.

RESUMO: *O estudo da geologia e paragênese do lineamento aurífero Córrego do Sítio foi conduzido, contendo os depósitos Cachorro Bravo, Laranjeiras e Carvoaria. Esses depósitos auríferos, do tipo lode, hospedados em sequência metaturbidítica, ocorrem na região do Quadrilátero Ferrífero, Minas Gerais, Brasil. Esses três importantes depósitos são descritos para ilustrar as características semelhantes, composição mineralógica e diferenças no tipo de minério ao longo desse lineamento. Para o depósito de Cachorro Bravo, o mapeamento geológico inclui duas galerias subterrâneas. A unidade Córrego do Sítio é composta por uma sequência turbidítica com alternância de grauvacas e filitos, associada a diques e sills metamáficos, paralelos a discordantes. A zona de minério é predominantemente relacionada ao intervalo estratigráfico localizado entre as rochas metassedimentares e as rochas metamáficas. Quatro eventos deformacionais afetaram a sequência estratigráfica do lineamento. Veios e venulações mineralizados formaram-se em vários episódios em ambiente de cisalhamento dúctil-rúptil. Diferentes tipos de veios são reconhecidos, mas a geração mais importante volumetricamente é concordante à estrutura S_1. Os veios são compostos por cristais de quartzo, tanto fumê quanto leitoso, carbonato e uma grande variedade de sulfetos e sulfossais. A pirita é o sulfeto mais comum seguido por arsenopirita e pirrotita, confirmados por detalhamento mineralógico em seções polidas. Sulfetos e sulfossais são inter-relacionados nos veios e disseminados nas rochas encaixantes. Os dados apresentados são consistentes com modelos genéticos relacionados a outros depósitos lode-gold arqueanos.*

PALAVRAS-CHAVE: *ouro orogênico, depósito tipo lode-gold; depósito aurífero em turbidito.*

2.1 Introduction

The gold production in the Archean greenstone-hosted deposits of the Quadrilátero Ferrífero mining district, Brazil, is important worldwide (Ribeiro-Rodrigues 1998), with banded iron formations being the one fo most important host to gold mineralization (Lobato et al., 2001). These authors estimated that only 4% of all the gold production of the Rio das Velhas greenstone belt are hosted in rock types other than banded iron formation (BIF) and in the hydrothermal products generically referred to as *lapa seca*; these 4% encompass ultramafic, mafic, volcaniclastic, and clastic rocks in general.

In the focus area, a deformed sequence of schistose sediments of the Nova Lima Group (Fig. 2.1), Rio das Velhas greenstone belt, crops out in a series of NE-SW regional lineaments that host gold mineralization and are known as Córrego do Sítio, Cristina and São Bento-Donana shear zones, respectively from the SE to NW (Fig. 2.2; Lima, 2012). They contain gold deposits with resources of approximately 5.12 Moz (Sequetto-Pereira et al., 2013). The Córrego do Sítio shear zone, named Córrego do Sítio structural lineament (Lima, 2012), hosts the Cachorro Bravo, Laranjeiras and Carvoaria deposits, the most important in this area.

The main rock units comprise a repetitive succession of metamorphosed, carbonaceous turbiditic, graywacke-siltstone-shale and slates, which host lode-gold mineralization associated with quartz-carbonate-sulfide-sulfosalt veins (Lima, 2012, Ribeiro et al., 2013). As in other Archean greenstone-belt-hosted gold deposits, those at Córrego do Sítio are at the greenschist metamorphic facies (*e.g.* Condie 1981, Groves et al., 1998). A series of mafic dikes and sills have been emplaced and may have had an important control for the gold mineralization and sulfide paragenesis (*e.g.* Canale 1999, Porto, 2008, Lima, 2012, Sequetto-Pereira et al., 2013, Ribeiro et al., 2013).

Thise present study contributes for the unpublished existing data of the Córrego do Sítio gold deposits, describing the stratigraphic and structural aspects, as well as the petrographic

characteristics, particularly the hydrothermal alteration evolution and sulfide paragenesis. We also focus on the geology of the 200-211 orebody of the Cachorro Bravo deposit, the most important gold producer of the Córrego do Sítio lineament, where 1:100 scale geological mapping was undertaken.

2.2 Regional geological setting

The Quadrilátero Ferrífero district (Figs. 1.2 e 2.1) is situated in the southern portion of the São Francisco craton (Almeida 1976) and is composed of the Archean Rio das Velhas greenstone belt (Schorscher et al. 1982), the paleoproterozoic Minas Supergroup and the Itacolomi Group. These supracrustal units are surrounded by granite-gneiss domes (Dorr 1969), which consist of poly-deformed unit. The regional basement metamorphic complexes crop out in several distinct domes and with metamorphic grades ranging from greenschist to granulite facies (Herz 1970).

The Rio das Velhas rocks comprise seven lithofacies associations (Fig. 2.1), according to Baltazar & Silva (1998a, 1998b), Zucchetti & Baltazar (2000), Lobato et al. (2005) and Baltazar & Zucchetti (2007), and these are, from base to top:

(1) Mafic-ultramafic: lavas with minor intrusions of gabbro, anorthosite and peridotite, as well as intercalations of BIF, ferruginous chert, carbonaceous pelite, turbidites, and rare felsic volcanoclastic rocks. It corresponds to the Quebra Ossos Group and Ouro Fino unit of the Nova Lima Group.

(2) Volcano-chemical-sedimentary: tholeiites intercalated with BIF and ferruginous chert and less fine-grained clastic sedimentary rocks, such as carbonaceous turbidites and pelites, intercalated with chemical sedimentary rocks.

(3) Clastic-chemical sedimentary: typified by alternating fine-grained, clastic and chemical rocks. Pelites (micaceous and chloritic schists) are intercalated with lesser BIF, subordinate chert and carbonaceous phyllites. It corresponds to the Santa Quitéria unit in the study area.

(4) Volcaniclastic: made up of volcaniclastic felsic and mafic rocks.

(5) Resedimented: widely distributed in the Quadrilátero Ferrífero, it includes three different sequences of graywacke-argillite, two metamorphosed in the greenschist facies in the N and E sectors (they are composed mainly of graywackes, quartz graywackes, sandstones and siltstones, with cyclic layers and abrupt basal contacts between cycles) and one in the amphibolite facies in the south. In the E and N sectors, it includes the Córrego do Sítio unit outcropping in the study area.

(6) Coastal: restricted to a small area, with sandstones exhibiting preserved sedimentary structures.

(7) Non-marine: conglomerate-sandstone; coarse-grained sandstone, fine- to medium-grained sandstone; it includes the Casa Forte Formation of the Maquiné Group (Dorr et al., 1957).

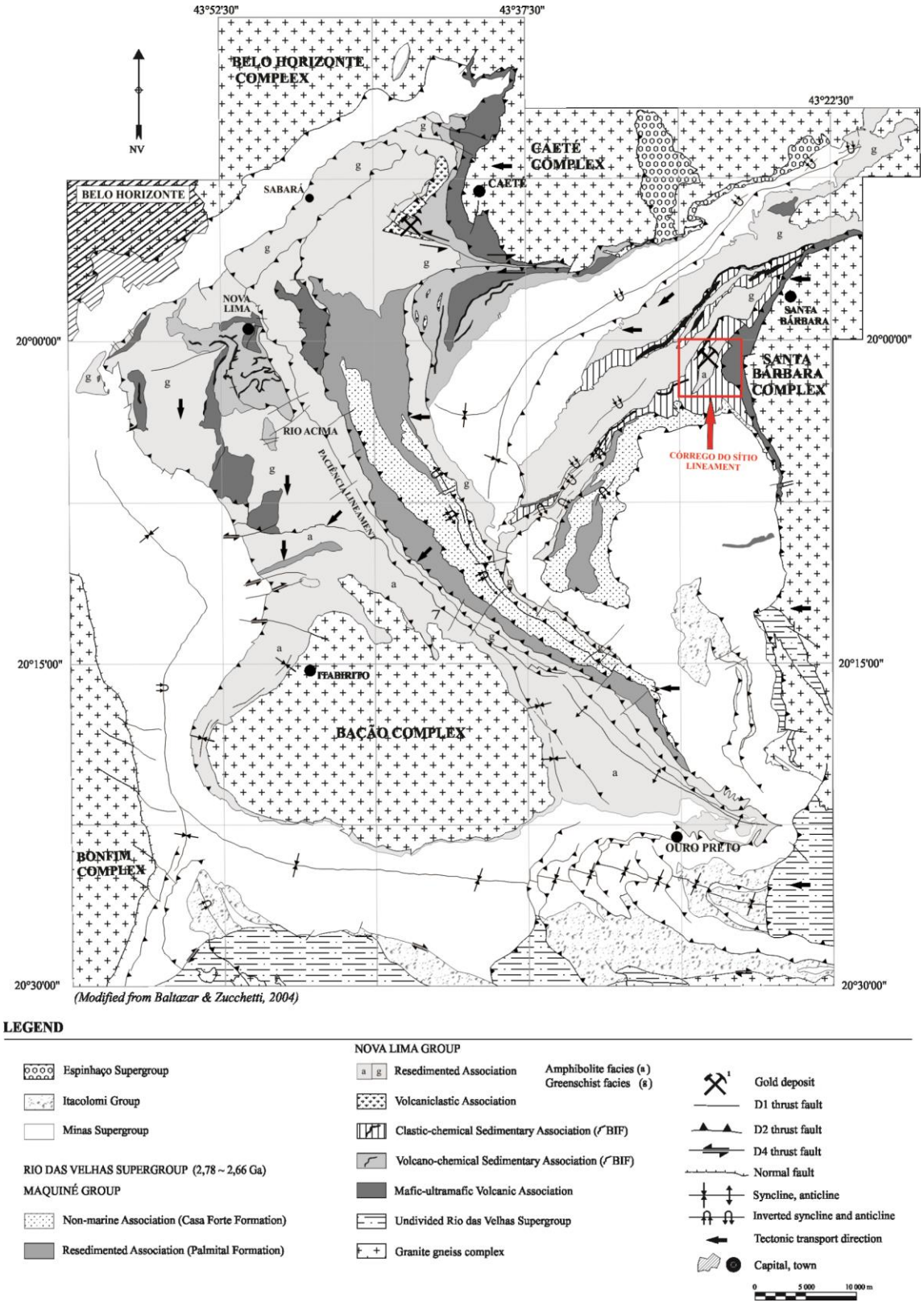

Figura 2.1. Geological map of the Quadrilátero Ferrífero region showing the study area in the Rio das Velhas Supergroup in detail (modified from Baltazar & Zucchetti 2007).

2.3 Local Geology

The term Córrego do Sítio auriferous structural lineament was initially proposed by Lima (2012) to include all gold occurrences that encompass those of the Córrego do Sítio, Cristina and São Bento-Donana shear zones (Fig. 2.2; Lima, 2012), since they all have the same NE-SW direction and mineralization in similar lithostratigraphic hosts. In its SW extension (Fig. 2.2), the Córrego do Sítio lineament comprises the Carvoaria, Laranjeiras, Cachorro Bravo, Cristina, Rosalino and Grota Funda deposits.

Porto (2008) and Lima (2012) consider the Córrego do Sítio lineament as a package of metasedimentary rocks consisting of alternating graywackes and phyllites in a turbidite sequence with incomplete Bouma cycles (Bouma 1983), metamorphosed to the greenschist facies. Metamafic dikes and sills are subparallel to discordant.

The Córrego do Sítio unit (Baltazar & Silva 1998b) is widely distributed in many parts of the Quadrilátero Ferrífero and includes sequences of graywacke and argillite. Graywackes, quartz graywackes, sandstones and siltstones display cyclic layers and abrupt basal contacts between cycles. The features of this association indicate that it was deposited by turbidity currents (Lima, 2012), and this unit is considered part of the re-sedimented association.

The contacts between the metasedimentary units are abrupt, oblique and marked by the development of hydrothermal alteration zones containing carbonate, sericite, quartz and sulfide minerals.

From E to W, Lima (2012) mapped the Córrego do Sítio unit based on the relative proportion of the different rock types and proposed an informal stratigraphic subdivision (Fig. 2.3):

• Lower subunit: thick carbonaceous phyllite and graywacke sequence. It contains subordinate metric-decimetric BIF layers, some of which are magnetic and intercalated with carbonaceous phyllites (Figs. 2.4A, 2.4B, and 2.4C).

• Intermediate subunit: carbonaceous phyllite with an anastomosing schistosity hosting millimetric to metric quartz-carbonate veins and microfolded layers, transposed locally in axial plans of assymetric folds. This is where the auriferous mineralization is concentrated, with sulfide and sulfosalts in quartz-carbonate veins, representing an important zone of hydrothermal alteration. The upper and lower contacts are sharp.

• Upper subunit: intercalation of a thick graywacke sequence and subordinate carbonaceous phyllite in incomplete Bouma cycles. Bedding exhibits upward grain-size fining in normal and inverted sequence.

Metamafic dikes and sills have a NNE-SSW direction, dipping to the SE. Metamafic rocks with chlorite and muscovite alteration (MBcl) are epidote-rich dolerites (Fig. 2.4D, Table 2.1). Quartz-bearing, schistose chlorite-carbonate dominated metamafic rocks (MBcb) are the most hydrothermally altered; these are locally hydrothermally altered bearing gold (Fig. 2.4E, Table 2.1). The incipiently altered metamafic rocks (MBpx) (Fig. 2.4F, Table 2.1) represent a fine-grained dolerite with relict pyroxene, amphibole and plagioclase.

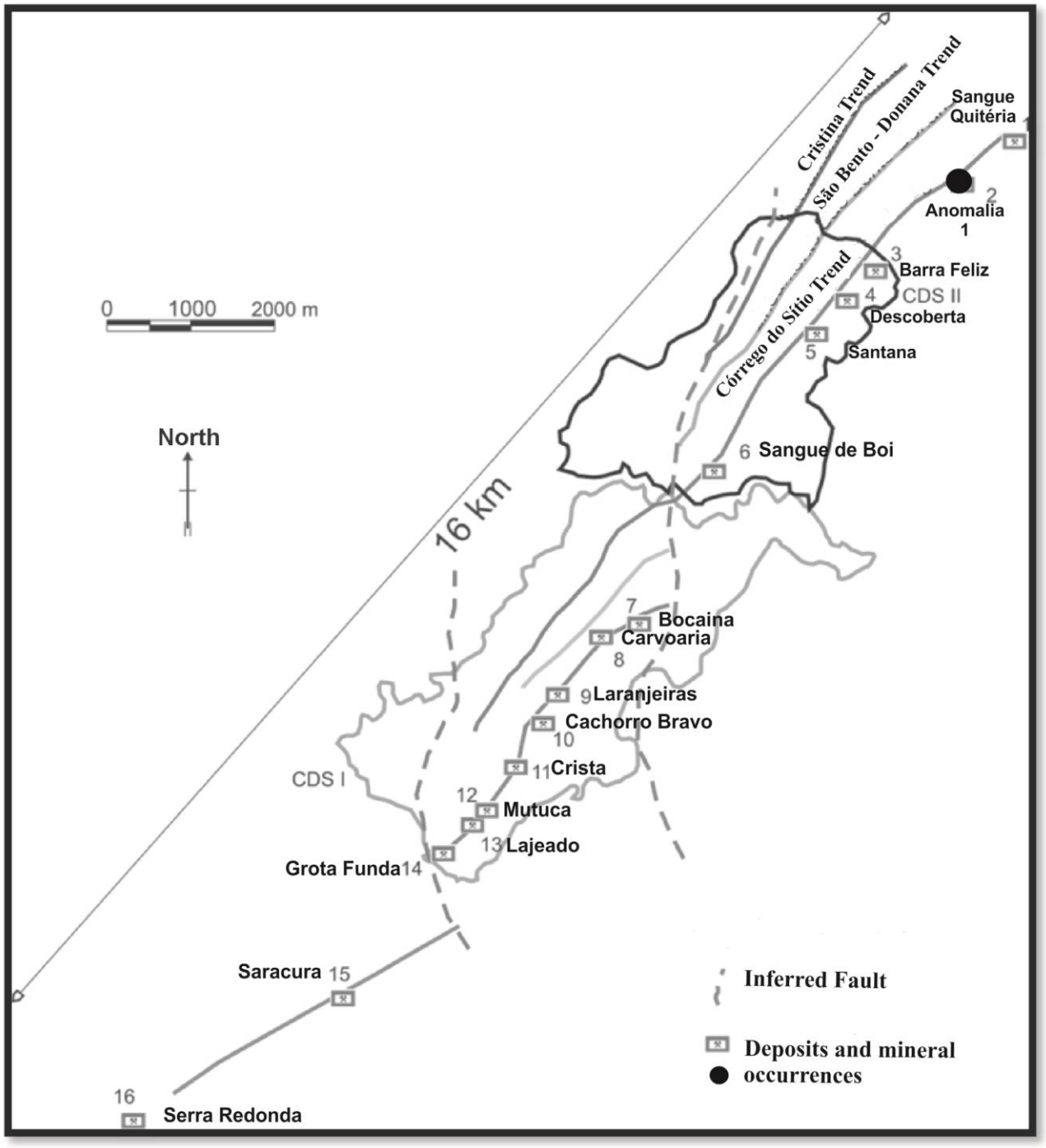

Figura 2.2. The NE-SW 16-km long Córrego do Sítio auriferous lineament, displaying the Cristina, São Bento-Donana and Córrego do Sítio structural trends (modified from Lima, 2012).

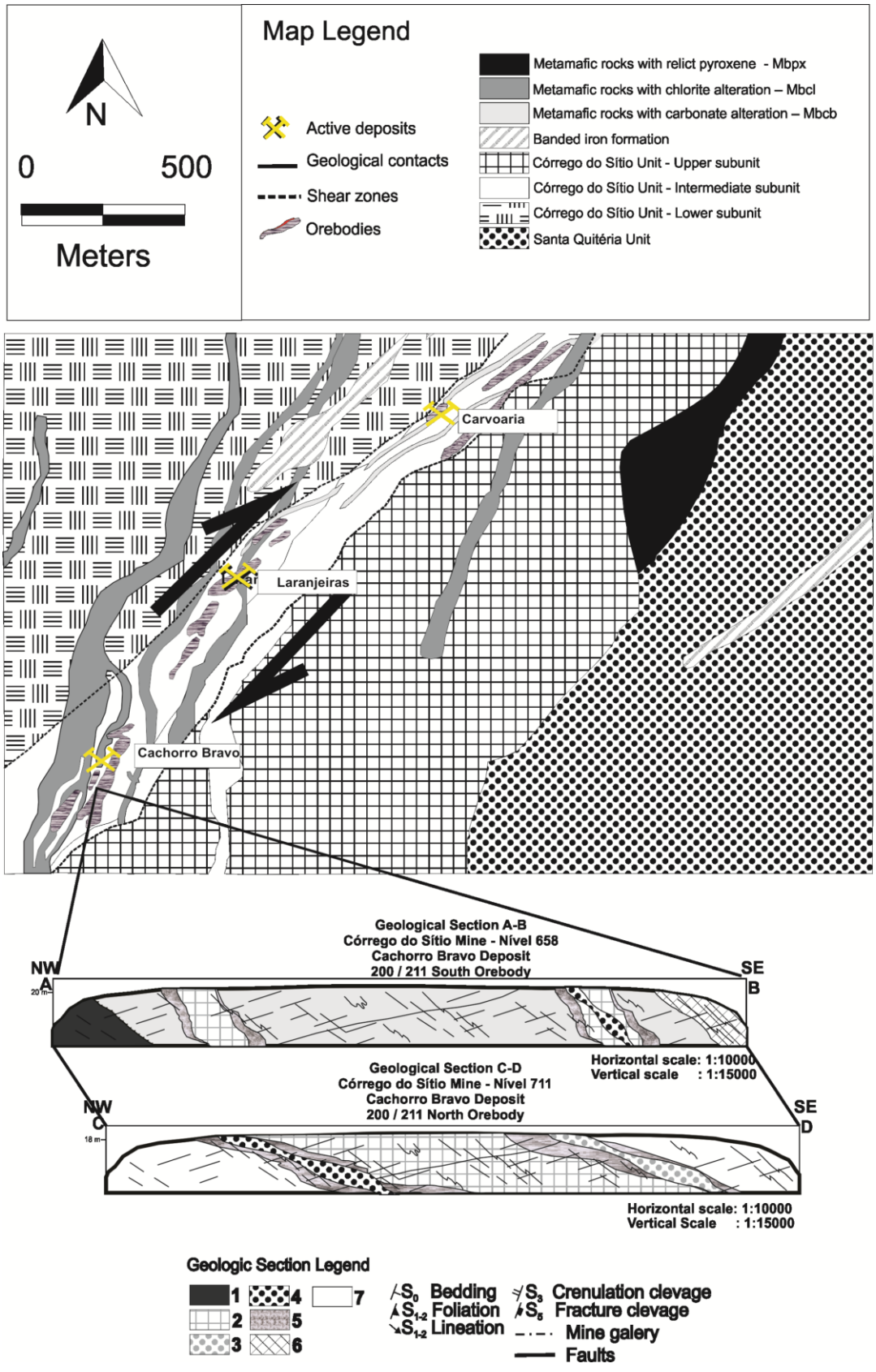

Figura 2.3. Geological map of the Córrego do Sítio Lineament, central portion (modified from Sequetto-Pereira et al. 2014)

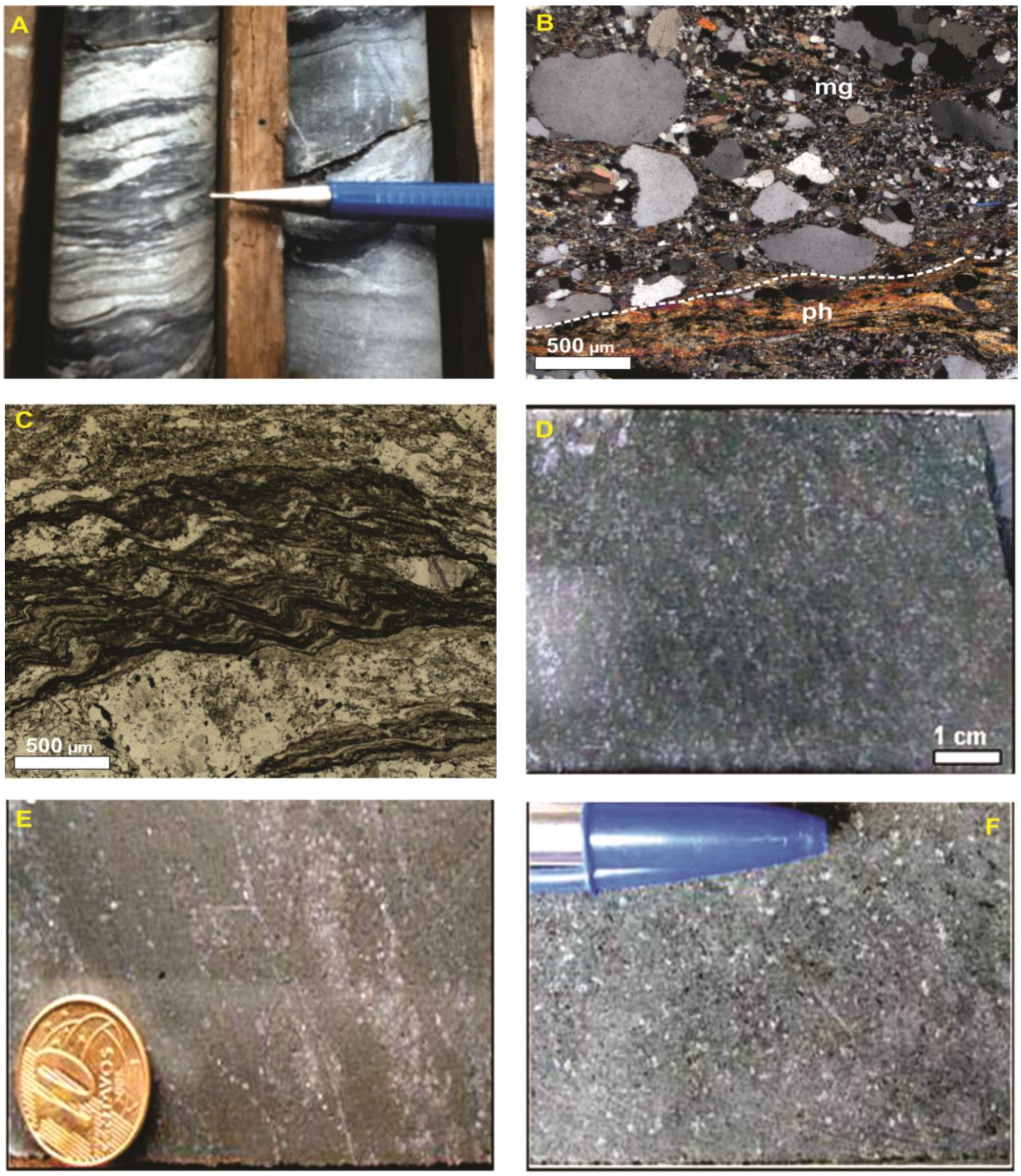

Figura 2.4. Rhythmic alternation of graded phyllites (ph) and metagraywackes (mg). (A) Macroscopic. (B) Microscopic transmitted light (TL). (C) Photomicrograph of carbonaceous phyllite, TL. Metamafic dikes and sills: (D) Metamafic dikes and sills incipiently alteration.

Tabela 2.1. Micro and macroscopic aspects of the Córrego do Sítio lineament metamafic rocks (modified from Lima, 2012)

Geologic unit	Thickness (m)	Mineralogy	Macroscopic characteristics of rocks			
		Essential	Accessories	Center	Intermediate	Border
MBpx[1] - incipiently altered metamafic rocks with relict pyroxene (Fig. 4D)	60 to 100	Pyroxene Amphibole Biotite Plagioclase Chlorite Quartz Titanite Muscovite Carbonate	Magnetite Ilmenite Pyrite Pyrrhotite Chalcopyrite Sphalerite Apatite	Dark green Medium to coarse-grained Preserved ophitic to subophitic igneous texture Chlorite orientation in cleavage Rare quartz and carbonate veinlets	Light to dark green Medium to coarse-grained Chlorite, biotite and muscovite aligned along cleavage Stockwork with millimeter quartz-carbonate veinlets	Light to dark green Medium to coarse-grained Chlorite, biotite and muscovite aligned along cleavage Dense stockwork with centimetric to millimetric quartz-carbonate veinlets
MBcl[2] - metamafic rocks with chlorite and muscovite alteration (Fig. 4E)	10 to 40	Hornblende Tremolite-actinolite Plagioclase Chlorite Epidote Carbonate Quartz Muscovite Biotite	Magnetite Titanite Ilmenite Rutile Pyrrhotite Pyrite Chalcopyrite	Dark green Medium to coarse-grained Preserved ophitic to subophitic igneous texture Chlorite oriented in cleavage Rare quartz and carbonate veinlets	Light to dark green Medium to coarse-grained Chlorite and muscovite aligned along cleavage Stockwork with millimeter quartz and carbonate veinlets	Light green to grey Medium to coarse-grained Chlorite and muscovite orientated along penetrative cleavage Stockwork with millimeter quartz and carbonate veinlets
MBcb[3] - metamafic rocks with chlorite and carbonate alteration (Fig. 4F)	0.10 to 7	Muscovite Carbonate Chlorite Quartz Tremolite Actinolite	Pyrrhotite Pyrite Chalcopyrite	Grey to dark grey, massive rocks. Thinnest intrusion of all. In swarms and radial directions. Their contacts may be crosscut and displaced by E-W faults. Do not display hydrothermal zoning and exhibit incipient schistosity. Euhedral carbonate crystals are dispersed throughout the rocks. Quartz, carbonate, sulfide and sulfosalts may develop euhedral crystals in vugs. Local crenulation cleavage is present.		

Local mine names: (1) DB4; (2) DB2, DB5; (3) DB1.

2.4 Geology and mineralogy of the deposits

For the Cachorro Bravo deposit, the 1:100-scale geological mapping included the outcrops exposed in a 250-m section of the mine galleries. The host metaphyllites and metagraywackes of the 658 and 711 galleries are hydrothermally altered and deformed, showing no apparent significant geological depth variations. The mapped deposits are located exclusively in the Intermediate subunit, where the regional rocks and structural features are easily recognized and correlated (Figs. 2.5 and 2.6).

The gold-bearing ore veins take the form of narrow, mineralized lodes and elongated boudins that strike 20° – 30° to the NE and dip between 60° and 70° to the SE. Metamafic MBcl dikes and sills

are always located in the hanging wall; they only crop out in the 658 gallery (Fig. 2.5), although they occur to the west of the 711 gallery (Fig. 2.6),.

The galleries 658 and 711 (Figs. 2.5 and 2.6) have an N-S horizontal strike and a depth of 115 and 170 m below surface, respectively, with mineralized lenses that extend to 250 m along the length of each gallery. Each lens is about 6 m wide, covering an area of 1,500 m^2 (Figs. 2.5 and 2.6), with the orebody plunging on average 130/35. Together with graywacke lenses, carbonaceous phyllite locally dominates the mapped area along the eastern wall. In the SW portion of the 658 gallery, metamafic MBcl dikes and sills represent the hydrothermal alteration boundary, since these rocks are practically unaltered beyond the contact with the metasedimentary host rocks. Quartz-carbonate veins occur along the mine gallery. Fault zones are common in the carbonaceous phyllite layers. Silicification zones predominate in the southern part of the gallery.

From N to S in the mapped areas, the turbiditic sequence varies from a somewhat psammitic to more pelitic, although in general the pelitic component dominates and is mainly represented by carbonaceous phyllites; outcrops of metagraywacke are exposed on the E side (Figs. 2.5 and 2.6).

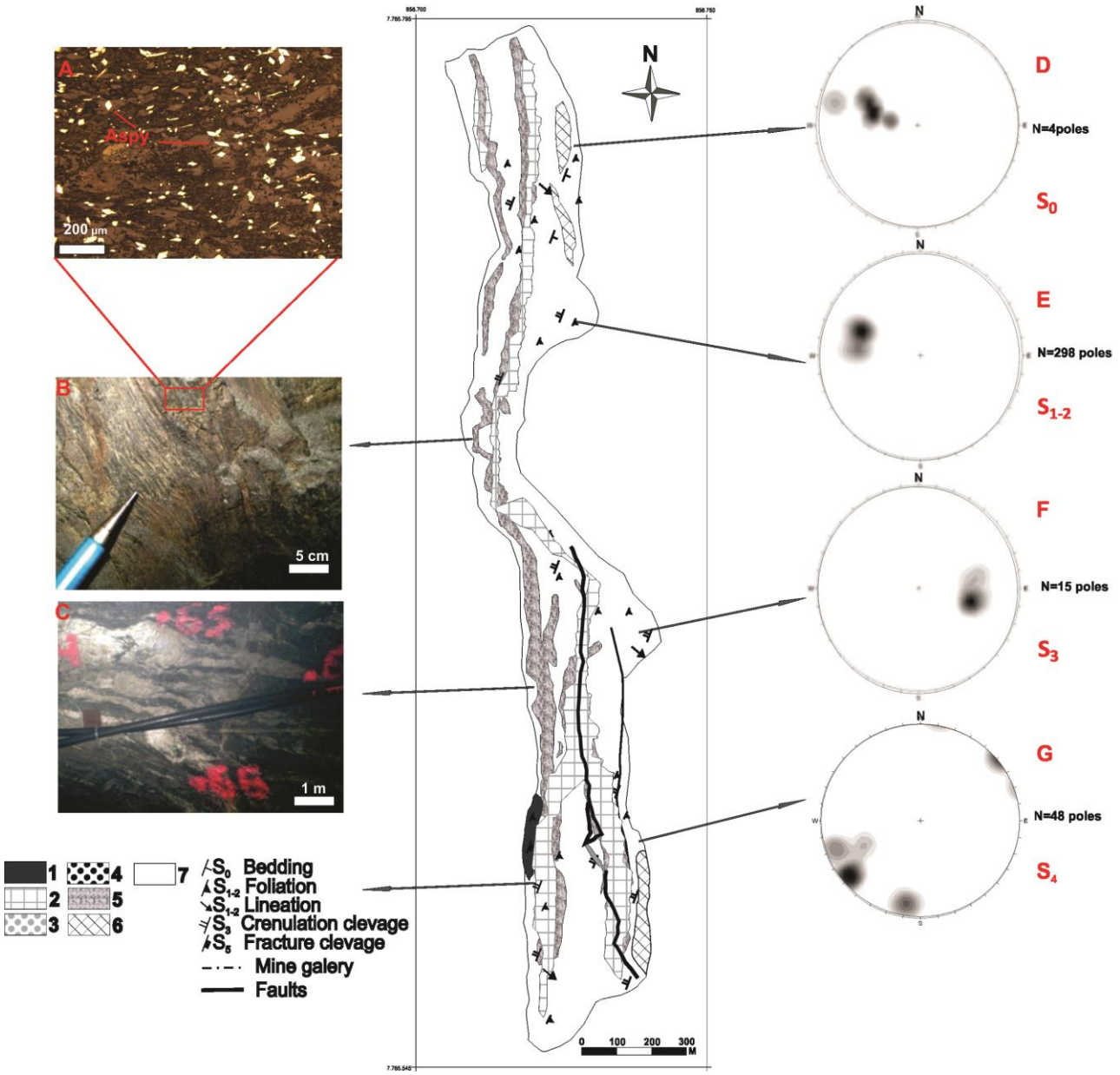

Figura 2.5. Simplified 1:100 scale geological map of mine Gallery CB-658-200/211-south with lithological types (A to C) and structural data (stereograms D to G), Córrego do Sítio intermediate unit, Cachorro Bravo gold deposit. (A) Photomicrograph of disseminated arsenopyrite (Aspy) in metasedimentary rocks (reflected light). (B) Intercalation of phyllite and metagraywacke along bedding (S0). (C) White/smoky-quartz-carbonate veins and veinlets in metasedimentary rocks. (D) Bedding (S0). (E) Mylonitic foliation (S1-2). (F) Crenulation cleavage (S3). (G) Fracture cleavage (S5).

2.4.1 Structures

The oldest planar structure, S_0 is the compositional and gradational banding that trends to the SE and is concentrated in the phyllite layers as an upward grain-size coarsening, rarely perceptible in the metagraywacke lenses; S_0 has a modal orientation of 114/59 (Figs. 2.5D, 2.6D, 2.7A, and 2.7E).

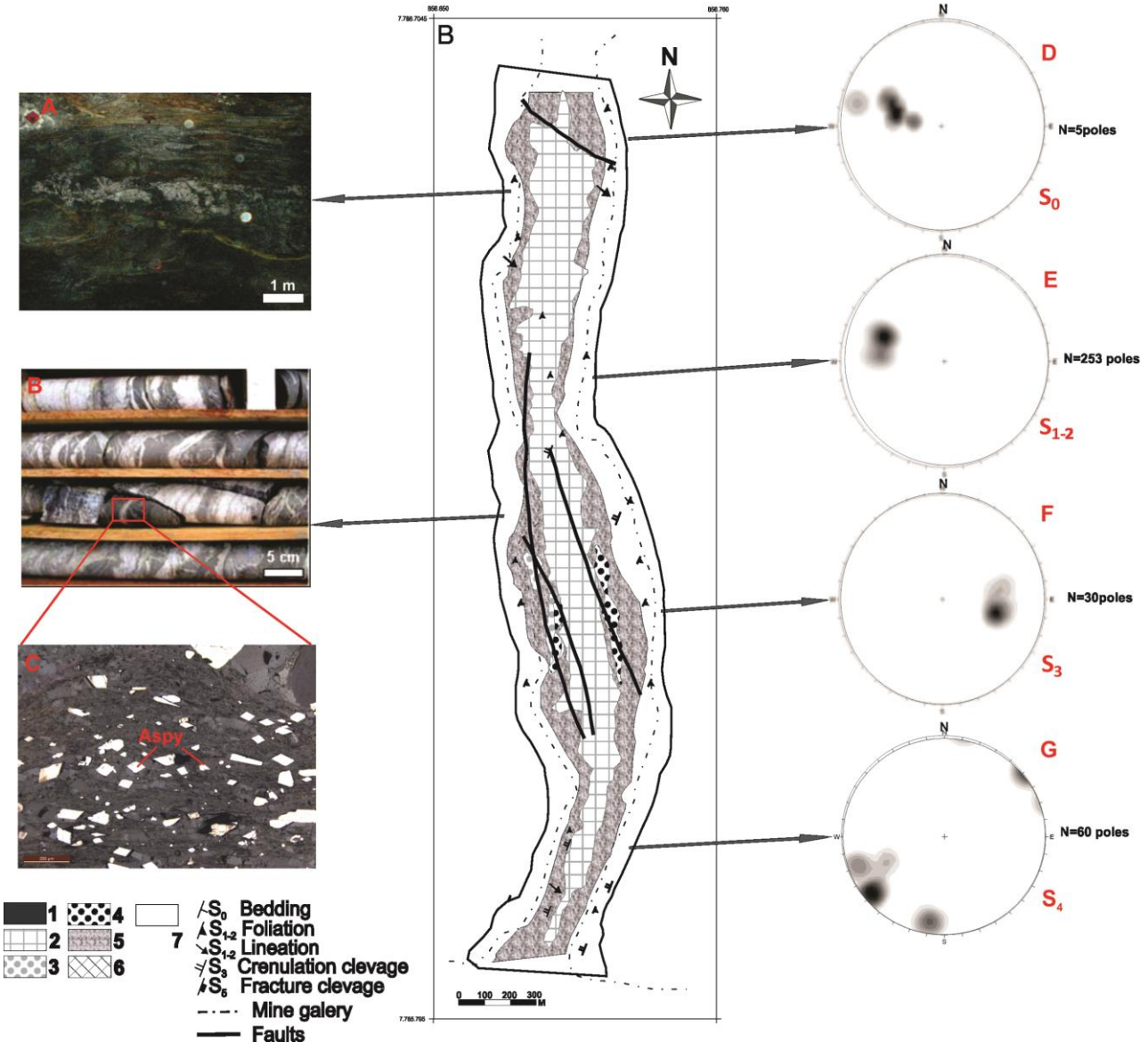

Figura 2.6. Simplified 1:100 scale geological map of mine Gallery CB-711-200/211-south (as in Fig. 5) with lithological types (A to C) and structural data (stereograms D to G), Córrego do Sítio intermediate unit, Cachorro Bravo gold deposit. (A) Intercalation of phyllite and metagraywacke along bedding (S0). (B) White/smoky-quartz carbonate veins and veinlets in metasedimentary rocks near the contact with metamafic dikes and sills with chlorite and muscovite alteration (MBcl). (C) Photomicrograph of disseminated arsenopyrite in metasedimentary rocks (reflected light). (D) Bedding (S0). (E) Mylonitic foliation (S1-2). (F) Crenulation cleavage (S3). (G) Fracture cleavage (S5).

The pervasive S_{1-2} foliation is parallel or sub-parallel to the bedding planes. These structures are mainly present in the carbonaceous phyllite and the hydrothermally altered metamafic rocks, but are subordinate in the metagraywacke. The S_{1-2} foliation is defined mainly by aligned sericite and has a strong dip to SE, with a modal orientation of 119/70 (Figs. 2.5E, 2.6E, 2.7B, and 2.7F), followed by a rarely observed down-dip L_{m1-2} lineation with a 45/45 orientation. The dip of the foliation

increases both in the S direction and vertically (from the 658 to the 711 gallery) by roughly 1 – 2 degrees, and regionally it is more intense in the SW quarter. Folds are well visualized when structural data from various levels are compiled. They are well defined by the main foliation S_{1-2} in metasedimentary rocks.

The S_3 crenulation cleavage is an important structural element characterized by having an opposing dip to S_{1-2}. Similarly to S_{1-2}, this structure is very well marked in the carbonaceous phyllite and is subordinate in graywackes (Figs. 2.5F, 3.6F, 2.7C, and 2.7G). The S_3 crenulation cleavage data are concentrated in the SE quarter with orientations 280/60, 250/65, and 270/66 (Figs. 2.5F, 2.6F, and 2.7D).

The last structure recognized in the mapped areas is the S_4 spaced fracture cleavage, with a N-NW direction and a modal orientation of 60/82. These fractures are centimetre-to-metre spaced and filled by quartz and carbonate (Figs. 2.5G and 2.6G).

Shear zones were mapped mainly in the carbonaceous phyllite layers, with the development of S-C structures parallel or sub-parallel to S_{1-2}. Faults are well displayed in the carbonaceous phyllite, showing a NW-SE strike.

2.4.2 Mineralization and hydrothermal alteration

The ore zone is predominantly hosted at the stratigraphic break between metasedimentary and metamafic rocks. Mineralization is associated with intense silicification and narrow, variably deformed, quartz-carbonate-bearing veins parallel to the S_{1-2} foliation (Figs. 2.7H and 2.7I). Lodes are generally located within structurally favorable S_{1-2} sites in shear zones and folds, while individual veins are 0.1 to 5 m thick, locally up to 10 m. The lode gold quartz-carbonate veins are discontinuous both along strike and down dip and are highly boudinaged (Ribeiro et al. 2013, Sequetto-Pereira et al., 2013; Table 2.2). Canale (1999), David (2006), Porto (2008), Lima (2012), Ribeiro et al. (2013) and Sequetto-Pereira et al., (2013) describe the structurally controlled

mineralization styles as disseminated, sulfide replacement and associated with quartz-carbonate-sulfide ± sulfosalts veins.

Tabela 2.2. Synthesis of vein characteristics modified from Ribeiro et al. (2013) and Sequetto-Pereira et al. (2013).

Type	Reference		Mineralogy	Thickness (cm)	Host rock	Vein texture	Orientation	Associated structure
	Ribeiro *et al.* (2013)*	Sequetto-Pereira *et al.* (2013)						
Early-stage alteration, mineralized veins	V1	V1a	Smoky quartz-ankerite-arsenopyrite-pyrite-gold	1 – 600	Metagraywacke, schist and phyllite	Pinch-and-swell	120/70	Parallel to foliation S_{1-2} Folded with axial- plane foliation Shear veins
		V1b	Milky quartz-ankerite-arsenopyrite-pyrite-pyrrhotite-free gold			Massive	120/70	
		V1c	Laminated smoky or milky quartz with pyrite gold			Granulated	120/70	
Later-stage veins (non-mineralized)	V2	V2a	Milky quartz-(subordinate) ankerite	Irregular	Metagraywacke, schist and phyllite	Massive	70/70 and 160/80	Diagonal to foliation S_3
		V2b	Quartz-ankerite-pyrite	2 – 300	Metagraywacke, schist and phyllite	Massive	295/40	Parallel to foliation S_3 Extensional veins
	V3	V3a	Milky quartz-(subordinate) ankerite	1 – 20	Metagraywacke, schist and phyllite	Fibrous	70 – 130/80	Parallel to foliation S_4 Fracture veins
		V3b	Milky quartz-ankerite veins and schist fragments			Breccia	60/70	
	-	V4	Varied mineralogy	Irregular	Metagraywacke, schist and phyllite	Massive	300/30	Parallel to foliation S_3
	V4	V5	Quartz-carbonate-calcite	1 – 15	Metamafic dikes and sills	Shear veins/ stockwork	90/80	Varied structures Extensional veins

*Chronological classification

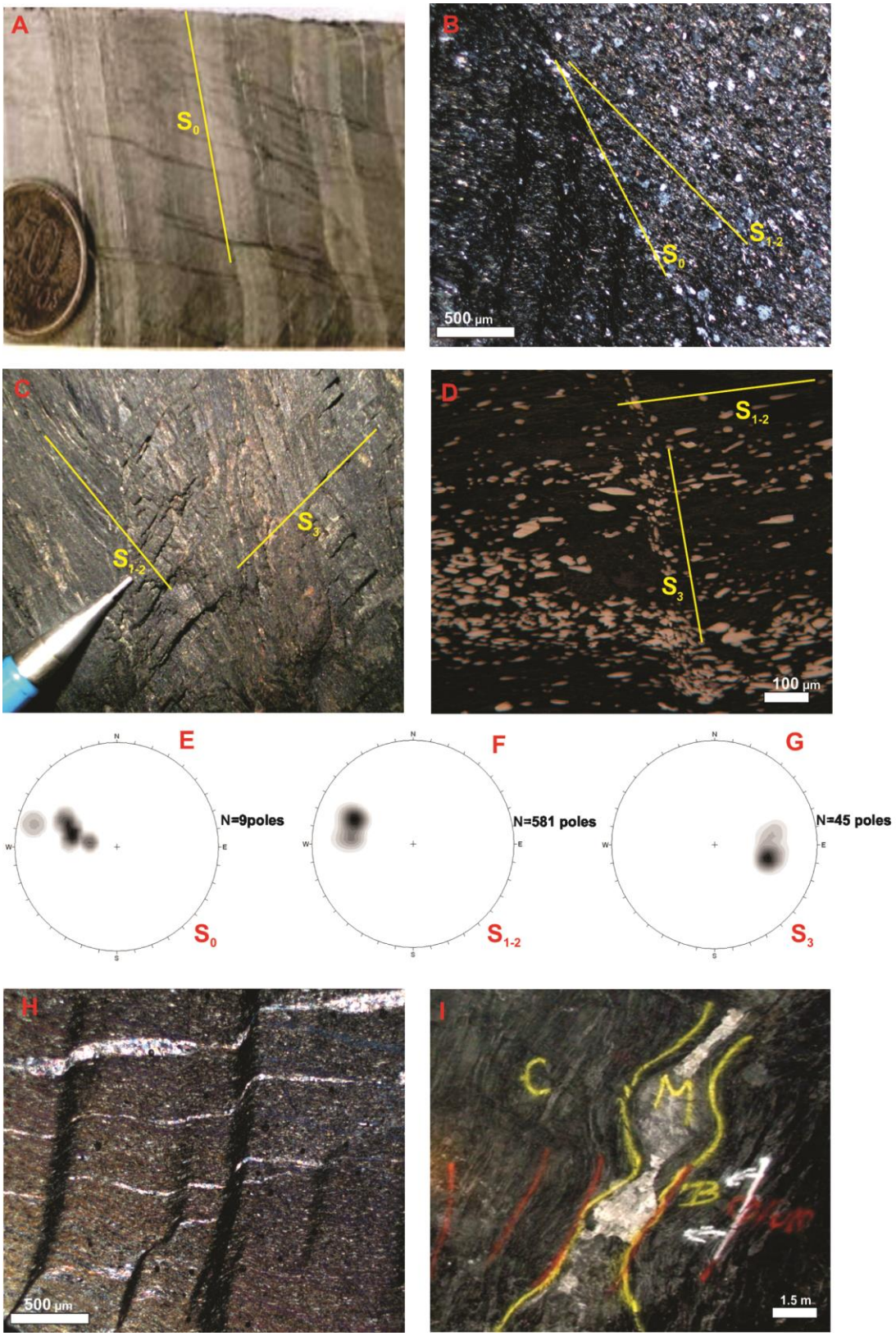

Figura 2.7. Structural data from the Córrego do Sítio auriferous lineament. (A, B, E) Bedding (S0). (B) With transmitted light. (C) With reflected light. (D, F) Mylonitic foliation (S1-2). (C, D, G) Crenulation cleavage (S3). (H) With transmitted light. (I) Pinch--and-swell mineralized flattened veins and veinlets (M) of Cachorro Bravo deposit (C and B in the picture).

Smoky quartz in veins containing carbonate-sulfide-sulfosalt is xenoblastic, very deformed, with lobate edges and wavy extinction. Subhedral and polygonal quartz crystals show straight to undulose extinction (Ribeiro et al., 2013). Fine-grained, anhedral carbonate is abundant. Milky quartz is granoblastic and represents a recrystallization product of the smoky quartz; it is commonly concentrated near metamafic dikes and sills. The milky recrystallized quartz forms mosaic textures of polygonal and subhedral crystals, with straight extinction. Fine-grained crystals are associated with fine, anhedral carbonate (Ribeiro et al., 2013).

Many descriptions of the relationship between gold and veins in the older literature of Archean deposits of the Quadrilátero Ferrífero indicate that gold is most commonly found in smoky quartz veins (e.g. Martins et al., 2016). However, in the Cachorro Bravo deposit, gold is consistently found in both milky and smoky quartz veins, and the same is true for the Laranjeiras deposit, in which gold is most commonly located in sulfide-bearing, S_1-concordant veins. However, this is not a typical feature of other metasedimentary-hosted vein gold deposits (*e.g.* Cox et al., 1991).

Mineralogical and textural transformations accompanying wall-rock alteration are observed surrounding the main mineralized vein systems (Fig. 2.8), although the limits of the alteration zones (Fig. 2.9) are not always sharp and regular. There are two main distinct hydrothermal alteration assemblages of the host metasedimentary rocks, which depend on the proximity to metamafic dikes. Whereas the Cachorro Bravo deposit is closely limited on both sides by dikes (specifically MBcl), these igneous intrusions are located farther away from the Laranjeiras and Carvoaria deposits (Fig. 2.2). In the former, chlorite and pyrrhotite are present, while at Laranjeiras and Carvoaria berthierite, stibnite and pyrite are part of the distinct mineral assemblage (Figs. 2.9A and 2.9B).

The main hydrothermal minerals in all deposits include quartz, carbonate, white mica, chlorite and accessory rutile, titanite, apatite ilmenite and sphalerite. Minerals in trace amounts include chalcopyrite, galena, sphalerite, sulfosalts and tetrahedrite.

The hydrothermal assemblage in metamafic rocks is chlorite, epidote, calcite, quartz, muscovite and rare biotite. The accessories are magnetite, ilmenite, rutile, pyrrhotite, pyrite, chalcopyrite, galena and sphalerite (Fig. 2.10). In transitional zones, the consumption of carbonaceous matter is almost complete (Porto et al., 2006, Porto, 2008) with bleaching of these carbon-rich phyllites.

Mineralization in the mapped area is composed of white/smoky-quartz-carbonate veins and veinlets in metasedimentary rocks near the contact with MBcl dikes, containing sericite, chlorite and carbonate and showing transitional zones with dikes. Arsenopyrite is the main sulfide mineral, but pyrrhotite is also significant in the proximity to dikes.

Based on the mineralogical composition and mineral textures, Lima (2012) identified gold in five associations: (i) free and disseminated electrum in quartz-carbonate veins; (ii) included in disseminated arsenopyrite, generally parallel to the main foliation and associated with phyllosilicates, chlorite, sericite or muscovite; submicroscopic gold observed in subhedral arsenopyrite crystals, suggesting the presence of invisible gold (Porto, 2008); (iii) included in berthierite; (iv) included in pyrite or pyrrhotite that are disseminated parallel to the main foliation in micaceous portions; (v) included in silicates, such as quartz or muscovite.

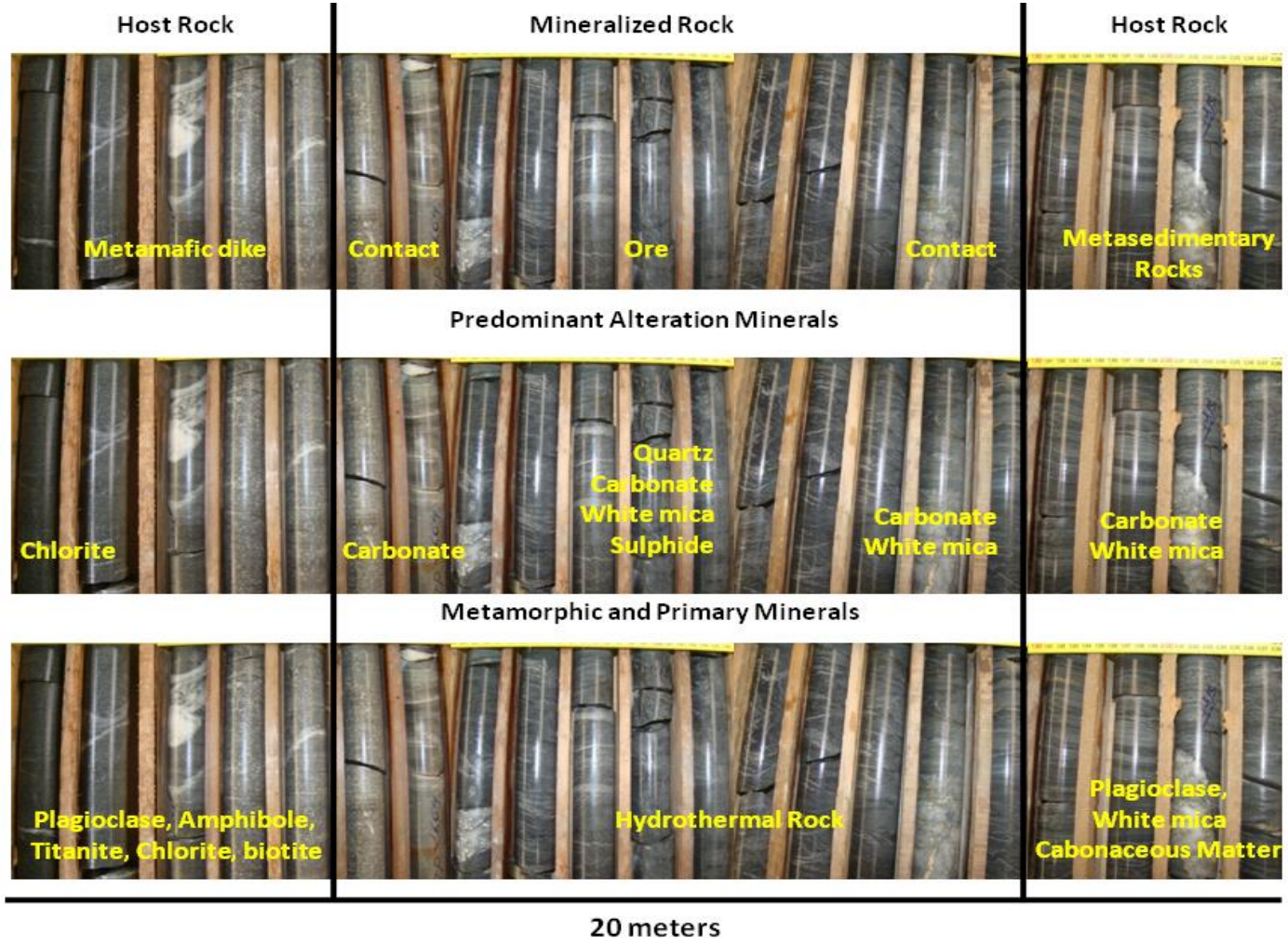

Figura 2.8. Hydrothermal alteration zones along the contact between metasedimentary and metamafic rocks (modified from Porto, 2008).

Figura 2.9. Hydrothermal paragenic zoning, including the main sulfi des, associated with gold in (A) Metapelite. (B) Metagraywackes, Córrego do Sítio auriferous lineament. Line thicknesses represent schematically the relative quantities of each mineral deposited (constructed also including data from Porto, 2008 and Lima, 2012).

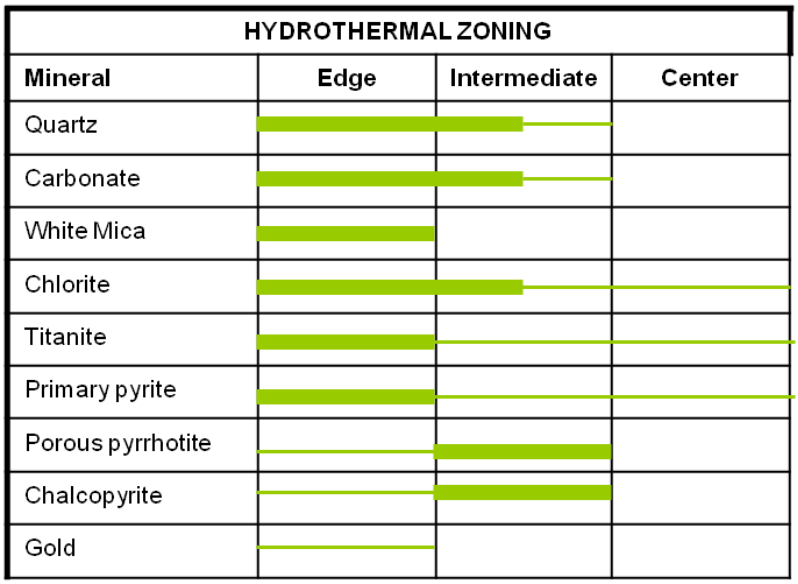

Figura 2.10. Hydrothermal paragenic zoning, including the main sulfide minerals in metamafic rocks of the Córrego do Sítio auriferous lineament. Line thicknesses represent schematically the relative quantities of each mineral deposited (constructed also including data from Porto, 2008 and Lima, 2012).

2.4.3 Petrography of sulfides

Sulfide minerals are present mainly along the edges of veins, with pyrite being the most common (Lima, 2012). Three generations of pyrite are recognized: (i) isolated and disseminated pyrite in carbonaceous layers, in non-mineralized zones, in circular or rounded aggregates that may be folded and partly disintegrated (Fig. 2.11A); (ii) ± porous pyrite crystals, which may contain gold, associated with a myriad of other sulfide minerals, commonly displaying irregular boundaries of smooth pyrite; porous pyrite may be replaced by arsenopyrite (Figs. 2.11B and 2.11C); (iii) late-stage, smooth euhedral pyrite in isolated crystals that apparently result from borders of the porous pyrite (Fig. 2.11D). Early-stage porous pyrrhotite is sometimes replaced by smooth pyrrhotite (Fig. 2.11D).

Arsenopyrite is the predominant gold-associated sulfide mineral in the Cachorro Bravo deposit, and is always present in the carbonaceous phyllites, where in veins it is also related to phyllite portions. Arsenopyrite forms from pyrite in mineralized metasedimentary rock zones away from metamafic

dikes and sills, or from pyrrhotite in mineralized transitional zones between metasedimentary rock zones and metamafic dikes and sills. Two generations of arsenopyrite are identified: (i) euhedral and subhedral, smooth, very fine-grained crystals, in prisms or needles (Fig. 2.11E), or (ii) anhedral to subhedral crystals (Fig. 2.11F) associated with pyrite or pyrrhotite, preserving the original habit and porosity of the latter sulfides. Stibinite and berthierite are commonly associated with the main sulfide minerals in the mineralized metasedimentary rocks, mainly in smoky quartz-carbonate-sulfide-sulfosalt veins. As indicated by Lima (2012), both porous pyrrhotite and pyrite occur in the core of sulfide crystal aggregates (Fig. 2.11G), with berthierite being the most abundant. This opaque mineral is present mainly in millimetric, subhedral to euhedral crystals in vugs, with inclusions of anhedral pyrrhotite, porous pyrite, anhedral arsenopyrite, chalcopyrite, sphalerite and gold.

Microprobe studies undertaken by Lima (2012) and Ribeiro et al. (2013) detailed a series of phases that are not identified under the microscope, including sphalerite, cobaltite, cinnabar, tetrahedrite, boulangerite-group minerals and ullmanite.

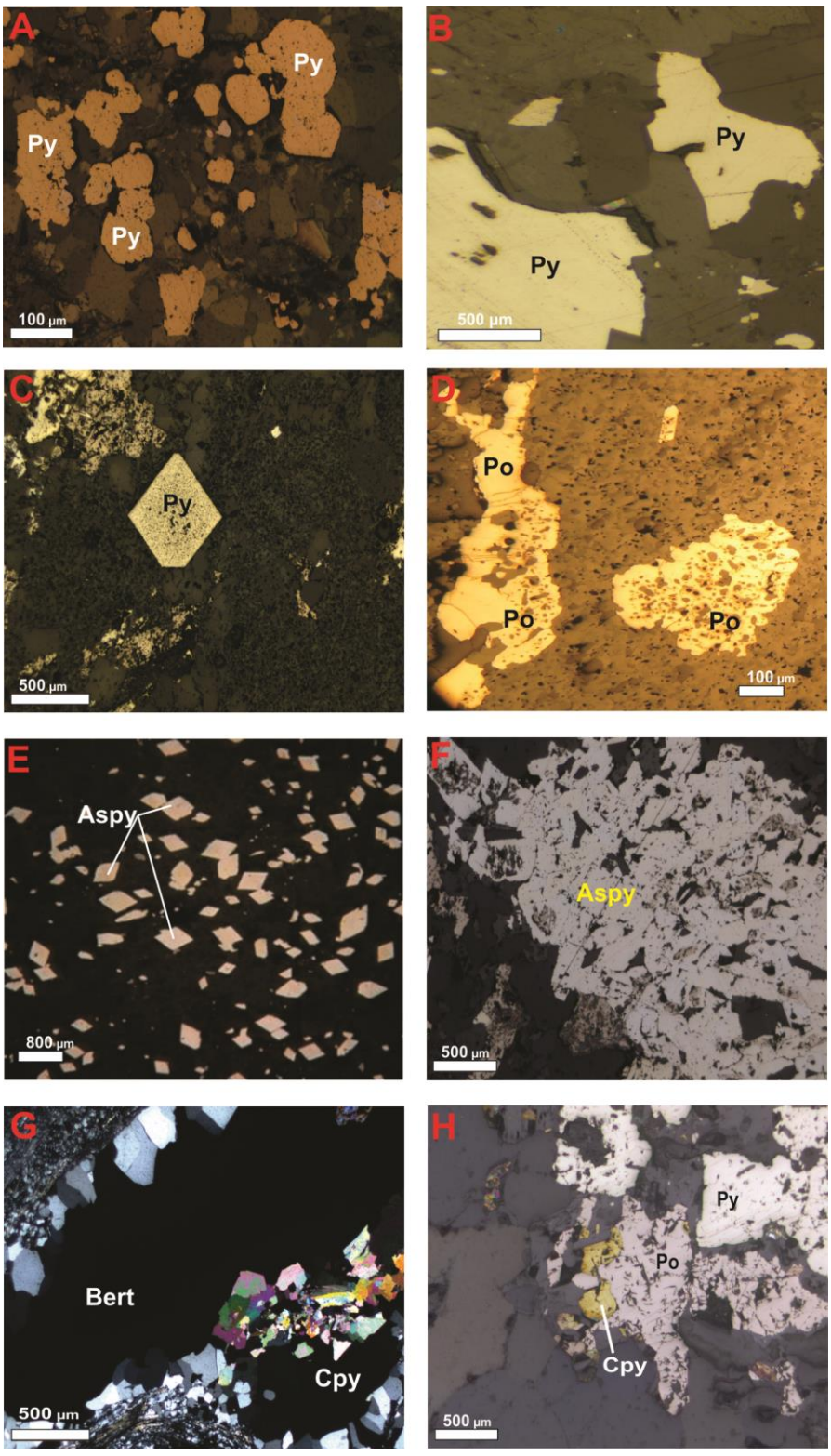

Figura 2.11 Generations of sulfide minerals associated with the Cachorro Bravo gold deposit, Córrego do Sítio auriferous lineament. (A) Primary rounded pyrite (Py) reflected light. (B) ± Porous pyrite (Py) reflected light. (C) Euhedral pyrite (Py) transmitted light). (D) Early stage, porous pyrrhotite (Po) replaced by smooth pyrrhotite (Po) reflected light. (E) Euhedral acicular arsenopyrite (Aspy) reflected light. (F) Anhedral-to-subhedral arsenopyrite (Aspy) reflected light. (G) Subhedral-to-euhedral berthierite (Bert) in vugs (transmitted light). (H) Sulfide crystals aggregates with chalcopyrite (Cpy) reflected light.

2.5 Discussion and Conclusions

The Archean Córrego do Sítio unit is the most abundant metasedimentary unit in the Rio das Velhas greenstone belt in Quadrilátero Ferrífero region (Baltazar and Zuchetti, 2007), occur as a sequence of metamosphosed turbidite sequence. Baltazar and Zuchetti (2007) included this unit in a resedimented association, which contains greywacke, phylites, and banded iron-formation. These facies represent deposition within different submarine ambient. Depositional characteristics in the Rio das Velhas greenstone belt are similar to other Archean sedimentary dominated greenstone belts in the world (Padgham, 1992; Krapez, 1993; Jackson *et ali.*, 1994; Ootes *et ali*., 2011).

The eastern portion of the Rio das Velhas greenstone belt is dominated by a package of metasedimentary rocks consisting of alternating metagraywackes and phyllites in a turbidite sequence, metamorphosed to the greenschist facies.

Metamafic dikes and sills have an NNE-SSW direction and are divided as incipiently altered metamafic rocks and hydrothermally altered type locally mineralized in gold. Clearly, the increased mineralization is combined with the proximity of metamafic dikes and sills. The Cachorro Bravo Deposit is, currently, the most important in production and records the largest amount of the metamafic rocks.

Four deformation events affected the mine sequence, and these are in part progressive. Event D_1 is characterized by a progressive foliation S_{1-2}, striking NNE, and dipping to ESE, producing tight, asymmetric, isoclinal and disharmonic, kink folds; D_2 is typified by a crenulation cleavage and a spaced crenulation cleavage S_3, which strikes NNE crosscutting the regional foliation S_{1-2} at a high angle to the NW; D_3 is represented by large-scale, open folds, arching S_0, S_{1-2} and S_3. These structures may represent more recent orogeny; and D_4 has parallel fractures, spaced from centimetres to metres along with open folds or subordinate kink folds with high angle vertical axial plane, striking mainly towards NW.

Two different vein types are important to mineralization, smoky-quartz-carbonate-sulfide-sulfosalt veins, which are very deformed; and milky-quartz-carbonate veins that represent the recrystallization product of the smoky quartz-carbonate veins. Sequetto-Pereira (2013) and Ribeiro *et al.* (2013) classified the mineralized veins as associated with smoky and milky quartz veins, and at the non-mineralized veins, are observed only

milky quartz veins. They commonly occur close to dikes and sills that probably have influenced their recrystallization (Ribeiro *et al.*, 2013).

Four types of structurally controlled, gold mineralization are identified along the deposits. These include disseminated, sulfide replacement, and associated with quartz-carbonate-sulfide±sulfosalt veins each showing a representative mineralogy and paragenetic sequence.

The main deposits Cachorro Bravo, Laranjeiras and Carvoaria have a paragenesis similar in other turbidite-hosted deposits worldwide (e.g., Jaclyn Deposit, Newfoundland Appalachians, Sandeman *et ali.,* 2010; Bendigo-Ballarat, Australia, Gao & Kwat, 1995; Wattle Gully Deposit, Australia, Cox *et ali.* 1995; Lachlan Fold Belt, Australia, Bierlein, 1998), where gold occurs both as free grains and in association with arsenopyrite and pyrite; stibnite in some lodes. The most common sulphides in all vein types are arsenopyrite, pyrite, chalcopyrite and pyrrhotite, presenting diverse textures, and more than one generation.

In the hydrothermal zones, arsenopyrite forms after pyrite or pyrrhotite, both of which is locally seen originated from the consumption of magnetite. Near the metamafic dikes, especially in the Cachorro Bravo deposit, arsenopyrite develops after pyrrhotite in the mineralized veins and veinlets. The pyrrhotite/arsenopyrite association along dike zones may reflect local conditions of relatively higher temperature (Mikucki, 1993). Arsenopyrite after pyrite is typical of alteration zones far from metamafic dikes, where veins are dominated by smoky quartz-carbonate veins with berthierite, stibnite and pyrite, and gold. In the Sb-Au-quartz veins, berthierite and stibnite are the most abundant Sb-bearing minerals. This mineralization stage is mainly observed in carbonaceous phyllites and has a gold-dominated association with porous arsenopyrite, which is the predominant gold-associated sulfide in the Cachorro Bravo deposit. Historical data reveal a remarkable correspondence to variations of gold abundance, suggesting a genetic relationship of gold enrichment to hydrothermal alteration, and this are common to several other described Archean lode gold deposits.

A 1:100-scale geological mapping of the Cachorro Bravo deposit was undertaken at the mine galleries 658 and 711 in the CB-658-200/211-south and CB-711-200/211-north orebodies, composed of carbonaceous phyllite with graywacke lenses that host millimetric to metric smoky-milky quartz-carbonate-sulfide-

sulfosalt veins. Metamafic rocks with chloritic alteration sills are always located west of the mined 200 series orebodies in the hanging wall and only outcrop in the 658 gallery.

Nevertheless, the mapped galleries illustrates that detailed petrographic and structural studies are capable of detecting mineralization and wallrock alteration zones around this deposit. The increase in the intensity of the hydrothermal alteration with the proximity to quartz lodes is indicated by the bleaching of the wall rocks, and the abundance of disseminated pyrite, pyrrhotite and arsenopyrite, as well as stibnite and berthierite.

The data presented provide some structural and petrographic similarities on models for formation of these deposits, assuming that the Cachorro Bravo, Laranjeiras and Carvoaria are representative of the metaturbidite-hosted lode-gold deposits. Vein formation and mineralization occurred in multiple episodes, as suggested by Sequetto-Pereira et al. (2013). The fluid was most likely modified during ascent and later interaction with wallrocks. This is consistent with the conclusions of other studies directed at lode-gold deposits of Archean to Phanerozoic ages (*e.g.* Goldfarb et al., 1988, 1991).

2.6 Acknowledgments

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PARTE III – ESTUDOS COMPARATIVOS DAS ASSOCIAÇÕES RESSEDIMENTADAS DO LINEAMENTO CÓRREGO DO SÍTIO E DA ÁREA AURÍFERA CUIABÁ-LAMEGO

3 GEOCHEMISTRY, IN SITU LA-ICP-MS AND SEDIMENTARY SOURCE OF THE HOST TO GOLD CLASTIC ROCKS IN THE RIO DAS VELHAS GREENSTONE BELT, BRAZIL

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ABSTRACT

The Rio das Velhas greenstone belt is located in the Quadrilátero Ferrífero district, in the southern extremity of the São Francisco Craton, State of Minas Gerais, SE Brazil. Turbidite sequences of the greenstone belt stratigraphy are largely distributed in the region, and represent clastic sedimentary associations dominated by alternating graywackes and pelites. Important turbidite-hosted gold deposits occur in the Córrego do Sítio lineament of the eastern sector of the Quadrilátero Ferrífero region. On the other hand, similar rocks overlying the area comprise the Cuiabá-Lamego BIF-hosted gold deposits which are loci to historical diggings and occurrences, in the northern sector. The geochemical data indicate that the clastic sedimentary rocks have a mixed and felsic sources for the eastern greywackes grade into pelagic sedimentary rocks. The in situ U-Pb and Lu-Hf detrital zircon analyses suggest that sedimentary rocks were sourced from granitoids belonging to the Rio das Velhas II and Mamona age magmatic events. Proterozoic ages, ranging between 2.0 and 2.45 Ga recorded by these isotope data reinforce the notion that Archean and Paleoproterozoic rocks are tectonically imbricated. Variations in Lu-Hf isotope analyses indicate that the source areas evolved via crust-mantle mixing processes. In situ LA-ICP-MS analyses on sulfide minerals of carbonaceous pelites from the Córrego do Sítio gold lineament, - pyrite, arsenopyrites and pyrrhotites grains from the Laranjeiras deposit, and pyrites grains from the Cachorro Bravo deposit which display a considerable range of trace element compositions. Two hydrothermal stages are recognized: (1) early hydrothermal, marked by the development of porous sulfides, during which some gold precipitation took place; and (2) main to late hydrothermal, recognized by the development of smooth sulphide minerals, containing peak gold in 135 ppm. The mixed source for the host rocks may explain why gold correlates to Se, As, Sb and Te of sedimentary affiliation, as well as to the mafic-ultramafic elements Co, Ni, and Pt. Arsenic is the most abundant trace element in Au-bearing porous and smooth pyrite (P-Py and S-Py), and porous and smooth arsenopyrite (P-Apy and S-Apy), of the Laranjeiras and Cachorro Bravo deposits, followed by Ni and Co. These elements were probably leached during hydrothermal alteration indicating a local metal and fluid source during gold mineralization. The As, Co, Ni, Te, Pb and Sb concentration in porous and smooth arsenopyrite from the main stages of gold mineralization has important implications for exploration of turbidite-hosted deposits in the Rio das Velhas greenstone belt, where Arsenopyrite and pyrite, which have the highest Au content, also record high concetration of these elements.

Keywords: Orogenic gold, geochemistry,U-Pb geochronology, Lu-Hf analyses, hydrothermal paragenesis, clastic sedimentary association, Rio das Velhas greenstone belt.

3.1 Introduction

Orogenic gold deposits (*e.g.*, Groves et al., 1998) are associated with a wide range of host rocks from from 2 to 15 km, and arguably 20 kmin the crust. Most of them are typified by mineral parageneses of the greenschist metamorphic facies (Poulsen et al., 2000; Goldfarb et al., 2005; Robert et al., 2005; Dubé and Gosselin, 2007, and references therein; Groves and Santosh, 2015), as is the case in the Archean greenstone-hosted deposits of the Quadrilátero Ferrífero (QF) mining district, Brazil.

Gold production in the QF Archean Rio das Velhas greenstone belt is significant worldwide (Ribeiro Rodrigues, 1998), with banded iron formations (BIF) being one of the most important host to gold mineralization (e.g., Lobato et al., 2001). These authors estimated that only 4% of all gold is produced from deposits hosted in rocks other than BIF, including ultramafic, mafic, volcaniclastic, and clastic rocks in general.

Based on these authors, Martins et al. (2016) calculated an approximate thickness of 5,550 m of clastic, clastic-chemical and volcaniclastic sedimentary rocks, making the Rio das Velhas a sedimentary-dominated greenstone belt.

The resedimented association, of Baltazar and Zucchetti (2007), hereinafter referred to as "clastic sedimentary association", is locally an important host to gold. This is the case in the Córrego do Sítio lineament (*e.g.*, Ribeiro et al., 2015, Roncato et al., 2015, Lima, 2012), here referred to as the eastern sector, where three different sequences of graywacke-argillite outcrop. The lineament forms a series of NE-SW regional tracts known as Córrego do Sítio, Cristina and São Bento-Donana shear zones, containing gold deposits with resources of approximately 5.12 Moz (Sequetto Pereira et al., 2013; Roncato et al., 2015). They represent the most important metaturbidite-hosted gold deposits in the QF district, with sixteen diggings and deposits, including Cachorro Bravo, Laranjeiras and Carvoaria (Roncato et al., 2015), having an annual production planned to average 140,000 oz a year. The Cachorro Bravo deposit is the most productive of them all at 7.6 g/t of Au, followed by

Carvoaria (6.7 g/t) and Laranjeiras (6.3 g/t). They represent 25%, 18%, and 37% of the total reserves, respectively.

The Córrego do Sítio occurrences were discovered in the 1980's, produced gold in open-pit operations since 1990, and finally started underground mining in 2002 by AngloGold Ashanti Córrego do Sítio S/A-AGABM (Porto, 2008). The BIF-hosted São Bento deposit is located at the extreme NE limit of the lineament, with a historical production of 56.2 tonnes from 1986 to December 2006 (*e.g.*, Martins Pereira et al., 2007).

The Lamego and Cuiabá gold deposit area, with underground mines are also operated by AGABM, are here referred to as the northern sector, and located near the town of Sabará (Figs. 3.1). The BIF-hosted Lamego deposit (1.3 million ounces resource contained Au at 7.3 g/t Au; Martins et al., 2016) is located at the southwestern end of the area, where gold also associated with pervasive zones of silicification, similar to zones of silica flooding. The world-class BIF-hosted Cuiabá (*e.g.*, Ribeiro Rodrigues et al., 2007, Lobato et al., 2005) deposit contains 150 t of gold (5 Moz produced until 2015 and more 7 Moz in mineral resources; AGA, personal communication), where sulfide (mainly pyrite) replacement of BIF is the dominant gold mineralization style. Both deposits consist of mafic volcanic rock, chert and BIF, carbonaceous and micaceous pelites, which belong to the volcano-chemical and clastic-chemical lithofacies associations (Baltazar and Zucchetti, 2007).

Rocks belonging of the volcaniclastic-clastic sedimentary associations cover the whole area of the Cuiabá-Lamego gold deposit area, where metaturbidites prevail. Although no important gold deposit of this association have been mined until today, a series of old artisanal diggings have historically produced some gold, such as at the Descoberto de Cuiabá and Biquinha mines (Vial et al., 2007). Minor diggings also include Viana, São José, Cristais, Herbert Marins, Capão, Brumado, Enforcado and Galinha.

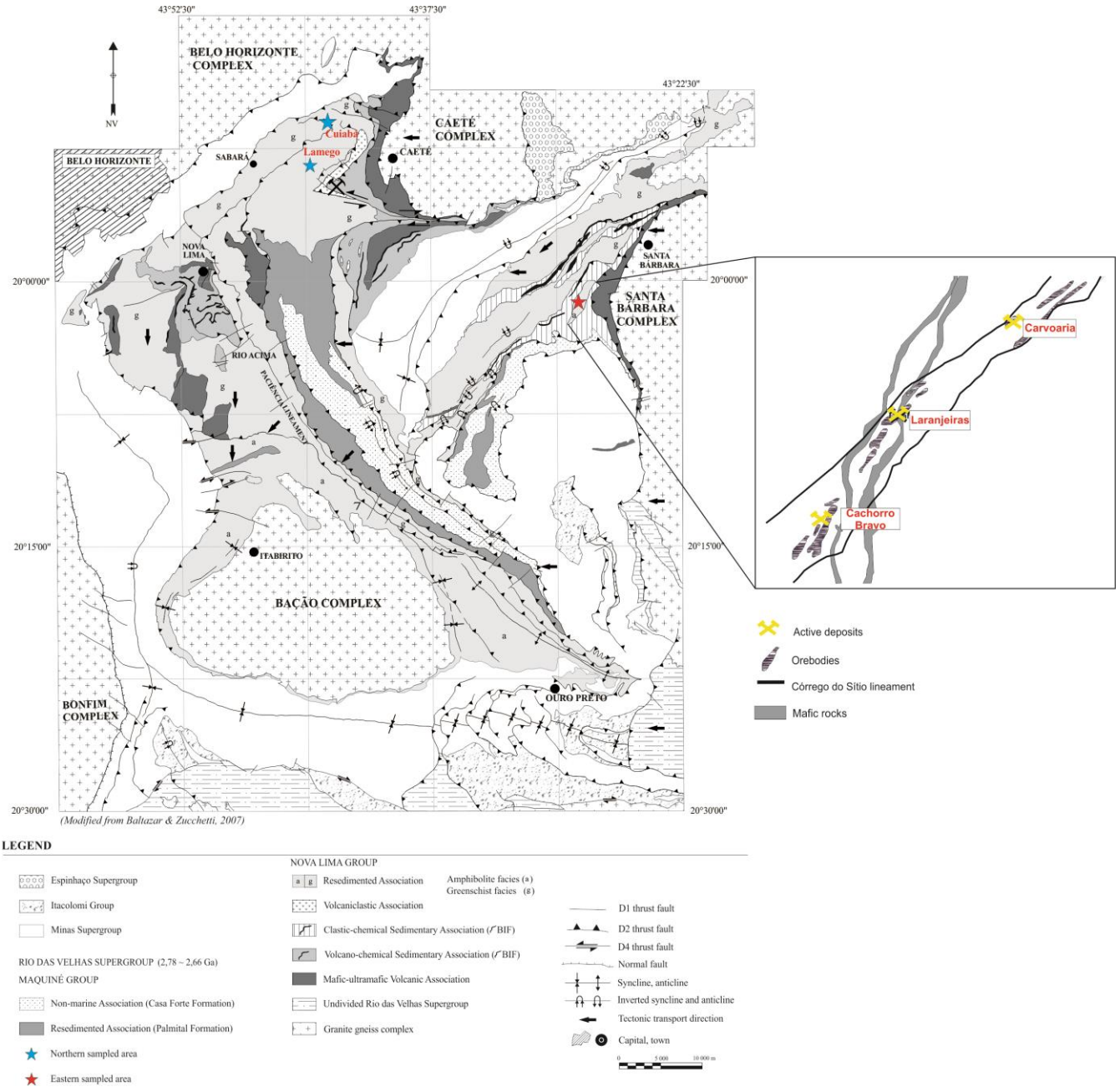


Figure 3.1. Geological map of the Quadrilátero Ferrífero district showing location of sampled areas, i.e., the eastern Córrego do Sítio lineament (deposits indicated in inset; geology modified from Lima, 2012) and northern Cuiabá-Lamego gold deposit area in the Rio das Velhas Supergroup (modified from Baltazar and Zucchetti, 2007).

Other metaturbidite-hosted gold diggings are described in the northern branch of the Paciência structural lineament (Fig. 3.1), including Engenho de Baixo and Velho. The lineament also hosts

Engenho d´Água (Beleque, 2015), which produced (2.91 tons of gold) mainly from 2007 to 2011, as well as the gold occurrences Olhos d'Água and Crista.

Archean metaturbidites are producers of gold especially in the Slave province of Canada, where deposits of the Quetico metasedimentary belt (Sawyer, 1986) and the world-class Roberto deposit (Fontaine et al., 2015) are examples. In fact, the discovery of the Roberto deposit in 2004 has greatly increased the interest of mining companies in the Archean sedimentary rock sequences such as of Superior Province, which became targets with high exploratory potential (Beauchamp et al., 2015).

As new exploration frontiers for gold in Archean greenstone belts are demanded, the characterization of their clastic sedimentary sequences become more critical in order to distinguish the most fertile host sediments. This is the case of the Rio das Velhas greenstone belt where sedimentary rocks dominate (Baars, 1997).

We have sampled (Fig. 3.1) turbiditic graywackes and pelites from the eastern, gold-producing Córrego do Sítio lineament, and the northern Cuiabá-Lamego gold deposit area, seeking to examine similarities and differences between them. The study intends to constrain the source of these sedimentary rocks, their tectonic setting and provenance, as well as possible exploration implications. To meet these purposes, whole-rock geochemistry, as well as U-Pb and Lu-Hf determinations on detrital zircon grains were applied. To further constrain the source of the Córrego do Sítio turbidites, in situ LA-ICP-MS analyses on the ore-sulfide minerals have also been undertaken, helping establish the hydrothermal stages experienced in selected deposits of this lineament.

3.2 Regional setting of the Quadrilátero Ferrífero-QF District and surroundings

The Quadrilátero Ferrífero (QF) district is located in the southern part of the São Francisco Craton (Almeida, 1977; Teixeira and Figueiredo, 1994). The QF includes (Dorr et al., 1957; 1969): 1) granite-gneiss complexes, corresponding to the crystalline basement; 2) Archean greenstone belt

tracts belonging to the Rio das Velhas Supergroup; and 3) Proterozoic metasedimentary units, represented by the Minas Supergroup, the Itacolomi Group and the Espinhaço Supergroup (Fig. 3.1).

The Rio das Velhas greenstone belt corresponds to a metavolcanosedimentary sequence composed from the base to the top of the Nova Lima and Maquiné groups, respectively (Dorr et al., 1957; Almeida, 1977; Schorscher, 1978). The Nova Lima Group, shown on figure 3.2, comprises a basal unit formed by tholeiitic-komatiitic volcanic rocks, associated with chemical sedimentary rocks; a volcaniclastic intermediate unit, associated with felsic volcanism; and an upper unit with clastic sedimentary rocks (Ladeira 1980, 1991, Zucchetti and Baltazar 2000, Baltazar and Zucchetti 2007). Schorscher (1978) described komatiites at the base of the sequence, naming them the Quebra Osso Group. The largest gold deposits in the QF district, exemplified by Morro Velho, São Bento, Cuiabá, Lamego e Córrego do Sítio, are hosted in the Nova Lima Group (*e.g.*, Ladeira 1980, 1991; Lobato et al., 2001, 2016). The Maquiné Group, shown on figure 3.2, is composed (Gair, 1962) of sequences of graywacke and conglomerates deposited at ca. 2.73 Ga (Moreira et al., 2016).

The stratigraphic subdivision of the Rio das Velhas greenstone belt proposed by Zucchetti and Baltazar (2000) and Baltazar and Zucchetti (2007) is based on lithofacies associations that encompass, from the base to the top: (i) mafic-ultramafic volcanic rocks, with basalts, minor gabbro, anorthosite and peridotite, and intercalations of BIF, ferruginous chert, carbonaceous pelite, turbidites, and rare felsic volcaniclastic rocks. The ultramafic lavas are represented by peridotitic komatiites, in massive or pillowed flows, in places brecciated and with spinifex texture. Basalts dominate the association as massive and pillow flows, in places spilitized, with preserved primary textures such as varioles; (ii) volcano-chemical-sedimentary, with tholeiites intercalated with BIF-chert, and subordinate, fine-grained clastic sedimentary rocks, turbidites and pelites, intercalated with chemical rocks; (iii) clastic-chemical sedimentary, composed of alternating fine-grained micaceous and chloritic pelites with lesser BIF, and subordinate chert and carbonaceous pelite; (iv)

volcaniclastic, with felsic and mafic volcaniclastic rocks; (v) resedimented that is widely distributed in the QF, and comprises mainly graywackes, quartz graywackes, and siltstones. The features of this association indicate that it was deposited by turbidity currents of high and low densities; (vi) and (vii) coastal and non-marine associations corresponding to sandstone-siltstones and sandstones-conglomerates, respectively.

The U-Pb ages of detrital zircon from volcaniclastic rocks of the Nova Lima Group indicate felsic volcanism between 2.79-2.75 Ga (Machado and Carneiro, 1992; Noce 1998; Noce et al., 2007), and a minimum depositional age of 3.02 Ga (Machado et al., 1992).

The 2.60-2.10 Ga (Machado et al., 1996; Hartman et al., 2006) Minas Supergroup is subdivided into the Caraça, Itabira, Piracicaba and Sabará Groups (Dorr, 1969), all metamorphosed at low greenschist facies. The basal Caraça Group has metaconglomerate, quartzite and phyllite. The Itabira Group includes the Cauê Formation that hosts the great volume of Superior-lake BIF and iron orebodies in the region (Rosière et al., 2008). The Piracicaba Group is formed by phyllites and quartzites. The Sabará Group unconformably overlies the Piracicaba Group, and its deposition is considered about 2.12 Ga (Machado et al., 1996); it is a flysch sequence with metagraywacke, carbonaceous phyllite, metadiamictites, metaconglomerates, and felsic to intermediate metavolcanic rocks (Dorr, 1969). The Itacolomi Group (Dorr, 1969) is the youngest unit in QF, resting unconformably on the Minas Supergroup, and contains quartzite, metarkose and metaconglomerate.

The Paleo/Mesoproterozoic Espinhaço Supergroup covers a small area in the QF (Fig. 3.1). It is a rift sequence mainly with breccias, conglomerates and sandstone (*e.g.*, Brito-Neves et al., 1996).

The QF region has a geometry delineated by synform and antiform mega folds that, in its eastern portion, are truncated by north-south thrust faults (Baltazar and Zucchetti, 2007). Alkmin and Marshak (1998) describe in the QF a dome-and-keel structure, in which the basement occurs as domes (*e.g.* Bação, Bonfim, Santa Bárbara, etc.) that are circled by keels containing rocks of the Archean Rio das Velhas greenstone belt and the Minas Supergroup.

The structural evolution of the QF region took place in three main periods during the Rio das Velhas Orogeny (Baltazar and Zucchetti, 2007): between 2.8 and 2.67 Ga, which relates to the evolution of the Rio das Velhas greenstone belt; 2.10 to 1.90 Ga, the Transamazonian event; and the Brasiliano orogeny.

According to Alkmim and Marshak (1998), the Proterozoic tectonic evolution (Minas accretionary orogeny of Teixeira et al., 2015, from 2.35 to 2.00 Ga) took place in three main deformational phases. Fold and thrust belts shortly after 2.125 Ga; orogenic collapse with uplift of Archean granite-gneiss domes and formation of regional synclines at 2.09 Ga (Marshak and Alkmim, 1989); and the Brasiliano orogeny (0.7 – 0.45 Ga), with fold and thrust belts verging to the west.

South of the QF, the Mineiro belt (*e.g.*, Noce et al., 2000; Teixeira et al., 2000; Ávila et al., 2010) was created through successive accretion of oceanic and continental arcs during the Minas accretionary orogeny of Teixeira et al. (2015); it contains distinct granitoid suites dated between 2.36 and 2.12 Ga.

3.3 Geology of the Córrego do Sítio lineament and Cuiabá-Lamego gold deposits

The description that follows refers to rocks that are metamorphosed; hence, the prefix "meta" applies to rock names but is hereafter omitted for brevity.

The sampled areas (Fig. 3.1) include turbidites belonging to the clastic sedimentary association (Baltazar and Zucchetti, 2007), which crops out at the Córrego do Sítio lineament (eastern sector; Fig. 3.1) and Cuiabá-Lamego gold deposit area (northern sector; Fig. 3.1). Turbidites host economic gold deposits at the eastern sector, whereas at the northern sector these rocks overlie the Cuiabá-Lamego lithostratigrafic mine sequences, and only locally are loci to gold occurrences (Vial et al., 2007).

Deposits of the Córrego do Sítio lineament (Lima, 2012; Roncato et al., 2015) are structurally controlled by the Gandarela Syncline and the Conceição Anticline, and are truncated by the Fundão and Água Quente fault systems (Martins Pereira, 2007; Lima, 2012).

The Córrego do Sítio Unit is dominated by rocks of the resedimented and clastic-chemical sedimentary lithofacies association. In the study area, these correspond to an alternation of pelites and psamites, with gradational layering, plane-parallel and cross-bedding stratification. Subordinate thin levels of carbonaceous pelite and BIF are present. These units are interpreted by Zucchetti et al. (1998) as a result of deposition by turbidity currents. The rocks from these units are classified as quartz-carbonate-mica-chlorite schists, and represent the greenschists facies metamorphism of graywackes, sandstones and pelites. Also present is a swarm of mafic dikes and sills, possessing various orientations, with the predominance of the NE-SW direction, dipping towards SE, and in general subparallel to the metasedimentary sequence (Porto, 2008; Lima, 2012; Roncato et al., 2015). These are mafic tabular bodies of metric and decametric thickness, and kilometric continuity, composed of fine-grained gabbros variably hydrothermally altered to carbonate, chlorite and sericite; near the orebodies, especially in the Cachorro Bravo deposit (Fig. 3.1), dikes are replaced by sulfides (Porto, 2008; Lima, 2012, Ribeiro et al., 2015, Roncato et al., 2015). Their age is still debatable, because these rocks lodge an enormous amount of inherited zircons from their host rocks, therefore not exhibit reliable geochronological data. David (2006) obtained 2.69 ± 0.034 Ga by U-Pb SHRIMP on zircon.

Gold mineralization in the Córrego do Sítio lineament is structurally controlled and associated with hydrothermal alteration that gave place to the development of chlorite, carbonate, sericite, sulfide-sulfosalt minerals, and massive amounts of silica. Because of the nature of the sedimentary rocks, the contrast between pre-altered and altered sequences is very subtle, and has been dealt with in detail by Ribeiro et al. (2015) and Roncato et al. (2105). The sampled deposits for the present study are Cachorro Bravo, Laranjeiras and Carvoaria (Fig. 3.1).

The Cuiabá-Lamego gold deposit area (Fig. 3.1) is in the intermediate part of the Nova Lima Group, of the volcaniclastic and clastic sedimentary associations (Baltazar and Zucchetti, 2007). Both Cuiabá and Lamego represent tectonic windows in the area, exposing rocks that are

underneath these associations. Cuiabá (*e.g.*, Ribeiro Rodrigues et al., 2007, Lobato et al., 2005) and Lamego (Martins, 2011; Morales et al., 2016; Martins et al. 2016) are BIF-hosted gold deposits, marked by the contour of the large-scale Cuiabá and Lamego folds, respectively. For the case of Lamego, Martins et al. (2016) interpreted it as a rootless, reclined, isoclinal, cylindrical fold with an axial trace striking northeast-southwest, with a thickened hinge zone plunging parallel to the thinned limbs dipping 20° to 30° to the SE.

The lithological succession at Cuiabá includes volcanic, volcaniclastic and other sedimentary rocks (*e.g.*, Ribeiro Rodrigues et al., 2007). Rock types are described as lower and upper mafic volcanic rocks, the Cuiabá BIF, micaceous and carbonaceous pelites, volcaniclastic rocks and mafic dikes. The lower unit is characterized by a succession of mafic volcanics rocks interbedded with micaceous pelites and lenses of carbonaceous pelites. Mafic volcanics rocks are characterized by the presence of chlorite, epidote, plagioclase and actinolite and quartz as an alteration minerals. The BIF is characterized by alternating dark (rich in carbonaceous matter), carbonate-quartz (±magnetite) and light quartz-carbonate bands. The upper unit is constituted of pelites alternating with volcaniclastics rocks. Mafic dikes crosscut all rock types.

A concordant lithostratigraphic package of volcano-sedimentary rocks host the Lamego deposit (Sales, 1998; Martins et al., 2016). From bottom to top the lithostratigraphy at the Lamego deposit is defined by mafic volcanic rocks represented by basalt variably hydrothermally altered and schistose; banded chert with BIF that are both carbonaceous and/or ferruginous (the Lamego BIF); and carbonaceous and micaceous pelites (phyllites), which envelop the entire Lamego deposit (Martins et al., 2016). The Lamego BIF is composed of similar constituents as those of the Cuiabá mine, except that here the cherty component predominates. Diabase intrusions develop as dikes and sills.

The carbonaceous and micaceous pelites that overlie the Cuiabá and Lamego deposits, sampled for the present study (Fig. 3.1), are at the top of the stratigraphic succession. The carbonaceous pelite

(carbonaceous matter, quartz, chlorite, carbonate and minor sericite) is dark, finely laminated and thinly bedded. The micaceous pelite (sericite, muscovite, quartz, carbonate and minor carbonaceous matter) displays gradational and compositional stratification (Martins et al., 2016).

3.4 Methods

Seventeen samples of graywackes and pelites were collected from fresh boreholes across the strike direction in different deposits of the Córrego do Sítio auriferous lineament and the Cuiabá-Lamego gold deposit area (Fig. 3.1). Geochemical and geochronological analyses were carried out on 17 samples. Whole-rock geochemical analyses were carried out at the Acme Labs/Bureau Veritas Commodities Canada Ltd., Vancouver, Canada. Major elements were analyzed by X-ray fluorescence spectrometry (XRF). Trace and REE elements concentrations were determined by ICP-ES/MS.

3.5 Analytical isotope methods

A total of nine drill cores of the Nova Lima Group were sampled, alternating graywackes and pelites in a turbidite sequence of the clastic sedimentary association of Baltazar and Zucchetti (2007). Six are from the eastern (Cachorro Bravo – FCS0756-MG/PL, FCS1053-MG; Laranjeiras – FCS0831-MG/PL, FCS0929-MG/PL; and Carvoaria – FCS1196-MG, FCS1261-MG deposits), and three from the northern (Cuiabá – CBABSD04B-MG, CBABSD04B-PL and Lamego – CARBSD15-PL deposits) sectors of the QF district. Sampled areas are shown in Figure 3.1. Figure 3.2 shows the schematic drill core logs of the clastic sedimentary association (Baltazar and Zucchetti, 2007) and sampled locations of Córrego do Sítio lineament (A), Cuiabá (B) and Lamego (C) deposits.

3.5.1 U-Pb Determinations

The U-Pb isotopes were analyzed at the Department of Geology, Universidade Federal de Ouro Preto, Brazil. The technique of zircon separation uses a jaw crusher, milling and manual panning,

hand-picking under binocular microscope, with grains mounted on 25 mm epoxy (SpeciFix) mounts. Mounts were polished and imaged under SEM.

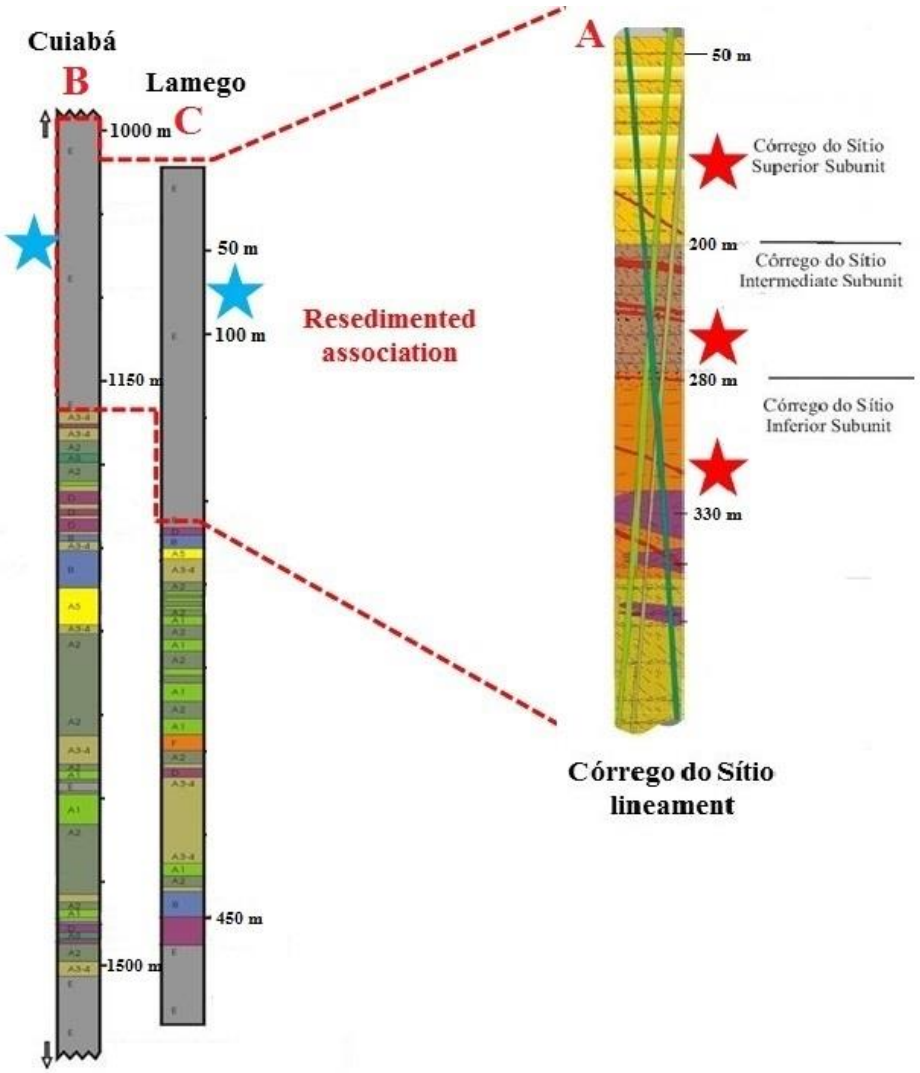


Figure 3.2. Schematic drill core logs of the clastic sedimentary association in the Córrego do Sítio lineament (A), Cuiabá (B) and Lamego (C) deposits. The stars indicate the sampled location for the eastern (red) and northern (blue) sectors. For detailed stratigraphic sequences of the Corrégo do Sítio lineament (A) see Roncato et al. (2015) and the Cuiabá-Lamego gold deposit area (B and C) see Martins et al. (2016).

Seventeen different samples extracted from underground drill holes were used (Table 1). Zircons were analyzed using a Thermo-Finnigan Element 2 sector field ICP-MS coupled to a CETAC213 ultraviolet laser system. A laser spot size of 20 μm was used (*e.g.*, Farina et al., 2015). The typical depth of the ablation crater was 15-20 μm. Data were acquired in peak jumping mode during 20 s

background measurement followed by 20 s sample ablation. Signal was tuned for maximum sensitivity for Pb and U while keeping oxide production well below 1%. Raw data were corrected for background signal, common Pb, laser-induced elemental fractionation, instrumental mass discrimination, and time-dependent elemental fractionation of Pb/U using an in-house MS Excel spreadsheet program. The common Pb correction was based on the Pb composition model (Stacey and Kramers, 1975). Laser-induced elemental fractionation and instrumental mass discrimination were corrected by normalization to the reference zircon GJ-1 (Jackson et al., 2004), which was analyzed during the analytical session under exactly the same conditions as the samples. Prior to this normalization, the drift in elemental fractionation was corrected by applying a linear regression through all measured ratios, excluding the outliers (N ± 2 S.D.), and using the intercept with the y-axis as the initial ratio. The total offset of the measured drift-corrected $^{206}Pb/^{238}U$ ratio from the "true" IDTIMS value of the analyzed GJ-1 grain was typically around 1-3%. Reported uncertainties (2σ) were propagated by quadratic addition of the external reproducibility (2 S.D.) obtained from the zircon reference material GJ-1 during the individual analytical session. Signal data were reduced using the software Glitter (Van Achterbergh et al., 2001); plotting and age were calculated using the Excel Isoplot program (Ludwig, 2012). The data reduction included the correction of fractionation problems and of errors in the masses counting. For both U-Pb methods, > 5% discordant zircons were not used to construct the distribution diagrams since they have no composition quality maintained and pinpoint unreliable ages.

3.5.2 Lu-Hf Measurements

Lutetium and Hf isotope analyses were carried out at Universidade Federal de Ouro Preto using a Thermo-Finnigan Neptune multicollector ICP-MS coupled to a Photon- Machine 193 nm laser system. Data were collected in static mode during 60 s of ablation with a spot size of 40 um. The spots were drilled with a repetition rate of 6 Hz. Typical signal intensity was ca. 10 V for ^{180}Hf. The ^{172}Yb, ^{173}Yb and ^{175}Lu isotopes were simultaneously monitored during each analysis step to allow

for correction of isobaric interferences of Lu and isotopes on mass 176. The accuracy and external reproducibility were verified by repeated analyses of the standard zircons Mud tank (Woodhead and Hergt, 2005), which yielded $^{176}Hf/^{177}Hf$ of 0.282504± 0.000040, respectively.

3.5.3 Analytical EPMA methods

Electron microprobe analyses (EMPA) of arsenic in all sulfide minerals were performed at the Centre for Microscopy, Characterisation and Analysis (CMCA), at The University of Western Australia (UWA). The microprobe used was a Jeol 8530F, with an accelerating voltage of 20 kV, beam current of 50 nA and an electron beam with 1 lm in diameter. The following elements were analyzed: Fe (Kα), Au (Lα), Te (Lα), Ni(Kα), Hg (Lα), Zn (Kα), Cu (Kα), Co (Kα), V (Kα), Ti (Kα), on LiF crystal; Sb (Lα), Pb (Mα), and Bi (Mβ) on PETH crystal; S (Kα), Ag (Lα) and Cd (Lα) on PETJ crystal; and As (Lα) and Se (Lα) on TAP crystal In order to improve count rate statistics, counting times were 20 s for Fe and S, 60 s for As, Cu, Ni, Se, Zn, and Co and 120 s for Pb, Ag, Sb, Te, Au, Hg, Cd, V, Ti and Bi.

Standards used for calibration were Fe_3O_4 (magnetite for Fe), FeS_2 (pyrite for S and Fe), FeAsS (arsenopyrite for As), PbS (galena for Pb), Bi_2Se_3 (for Bi and Se), Ag (silver for Ag), HgS (cinnabar for Hg), ZnO (for Zn), $CuFeS_2$ (chalcopyrite for Cu), NiS (millerite for Ni), Sb_2Te_3 (for Sb and Te), TiO_2 (rutile for Ti), cobalt (for Co), cadmium (for Cd), and vanadium (for V).

The analyses of Au used Au(Lα) on LIF to avoid interferences between Au(Mα, Mβ) lines and Hg(Mβ) and Te(Lα), respectively, noted on PETH; Hg(Lα) on LIF crystal instead of PETH to avoid interference with Au(Mβ); Te(Lα) on LLIF to avoid contribution from Ni(Kα) on PETH. The Bi(Mβ) line was used instead of Bi(Mα), to avoid interference with Pb (Mβ). The correction factor for Pb(Mα) for contribution from S(Kα) was applied

Elecron probe maps were collected using accelerating voltage of 20 kV, beam current of 50 nA, and a counting time of 20 ms/step to Fe (Kα) and S(Kα), and 60 ms/step to Tl(Mα), Hf(Mα), As(Lα), Au(Lα), Ag(Lα), Ni(Kα), Sb(Lα), Co(Kα) and Mn(Kα). For the specific case of the geochemical

distribution maps on sulfides, the standards used for Tl and Hf were TlBr/TlI and hafnium, respectively.

3.5.4 In situ LA-ICP-MS analyses on sulfide minerals

The study on the compositional data of sulfide minerals in the Córrego do Sítio lineament Is an important part of the studies that focuses on the turbidite-hosted of the Laranjeiras (porous and smooth pyrite - P-Py and S-Py; smooth pyrrhotite - S-Po; porous and smooth arsenopyrite - P-Apy and S-Apy) and Cachorro Bravo (smooth pyrite - S-Py) gold deposits (Figs. 3.1 and 3.3), using analyses by in-situ LA-ICP-MS technique and eletron microprobe for the determination of arsenic.

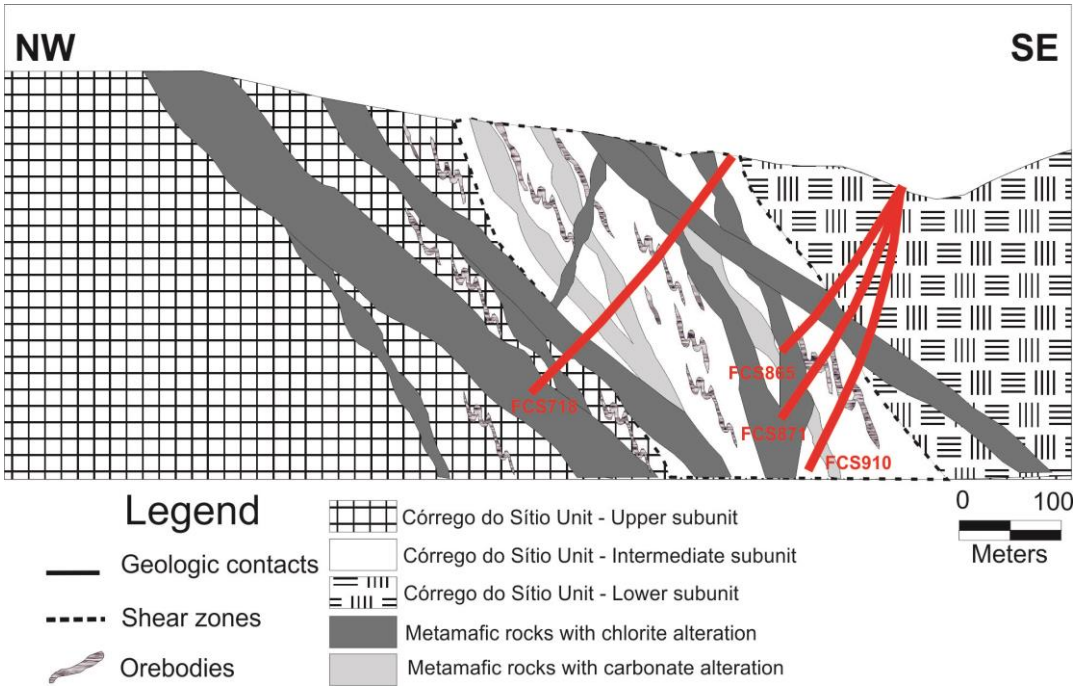


Figure 3.3. Schematic NW-SE geological cross section of the Córrego do Sítio lineament, eastern sector, showing the extrapolated position of the drill holes of AngloGold Ashanti Brasil Mineração - AGA. Units and subunits acording to Lima (2012).

Trace elements contained in sulfide minerals were analyzed at CODES, University of Tasmania, using LA-ICP-MS. A total of 10 pyrite, 3 pyrrhotite and 4 arsenopyrite spots were analyzed. These are contained in six rock samples from the Cachorro Bravo, Laranjeiras and Carvoaria deposits, Córrego do Sítio lineament (Table 3). The study intends to understand the in situ LA-ICP-MS analyses on the ore-sulfide minerals of the lineament, helping establish the hydrothermal stages

experienced in selected deposits of this lineament and compare with the future results in the Cuiabá-Lamego area.

The minerals and matrix were analyzed *in situ* via polished laser mounts. For details of the preparation of laser mounts see Gregory (2014). These samples were selected for sulfide trace element analyses using the LA-ICP-MS technique.

The analytical instrumentation engaged in this study consists of a New Wave UP-213 nm laser ablation system coupled with an Agilent 7700s Quadrupole ICP-MS. The methodology is described in detail by Large et al. (2009) and briefly introduced here.

Depending on the sulfides size, analyses were performed by laser ablating spot diameters of 15-43 μm and at a repetition rate of 5 Hz. The laser beam energy used was 90 mJ and the fluence was maintained between 2.7 and 5.0 J cm^{-2}. The analysis time for each sample was 90 s, which includes 30 s of background measurement with laser off and 60 s of analysis with laser on. Acquisition time for all masses was set to 0.02 s, with a total sweep time of ~0.6 s.

Data reduction was performed according to standard methods (Longerich et al., 1996), with Fe as the internal standard. Calibration was performed using the in-house standard (STDGL2b-2), comprising powdered sulfides doped with certified element solutions and fused to a lithium borate glass disk (Danyushevsky et al., 2011). The standard was analyzed twice every 1.5 h with a 100-μm beam size at 10 Hz to correct for instrument drift. Accuracy is expected to be better than 20% for most elements (Danyushevsky et al., 2011). A set of 35 elements was chosen for spot analyses (Na^{23}, Mg^{24}, Al^{27}, Si^{29}, Ca^{43}, Ti^{49}, V^{51}, Cr^{53}, Mn^{55}, Fe^{57}, Co^{59}, Ni^{60}, Cu^{65}, Zn^{66}, As^{75}, Se^{77}, Zr^{90}, Mo^{95}, Ag^{107}, Cd^{111}, Sn^{118}, Sb^{121}, Te^{125}, Gd^{157}, Hf^{178}, Ta^{181}, W^{182}, Pt^{195}, Au197, Hg^{202}, Tl^{205}, $Pb^{206, 207, 208}$, Bi^{209}, Th^{232} and U^{238}).

3.6 Turbidites of the Córrego do Sítio lineament

The Rio das Velhas Orogenic Event (Carneiro, 1992), reworking of Archean sialic crust, intrusion of tonalitic bodies and felsic volcanism of the Rio das Velhas greenstone belt (Baltazar and

Zucchetti, 2007). The clastic sedimentary rocks of the upper unit of the greenstone belt are dominated by graywacke–argillite sequences, with evidence of significant contribution in the turbidites from both the felsic volcanic rocks of the greenstone belt and the reworked ancient Archean crust.

The clastic assotiation is distributed in the Quadrilátero Ferrífero, it includes three different sequences of graywacke-argillite, two metamorphosed in the greenschist facies in the nothern and eastern sectors (they are composed mainly of graywackes, quartz graywackes, sandstones and silt-stones, with cyclic layers and abrupt basal contacts between cycles) and one in the amphibolite facies in the south. In the eastern and northern sectors (Baltazar and Zucchetti, 2007; Roncato et al., 2015).

3.6.1 Petrographic studies

In the eastern sector, graywackes in all deposits are gray to light-green (Fig. 3.4A), fine- to coarse-grained rocks, where the original clasts are angular and reach 2 mm. Quartz can make up 70-80% of the rock volume, with several shapes, and commonly recrystallized; white mica (10%) and incipiently saussuritized, coarse-grained plagioclase (5-10%) are also present (Fig. 3.4C). Epidote, zircon, rutile and sulfides are common accessory minerals, which may be in part hydrothermal. Oriented white mica imprints the main foliation planes between quartz grains.

Pelites are very fine-grained dark gray rocks, with a well defined bedding plane. They exhibit a lepidoblastic texture, and contain white mica (60-70%), quartz (15-25%) and oriented occurrence of carbonaceous matter (10-40%), along the foliation. Plagioclase, epidote and rutile are also common. Hydrothermal phases such as carbonate, chlorite and sulfide minerals may occur.

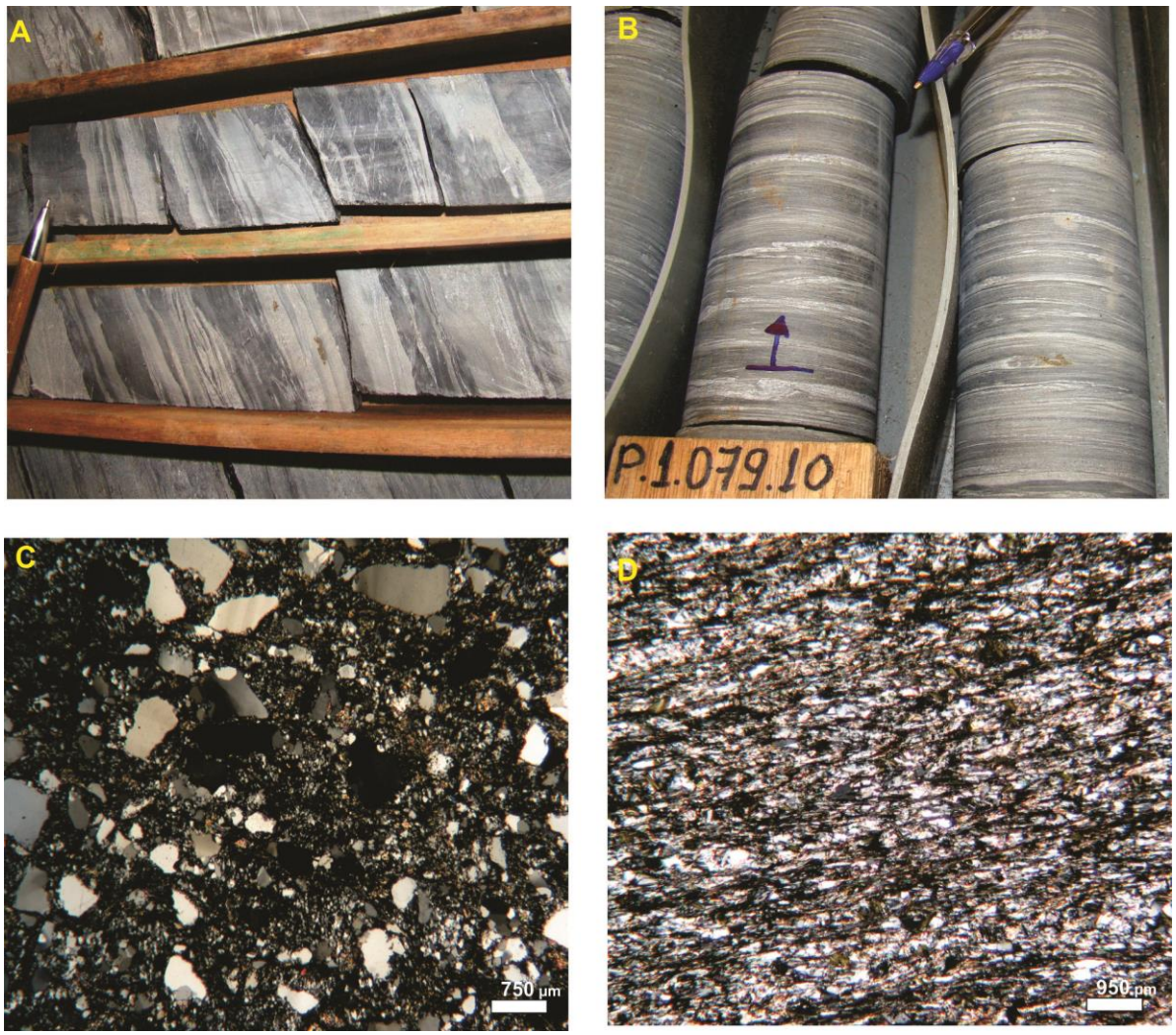


Figure 3.4. Rocks of the clastic sedimentary association from the eastern (A) and northern (B) sectors of the Quadrilátero Ferrífero district, showing alternating pelitic (dark) and psamitic (clear) bands. Photomicrographs of graywacke (C, eastern) and pelite (D, northern); transmitted light, crossed polars, 25X.

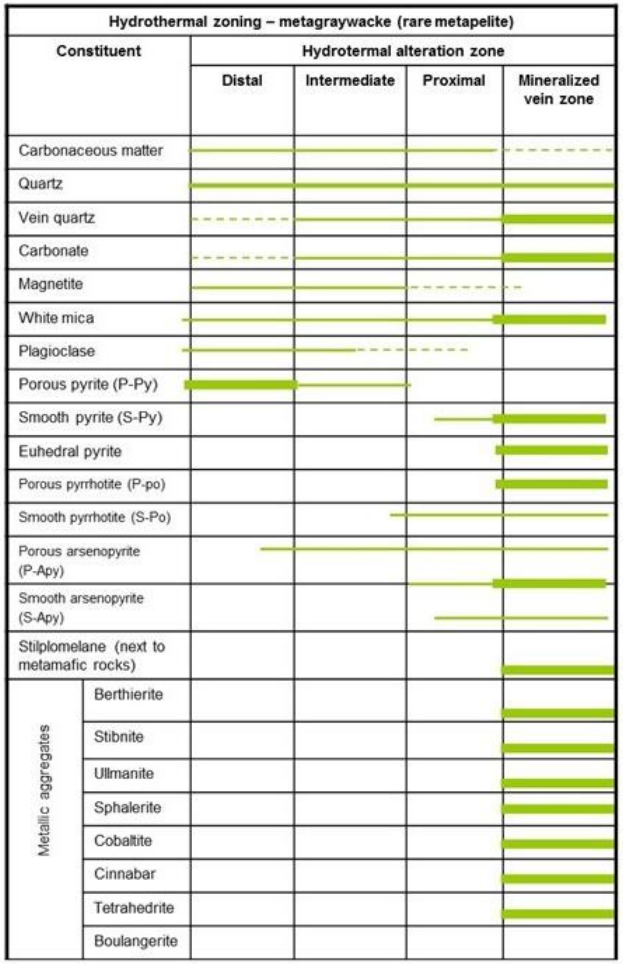
3.6.2 Hydrothermal alteration in gold deposits of the Córrego do Sítio lineament

Gold mineralization at the Córrego do Sítio turbidite sequence is characterized mainly spatially associated with silification zones, represented by the development of quartz veins and veinlets, carbonate, sericite and sulfide minerals (Lima, 2012; Ribeiro et al., 2015; Roncato et al., 2015; Fig. 3.5), which results from hydrothermal alteration (e.g. replacement) of the previous rock. Mineralogical and textural transformations accompanying wall-rock alteration are observed surrounding the main mineralized vein systems. A review of the generations of quartz veins is found in Sequetto Pereira et al. (2014) and (Ribeiro et al., 2015), with the latter having detailed their fluid inclusions.

Although the limits between the alteration zones are not always sharp and regular at Córrego do Sítio, they have a somewhat parallel distribution in relation to the veins, and their characterization is made possible particularly where the host rock is graywacke. In the case of pelites in general, the hydrothermal alteration halos are often narrow, discrete or apparently absent. Locally, alteration halos can be observed with carbonate and sericite plus quartz, where rocks have been bleached mainly in the original carbonaceous and-or graywacke portions.

There are two main distinct hydrothermal alteration assemblages of the host sedimentary rocks, which depend on the proximity to mafic dikes. The Cachorro Bravo deposit (Fig. 3.1) is closely limited on both sides by mafic dikes and sills, but these igneous intrusions are located farther away in the Laranjeiras and Carvoaria deposits. In Cachorro Bravo, chlorite and pyrrhotite (not pyrite) dominate, whereas at Laranjeiras and Carvoaria, berthierite, stibnite and pyrite are part of the distinct mineral assemblage (*e.g.*, Roncato et al., 2015).

Gold is mainly present as free particles and disseminated in quartz-carbonate veins mainly in Laranjeiras deposit. In Cachorro Bravo deposit, the substitution is the main form of hydrothermal alteration. It also forms inclusions in disseminated arsenopyrite, pyrite or pyrrhotite, as well as in other silicates and bethierite.



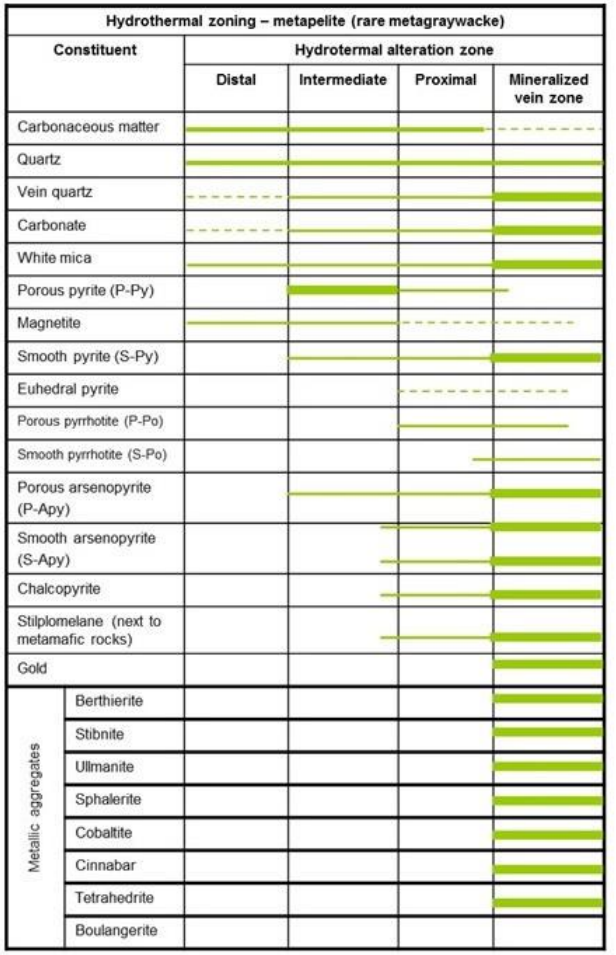


Figure 3.5. Hydrothermal Spatial zoning of hydrothermal minerals, including main sulfide minerals associated with gold in (A) greywackes (B) pelite, Córrego do Sítio auriferous lineament. Line thicknesses represent schematically the relative quantities of each mineral (after Roncato et al., 2015).

3.6.3 Textural features and paragenetic sequence of ore minerals

Ore minerals at the Córrego do Sítio lineament have been described mainly by Canale (1999), Porto (2008), Lima (2012), Ribeiro et al. (2015), and Roncato et al. (2015). The latter three publications structured them in paragenetic sequences, which are summarized in Figure 3.6. Sulfide minerals are present mainly along the edges of veins, with pyrite being the most common. In the hydrothermal zones, arsenopyrite forms after pyrite or pyrrhotite, both locally seen to originate from the consumption of magnetite. Near the metamafic dikes, especially in the Cachorro Bravo deposit, arsenopyrite develops after pyrrhotite in mineralized veins and veinlets. The pyrrhotite/arsenopyrite association along dike zones may reflect local conditions of relatively higher temperature (Ribeiro et al., 2015; Roncato et al., 2015).

Arsenopyrite after pyrite is typical of alteration zones far from metamafic dikes, where veins are dominated by smoky quartz-carbonate veins with berthierite, stibnite and pyrite, and gold. In the Sb-Au-quartz veins, berthierite and stibnite are the most abundant Sb-bearing minerals. This mineralization style is mainly observed in carbonaceous pelites, and has a gold-dominated association with porous arsenopyrite, which is the predominant gold-associated sulfide mineral in the Córrego do Sítio lineament.

Opaque minerals in trace amounts include chalcopyrite, galena, sphalerite, berthierite and tetrahedrite. Other hydrothermal minerals are quartz, carbonate, white mica, chlorite and accessory rutile, titanite, apatite, ilmenite and sphalerite. Some of these minerals are also present in the unaltered metasedimentary rocks to varying degrees.

Four pyrite generations have long been recognized, and are here designated porous pyrite (P-Py), smooth pyrite (S-Py), porous pyrrhotite (P-Po), smooth pyrrhotite (S-Po), porous arsenopyrite (P-Apy), and smooth arsenopyrite (S-Apy): i) isolated and disseminated Primary rounded pyrite in non-altered carbonaceous layers that commonly form subrounded aggregates (Fig. 3.7A); ii) ± P-Py, which may contain gold, associated with a myriad of other sulfide minerals, and that may be

replaced by arsenopyrite (Fig. 3.7B); iii) S-Py overgrowths forming irregular contours around P-Py (Fig. 3.7B); and iv) late-stage, euhedral pyrite in isolated and radomly distributed grains (Fig. 3.7C) apparently resulting from the detachment of smooth pyrite.

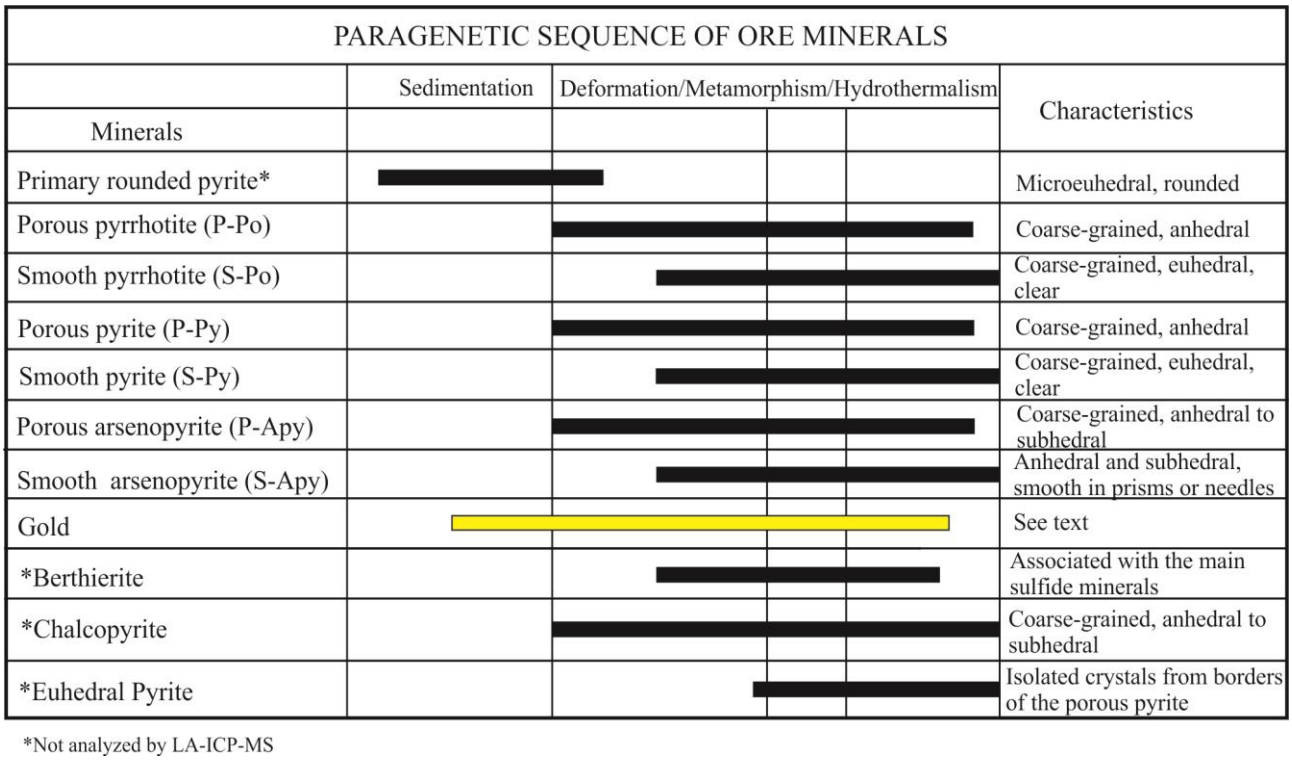


Figure 3.6. Paragenetic sequence of ore minerals and their characteristics with the advance of hydrothermal alteration – Córrego do Sítio lineament (modified after Roncato et al., 2015).

Early-stage, P-Po may be replaced by S-Po (Fig. 3.7D), and P-Po was formed before, but is in equilibrium with S-Po. P-Po is marked as stable during all mineralization stage (Fig. 3.6).Two generations of arsenopyrite are identified: i) P-Apy in anhedral to subhedral crystals (Fig. 3.7F) associated with pyrite or pyrrhotite, preserving the original habit and porosity of the latter sulfides, and (ii) S-Apy in subhedral, very fine-grained crystals, in prisms or needles (Fig. 3.7E).

Berthierite is commonly associated with the main sulfide minerals in the mineralized sedimentary rocks (Fig. 3.7G), mainly in quartz (smoky)-carbonate-sulfide-berthierite veins. Both porous pyrrhotite and pyrite occur in the core of sulfide crystal aggregates (Fig. 3.7H), with berthierite, chalcopyrite and gold.

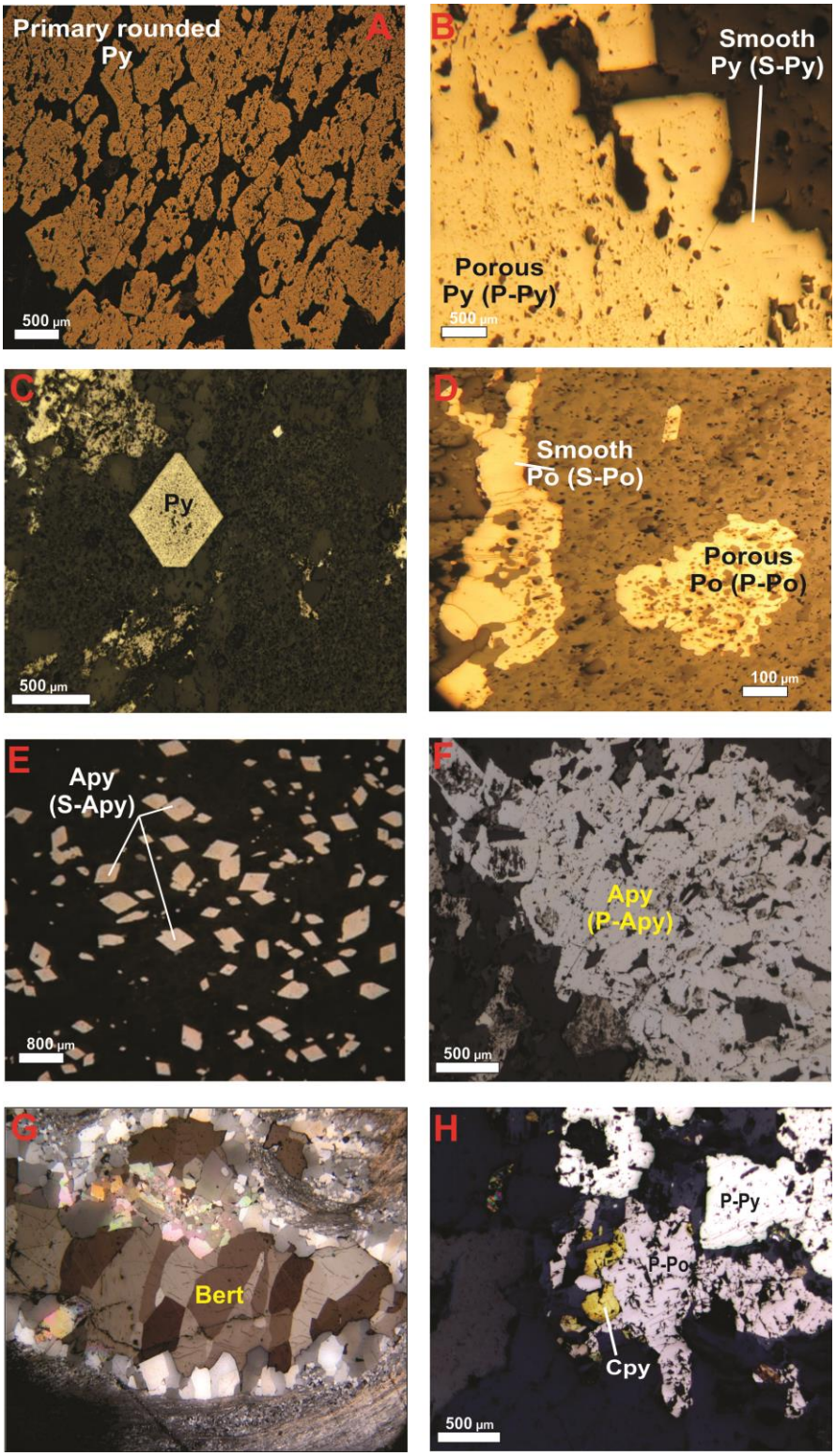


Figure 3.7. Photomicrographs of generations of ore minerals associated with Laranjeiras gold deposit of the Córrego do Sítio lineament. (A) Primary rounded pyrite (reflected light-RL, crossed nicols- CN; not analyzed in the LA-ICP-MS study). (B): ± Porous replaced by smooth pyrite – P-Py / S-Py (RL, CN). (C): Euhedral pyrite (RL, CN; not analyzed in this study). (D): Porous pyrrhotite replaced by smooth pyrrhotite – P-Po / S-Po (RL, CN). (E): Smooth euhedral, acicular arsenopyrite – S-Apy (RL, CN), (F): Porous anhedral to subhedral arsenopyrite – P-Apy (RL, CN). (G): Subhedral to euhedral berthierite in vugs (RL, CN, 50X). (H): Sulfide crystal aggregates (RL, CN, 50X). Apy: arsenopyrite; Bert: berthierite; Cpy: chalcopyrite; Py: pyrite; Po: pyrrhotite.

3.6.4 In-situ LA-ICP-MS in Trace elements of eastern sector

The low detection limit and simultaneous capture of data for up to 20 trace elements make the LA-ICP-MS a powerful analytical tool for understanding hydrothermal mineral genesis and evolution. The sulfide minerals commonly contain a wide range of enriched trace elements (Fig. 3.8), which are described for each mineral. The trace element abundance (Fig. 3.8) and the data obtained are presented in Table 3.3.

The P-Py and S-Py from the Laranjeiras and the S-Py from the Cachorro Bravo deposits are consistently enriched in As, Ni, Cu, Co, Cr, Se, Pb, Sb, Zn, Ag, Sn, Te, W and Au, following this order of elements (Fig. 3.8A). Many of them are generally within the structure of sulfide grains, or may be distributed as nanoinclusions.

For S-Po (Fig. 3.8B) of the Laranjeiras deposit shows an enrichment similar to the generations of previously described pyrites, with the exception of As, which occurs with less abundance than Ni and Cu.. The diference between analyses of P-Apy and S-Apy from Laranjeiras and the sulfides previously described is the elements are As, Co, Te, Ni, Sb, Bi, Se, Pb, Cu, Cd, Ag, Zn and Au, in order of abundance (Fig. 3.8C).

Cobalt correlates moderately well with Ni and Te in the majority of analyzed sulfide grains. Similarly to Ni, Co tends to be incorporated into the structure of pyrite and other sulfide minerals, or to be evenly distributed as nanoinclusions.

3.6.5 Composition of pyrites, pyrrhotites and arsenopyrites

The present study analyzed P-Py, S-Py, S-Po, P-Apy and S-Apy from the Laranjeiras deposit (Table 3). Smooth pyrites from the Cachorro Bravo deposit were analyzed to compare the early hydrothermal stage of both deposits (Fig. 3.9). Sedimentary, primary rounded pyrite has not been investigated, but rather pyrites similar to those classified by Large et al. (2009) as porous Py-3 and euhedral Py-4.

3.6.5.1 Porous pyrite (P-Py) composition

The P-Py from the Laranjeiras deposit (Table 3; Fig. 3.9) contains a wide range of trace elements, the most abundant of which are Ni (46-1332 ppm), Cu (0.11-41 ppm), Co (11-228 ppm), Cr (0.10-34 ppm), Se (31-41 ppm), Pb (0.37-45 ppm), Sb (0.54-55 ppm), Zn (0.22-7.30 ppm), Ag (0.01-0.84 ppm), Sn (0.1-1.0 ppm), Te (0.27-25 ppm) and W (0.01-0.18 ppm). The invisible gold content varies from 0.00032 to 0.73 ppm, whereas arsenic varies from 248 to 2998 ppm.

3.6.5.2 Laranjeiras smooth pyrite (S-Py) composition

The gold content (Table 3; Fig. 3.9) of S-Py from the Laranjeiras deposit varies from 0.00047 to 0.023 ppm and arsenic varies from 436 to 777 ppm. The Ni (2.9-32 ppm), Cu (0.17-0.61 ppm), Co (0.27-52 ppm), Cr (0.01-21 ppm), Se (4.33-4.87 ppm), Pb (undetected to 3.84 ppm), Sb (2.92-3.52 ppm), Zn (0.48-13 ppm), Ag (0.33-1.7 ppm), Sn (0.13-0.18 ppm), and W (undetected to 1.24 ppm) are representative of the most abundant elements.

3.6.5.3 Smooth pyrrhotite (S-Po) composition

The S-Po from the Laranjeiras deposit contains Ni (236-543 ppm), Cu (123-747 ppm), Co (38-67 ppm), Cr (13-458 ppm), Se (6.35-7.72 ppm), Pb (0.28-11 ppm), Sb (1.43-17 ppm), Zn (0.43-34 ppm), Ag (0.19-3.57 ppm), Sn (0.42-4.42 ppm), Te (0.16-0.52 ppm), W (undetected to 0.92 ppm), and Mo (0.04 ppm). The gold content varies from 0.004 to 0.052 ppm, and arsenic is 358 ppm (Table 3.3; Fig. 3.9).

3.6.5.4 Porous arsenopyrite (P-Apy) composition

The Laranjeiras P-Apy contains (Table 3.3; Fig. 9) As (445007 ppm), Co (24-618 ppm), Te (1.38-2305 ppm), Ni (54-435 ppm), Sb (0.05-263 ppm), Se (6.40 ppm), Pb (11.67 ppm), Cu (2.0-10 ppm), Cd (0.03-5.63 ppm), Ag (0.42-7.61 ppm), Zn (1.18-1.69 ppm) and Au (0.01-135 ppm).

3.6.5.5 Smooth arsenopyrite (S-Apy) composition

The Laranjeiras P-Apy (Table 3; Fig. 3.9) contains As (438266-442244 ppm), Co (392-1725 ppm), Te (6.38-746 ppm), Ni (166-390 ppm), Sb (0.03-646 ppm), Se (5.40 ppm), Pb (undetected to 74 ppm), Cu (1.02-2.11 ppm), Cd (0.01-3.76 ppm), Ag (0.44-1.31 ppm), Zn (0.20-0.28 ppm) and Au (0.01-1.17 ppm).

3.6.5.6 Cachorro Bravo smooth pyrite (S-Py) composition

For the S-Py of the Cachorro Bravo deposit, the invisible gold content varies from 0.032 to 0.10 ppm and arsenic varies from 924 to 1595 ppm (Table 3; Fig. 3.9). The most abundant trace elements range as follow: Ni (29-101 ppm), Cu (0.06-0.71 ppm), Co (0.1-1.4 ppm), Cr (0.2-2.0 ppm), Se (43-63 ppm), Pb (0.3-3.0 ppm), Sb (0.2-1.8 ppm), Zn (0.3-0.6 ppm), Ag (0.024-0.03 ppm), Sn (0.09-0.15 ppm), and Te (0.10-0.16 ppm).

3.6.5.7 Correlating sulfide textures and composition

Box and whisker plots (Fig. 3.9) show that for 11 (eleven) elements examined there is relevant element enrichment or depletion depending on texture, generation and type of mineral. The diagrams are constructed following the paragenetic sequence of Figure 3.6, and the elements under consideration are: Co, Ni, Se, Te, Cu, Pb, Au, Ag, Sb, Pt and As. Following removal of extreme outliers, box plots for each of the elements analyzed (Fig. 3.9) are used to evaluate the trends and variability of the data.

Gold, As, Pb, Te, Co, Ni and Sb are highly correlated (Fig. 3.9), recording very similar behavior for different sulfide minerals, even though statistically some of these elements display the same range. These concentrations are together in the same interval, and except for Ni they are highest in P-Apy and S-Apy. Gold, As and Sb are best concentrated in the S-Apy.

For the Laranjeiras gold deposit, from P-Py relatively to S-Py, our data show that Co, Ni, Se, Te, Cu and Pb are commonly enriched, Ag and Sb are depleted, whereas Au, Pt and As remain unchanged, considering the average values, although these can be seen as statistically the same; Au,

Co, Sb and Pb are enriched in S-Apy in relation to P-Apy. These latter elements have lower concentration in the S-Py of the Cachorro Bravo deposit.

In Laranjeiras (Fig. 3.9), some trace elements (Co, Ni, Se, Te, Cu, Pb, Pt) have statistically similar, high values, recorded mainly in P-Py; Ag and Sb are more enriched in the S-Py. Tellurium, Cu and Ag are enriched in P-Apy, whereas the S-Apy records the highest Co, Pb, Au and Sb. In P-Py and S-Py, As levels are in the range 0.25 to 3.0 ppm; Ni from 2.9 to 1332,00 ppm, and Co from 0.1 to 1725,00 ppm. In Laranjeiras, Sb has a tenfold enrichment in P-Py and S-Py, and S-Po; in P-Apy and S-Apy it is a hundredfold higher. Arsenic varies from 438,00 to 445,00 ppm in P-Apy and S-Apy.

These pyrites and pyrrhotites record similar contents, in ppm, of Au enrichment when compared to analyzed arsenopyrites (Fig. 3.9). The P-Apy and S-Apy exhibit a large interval of Au content, between 0.00032 to 135 ppm, with the highest value in a sample of S-Apy.

At the Cachorro Bravo deposit, the S-Py becomes progressively richer in As and Au in comparison to Laranjeiras, containing the gold richest pyrite, although they are statistically the same. On the other hand, the Laranjeiras S-Py contains the richest contents in Sb, Co, Ni, Pb and Te.

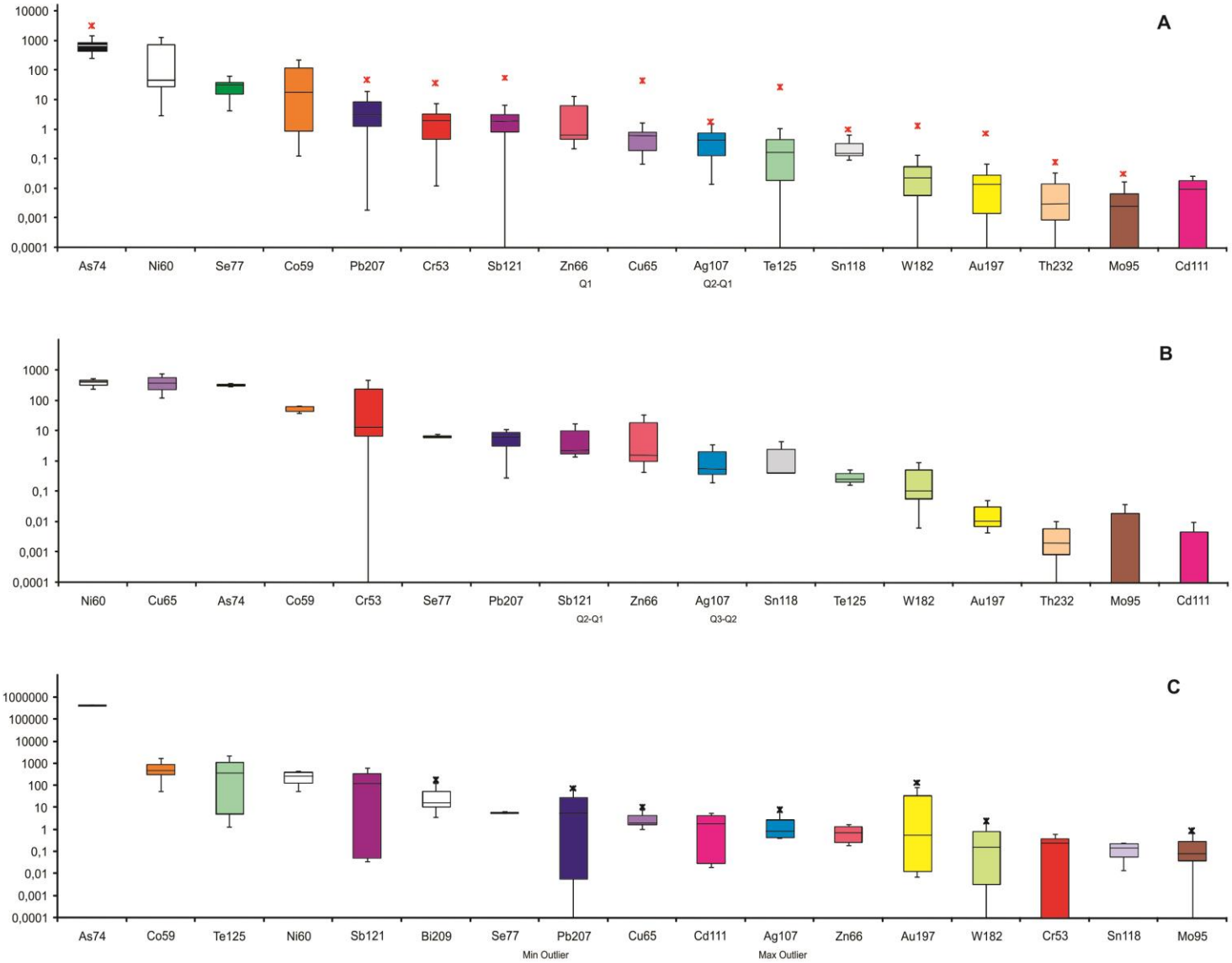


Figure 3.8. Box plot of trace metal content in descending order of elemental abundance of (A) P-Py and S-Py; (B) S-Po; (C) P-Apy and S-Apy. Py: pyrite; Po: pyrrhotite; Apy: arsenopyrite of Laranjeiras Deposit – Eastern Sector.

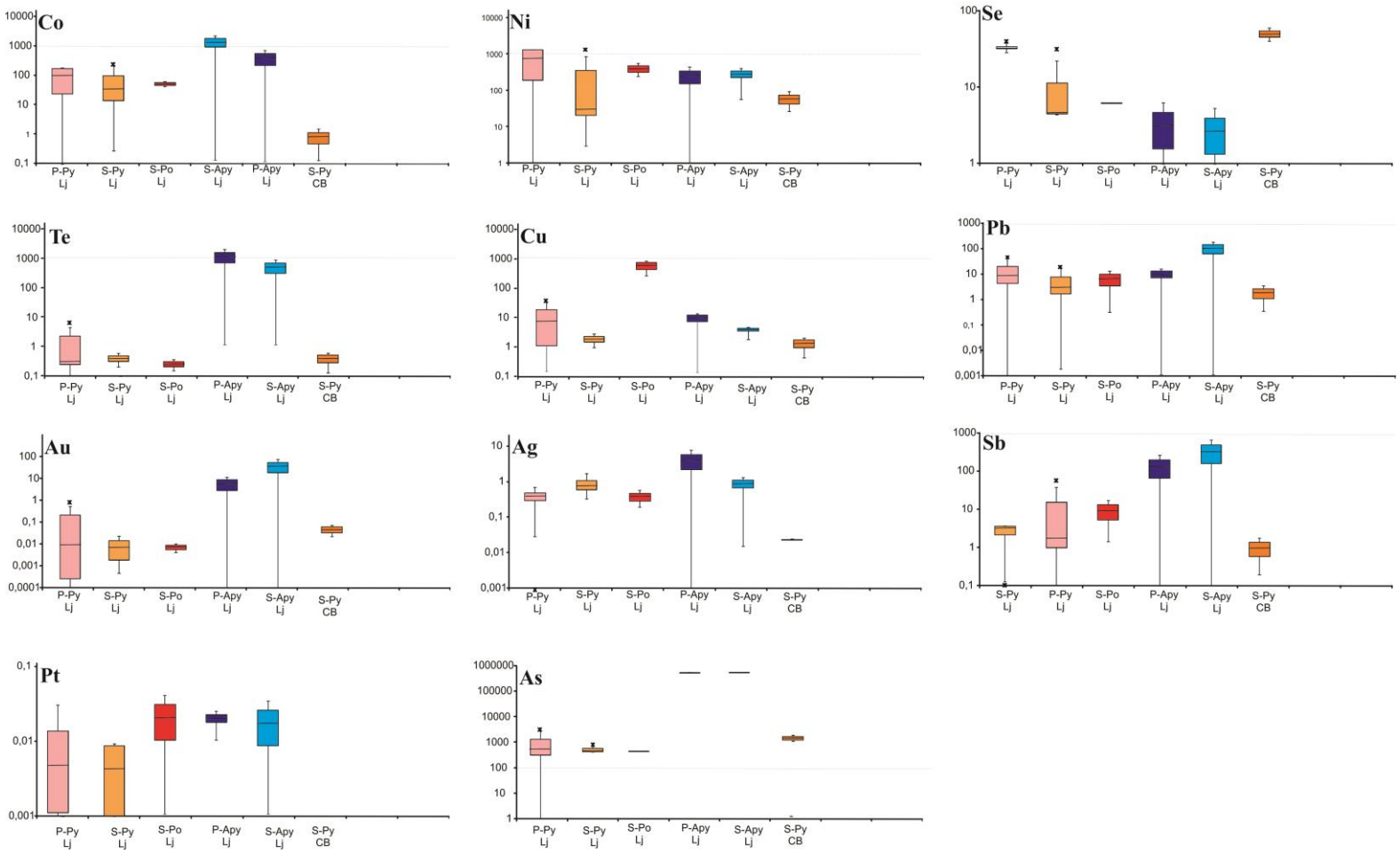


Figure 3.9. Trace element contents (ppm) of sulfide minerals (P-Py and S-Py; S-Po; P-Apy and S-Apy. Py: pyrite; Po: pyrrhotite; Apy: arsenopyrite), Laranjeiras (Lj) and Cachorro Bravo (CB) deposits, for Co, Ni, Se, Te, Cu, Pb, Au, Ag, Sb, Pt and As. The bar = median; box = 25 to 75th percentile of data (interquartile range); asterisk = outliers.

3.7 Cuiabá-Lamego gold deposit area

The sedimentary samples from the Córrego do Sítio lineament and Cuiabá-Lamego gold deposit area have very similar petrographic composition, texture and macroscopic characteristics (Figs. 3.3A and B, respectively). Graywackes of the northern sector are are light-gray, medium- to coarse-grained rocks, with granoblastic and granolepidoblastic textures. They are composed of quartz (70%), white mica (10-15%) and plagioclase (5%). Epidote, zircon, magnetite, rutile and sulfides occur as accessory minerals. The carbonaceous pelite is composed mainly of carbonaceous matter (20-40%), quartz (10-20%), chlorite (5%) and carbonate (1%), whereas the micaceous pelite (Fig. 3.3D) has quartz (30-40%), white mica (10-20%), and carbonate (10%).

3.8 Whole-rock geochemistry

As pointed out by Hayashi et al. (1997), the mineralogical and geochemical composition of clastic sedimentary rocks is controlled by various factors, including the: (1) composition of their source rocks; (2) environmental parameters influencing the weathering of source rocks (*e.g.*, atmospheric chemistry, temperature, rainfall and topography); (3) duration of weathering; (4) transportation mechanisms of clastic material from the source region to the depocenter; (5) depositional environment; and (6) post-depositional processes (*e.g.*, diagenesis, metamorphism, hydrothermal alteration).

Turbidites of the eastern and northern sectors have been subjected to geochemical studies in order not only investigate their composition, but also to help constrain their tectonic setting and provenance.

3.8.1 Major elements analyses

The distribution of major and trace elements is shown in Table 1, Figures 3.10A and 3.10B, respectively, normalized to the NASC (Groumet et al., 1983). All seventeen samples from both sectors display a similar general pattern, and suggest that hydrothermal alteration did not impose considerable geochemical changes. Several important differences may be highlighted. For instance,

rocks from the eastern sector have higher contents of MnO, K2O, Rb, Cs and Sb, and wider variation of CaO, Na2O, P2O5 and As. The northern metagraywackes show higher contents of MgO and Ni and lower Th and U contents.

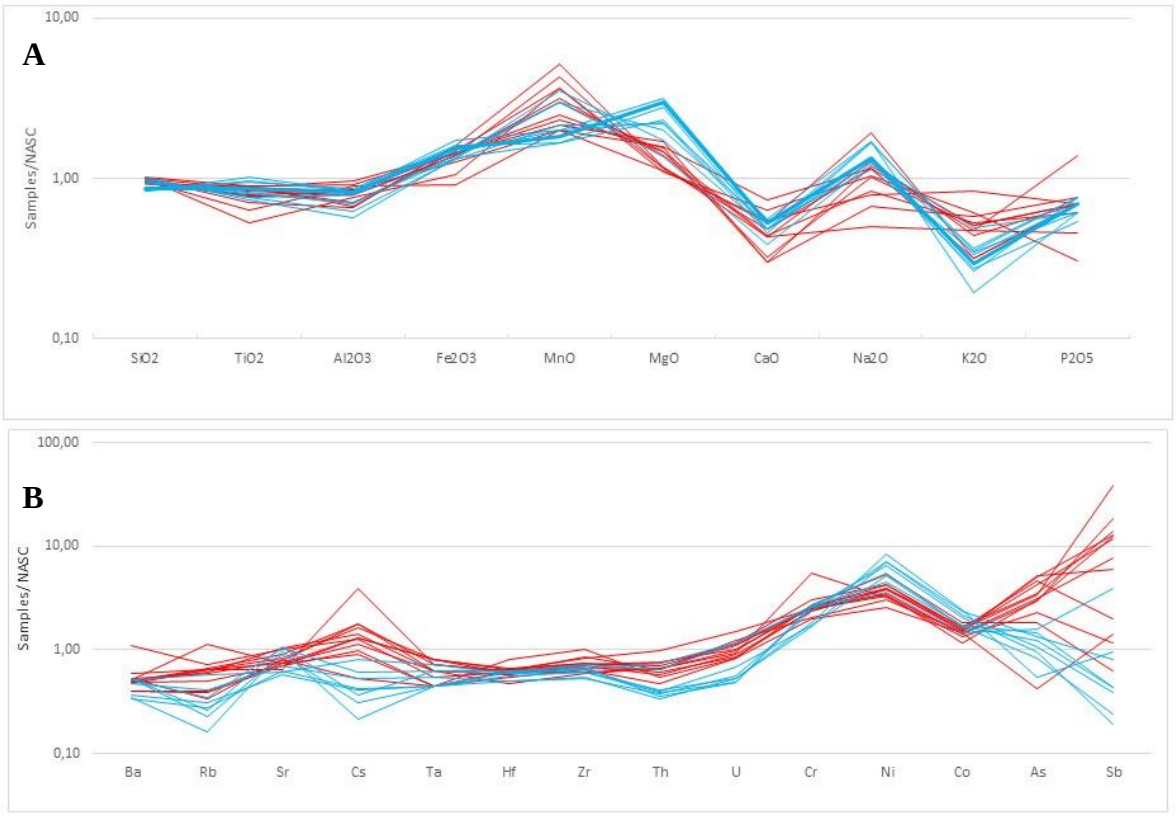


Figure 3.10. Spider diagrams normalized to the NASC of major (A) and trace elements (B) of the eastern (red) and northern (blue) sectors, Quadrilátero Ferrífero district.

The concentration of major elements in graywackes varies within a relatively narrow range (Table 1). Silica varies between 56.01 to 66.61 wt.%, and Al_2O_3 from 10.59 to 16.28 wt.%, with its concentration being highest where pelite levels dominate; TiO_2: 0.50 to 0.74 wt.%; Fe_2O_3: 5.14 to 9.13 wt.%; MnO: 0.01 to 0.31 wt. %; CaO: 1.1 to 2.69 wt.%; MgO: 3.21 to 8.03 wt.%; Na_2O: 0.57 to 2.19 wt.%; K_2O: 0.77 to 3.33 wt.%, and P_2O_5: 0.06 to 0.18 wt.%. Total iron is expressed as Fe_2O_3.

Pelites consist of 53.66 to 66.61 wt.% SiO_2; 9.57 to 14.20 wt.% Al_2O_3; 0.41 to 0.79 wt.% TiO_2; 5.96 to 9.73 wt.% Fe_2O_3; 3.15 to 9.06 wt.% MgO; 1.40 to 2.31 wt.% CaO; 1.18 to 1.90 wt.% Na_2O (Table 1).

The 3K/Al ratios that reflect the muscovite amount in a rock (*e.g.*, Kishida and Kerrich, 1986) average 0.33 in the eastern and 0.48 in the north sectors, respectively. In general, graywackes and pelites are classified variously based on their chemical composition (*e.g.*, Crook, 1974; PettiJohn, 1975; Herron, 1988). In the present study these rocks are classified according to the bivariate $\log_{(Fe_2O_3/K_2O)}$ *versus* $\log_{(SiO_2/Al_2O_3)}$ diagram after Herron (1988), where the samples plot in different fields (Fig. 3.11), being concentrated in the Fe-shale, shale and Fe-sand fields. Some samples show enrichment in Al, due to the presence of pelitic levels. One sample in particular (4506, Cachorro Bravo deposit, eastern sector) is the richest of all in K_2O, denoting its micaceous nature (Fig. 3.11).

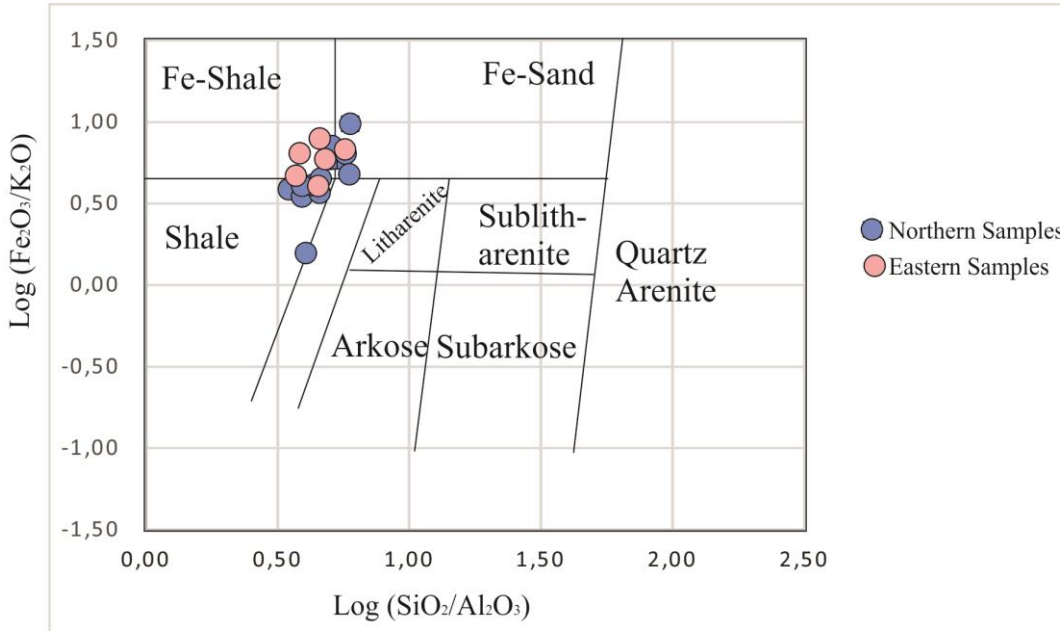


Figure 3.11. Geochemical classification of graywackes and pelites of eastern and northern sectors. $\mathbf{Log_{(Fe_2O_3/K_2O)}}$ versus $\mathbf{log_{(SiO_2/Al_2O_3)}}$ bivariate diagram (after Herron, 1988).

3.8.2 Trace and rare earth element geochemistry

The northern sector samples have higher Rb, lower Ba and equivalent Sr contents when compared to values of Archean mafic volcanic rocks (Taylor and McLennan, 1985). In the majority of analyses (Table 1) for this sector, Th, U, Zr and Hf are higher than in the eastern sector, but all of these elements have comparable abundances with samples from the Yellowknife (Taylor and McLennan, 1985).

The trace elements Rb and Th are relatively depleted, whereas Ni and Cr are enriched. Cesium, As and Sb show an irregular pattern, and are depleted in the northern and enriched in the eastern sectors, respectively. The clastic metasedimentary rocks are also characterized by high concentration of the transition metals, including V, Sc, and Co (Table 1) in the both sectors.

In all samples, Cr and Ni contents fluctuate with MgO, with Cr > 290 ppm in the northern and > 340 ppm to the eastern sectors; Ni is higher in the Cuiabá-Lamego area than in the Córrego do Sítio lineament (Table 1). All samples have indistinguishable V contents, which are correlated with $A1_2O_3$ and TiO_2 (Table 1). Cobalt is slightly more abundant in samples of the northern sector.

Arsenic and Sb are high, ranging from 248 to 445,000 ppm and 0.03 to 646 ppm, respectively. Gold has the highest content in the eastern sector (average 20 ppb), with samples in the northern sector averaging 5 ppb. These elements May be atttributed to hydrothermal processes.

The REE patterns are distinct. The eastern sector samples have higher LREE contents and more accentuated fractionation between LREE and HREE. In eastern graywackes values of Eu/Eu* seem to be higher. For the eastern sector, the La/Ybn ratios ranging from 2.60 to 3.43, and Eu/Eu* from 0.96 to 1.12. In the northern sector, the values of La/Ybn ratios ranging from 1.76 to 2.58, and Eu/Eu* from 0.94 to 0.96. The latter is characterized by lower La/Yb_n ratios (< 4.1). The rocks show light rare earth element (LREE) enriched and flat heavy rare earth element (HREE) patterns.; a weak or absent Eu anomaly is characteristic.

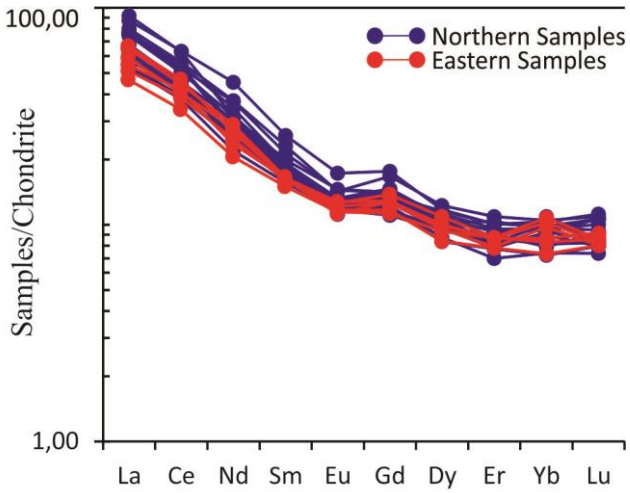


Figure 3.12. Chondrite-normalized REE patterns for the clastic sedimentary association in the eastern (red) and northern (blue) sectors (data in Table 2).

3.9 Zircon radiogenic isotope results

From the 1054 U-Th-Pb spot analyses investigated, 689 zircons are from the eastern (Cachorro Bravo, Carvoaria and Laranjeiras deposits) and 365 from the northern (Cuiabá and Lamego deposits) sectors (Fig. 3.1). Subsequently, Lu-Hf isotope analyses were carried out on 378 spot analyses, with 329 and 49 samples analyzed from the eastern and northern sectors, respectively. The 378 in-situ zircon Lu-Hf analyses were performed within the same spots chosen for U-Pb dating.

The SEM images suggest that all zircon grains under study are probably detrital in origin. Detrital zircons are rounded, euhedral to subhedral, with several grains as broken fragments; most show oscillatory zoning and some grains are either unzoned or exhibit sector zoning. Only zircon analyses with a level of concordance between 95% and 101% are used for the interpretation of age spectra and depositional ages. Chosen images of representative types of zircon grains are shown in Figure 3.13.

3.9.1 U-Pb geochronology

The U-Pb isotope studies were performed (Table 5) on samples of individual deposits, including Cachorro Bravo, Laranjeiras and Carvoaria (eastern sector) and Cuiabá, Lamego (northern sector). Metagraywackes are referred to as MG and pelites as Pl.

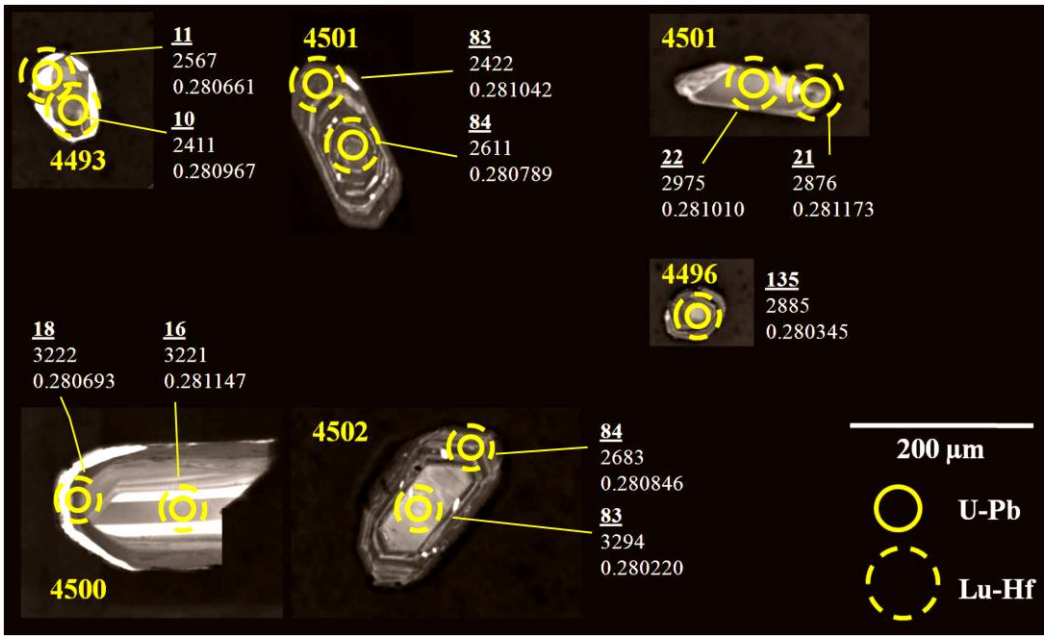


Figure 3.13. SEM representative images of zircon grains from the graywackes and pelites of clastic sedimentary association, with U-Pb and Lu-Hf measurement spots indicated.

3.9.1.1 Cachorro Bravo deposit

The samples were extracted from the FCS0756 (48.65 – 91.57 m) and FCS1053 (209.00 – 260.10 m) drill cores. The zircons range from 20 to 200 micrometers, are translucent and pinkish.

In the **pelite** of the FCS0756 drill hole, some percentage of the analyzed spots, 30 out of 106, are concordant; these data show a polimodal distribution pattern (Fig. 3.14A). The concordant spots yield ages from 2.02±0.018 to 3.65±0.025 Ga. The highest peak between 2.80 Ma and 2.99 Ga corresponds to 48 zircons ages, and the secondary peak comprises ages between 3.11 Ga and 3.49 Ga, which contains 36 zircons. There are relevant subordinate peaks at 2.60 Ga and 3.24 Ga (Fig. 3.14A).

In the **metagraywacke** of the FCS1053 drill hole, 36 concordant spots out of 128 produced ages from 2.43±0.015 to 3.49±0.0.20 Ga. The polimodal age (Fig. 3.14B) distribution records highest peak between ages of 2.80 Ga and 2.88 Ga, corresponding to 12 zircon ages. The secondary peak comprises ages between 2.88 Ga and 3.10 Ga, which contain 10 zircons. There are relevant subordinate peaks at 2.60 and 3.25 Ga.

3.9.1.2 Laranjeiras deposit

Zircons of the **metagraywacke** FCS0831 (267.20 – 296.44 m) have concordant spots with ages ranging from 1.93±0.015 to 3.38±0.020 Ma (Fig. 3.14C). The highest peak, in polimodal age distribution (Fig. 3.14C), is between 3.03 Ga and 3.38 Ga, corresponding to 17 zircon ages; the secondary peak is represented by ages from 2.69 Ga to 2.96 Ga. There are relevant subordinate peaks at 2.60 Ga, 1.93 Ga and 1.988 Ga.

The **pelite** FCS0929 (191.50 – 257.15 m) has 46 out of 91 concordant zircon analyses, where the spots yielded ages ranging from 2.43±0.022 to 3.55±0.032 Ga. The polimodal age distribution records (Fig. 3.14D) highest peaks between 2.69 Ga and 2.87 Ga, corresponding to 24 zircon ages; the secondary peak comprises ages between 2.90 Ga and 3.16 Ga, which contains 11 zircons. There are relevant subordinate peaks at 3.27 and 2.54 Ga.

3.9.1.3 Carvoaria deposit

Detrital zircon grains from **graywackes** in the FCS1196 (279.15 – 312.20 m) and FCS1261 (247.75 – 252.65 / 258.80 – 283.95 m) drill cores have sizes ranging from 10 to 180 micrometers; they are translucent and pinkish.

The analyzed concordant zircons (Fig. 3.14E) of sample FCS1196 (68 out of 126) were dated, and produced ages ranging from 1.80±0.022 Ma to 350±0.021 Ga (n = 20 and n = 7, respectively). The highest peak, in polimodal age distribution, is between 1.80 and 2.03 Ga.

Graywacke sample FCS1261 has concordant spots (59 out of 122) with ages from 1.58±0.011 to 3.38±0.021 Ga. The polimodal age distribution records the highest peak between ages of 2.57 and 3.03 Ga (n = 40; Fig. 3.14F), with the secondary peak between 3.21 Ga and 3.33 Ga, which is represented by 10 zircons. There are relevant subordinate peaks at 1.94, 3.16 and 3.38 Ga (Fig. 3.14F).

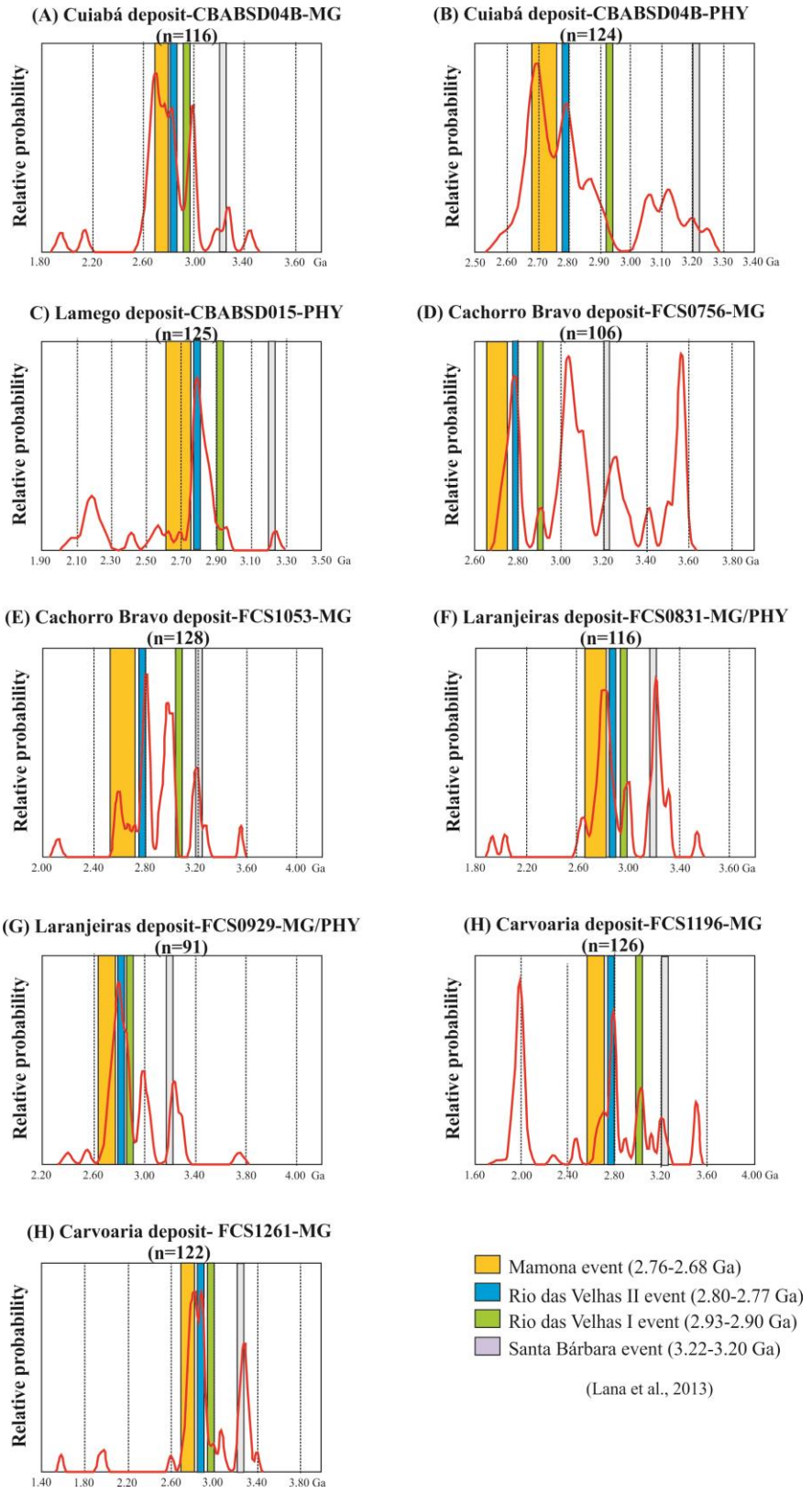


Figure 3.14. Probability density diagrams showing $^{207}Pb/^{206}Pb$ age spectra of zircon grains from graywackes and pelites of the Nova Lima Group clastic sedimentary association of the eastern (A-F) and northern (G-I) sectors. Cachorro Bravo (A, B), Laranjeiras (C, D), Carvoaria (E, F), Cuiabá (G, H), and Lamego (I) deposits. The events indicated are from Lana et al. (2013).

3.9.1.4 Cuiabá deposit

Sample CBABSD04B-MG was extracted between 1.274,10 - 1.310,35 m, and CBABSD04B-Pl between 1.274,05 - 1.279,01 m in a graywacke-pelite intercalation. The zircons (n = 240) have sizes ranging from 50 to 200 micrometers, are translucent, pinkish to brownish. The relative percentage of analyzed zircon spots is 81 out of 240.

The age distribution pattern is polimodal for both rocks (Fig. 3.14G and H). The concordant spots yield ages ranging from 1.93±0.018 to 3.42±0.030 Ma for **graywacke** intercalations (Fig. 3.14G). The highest Cuiabá peak is between 2.57 Ga and 3.09 Ga (Fig. 3.14G), with the secondary peak comprising ages between 2.57 Ga and 2.73 Ga (Fig. 3.14G), represented by 14 zircons. There are relevant, subordinate peaks at 3.22 Ga and 3.42 Ga (Fig. 3.14G).

Pelite intercalations yield ages ranging from 2.57±0.016 to 3.27±0.020 Ga based on concordant spots (Fig. 3.14H). The highest peak is between 2.57±0.016 to 2.76±0.018 Ma (Fig. 3.14H), corresponding to n = 25 zircons ages; the secondary peak comprises 3.03 Ga and 3.09 Ga (Fig. 3.14H), which contains n = 9 zircons.

3.9.1.5 Lamego deposit

In the sampled interval of the **micaceous pelite** CARBSD15-Pl, between 125.62 and 157.75 m, zircons ranging from 30 to 220 micrometers are translucent, pinkish to brownish, and the relative percentage of the analyzed zircon spots is 35 out of 125.

The polimodal pattern (Fig. 3.14I) has concordant spots and yields ages ranging from 2.05±0.019 to 3.24±0.021 Ga. The highest peak at Lamego between 2.71 Ga and 2.98 Ga corresponds to 17 zircon ages, whereas the secondary peak comprises ages between 2.05 Ga and 2.17 Ga, with 8 zircons. There are relevant, subordinate peaks at 2.39 Ga, 2.57 and 2.66 Ga (Fig. 3.14I).

3.10 Lu-Hf analyses

3.10.1 Eastern sector

Zircon grains from samples of the Córrego do Sítio lineament, only in concordant U-Pb ages belong to the major age population ranging between ca. 2.60 and 2.90 Ga, and have εHft between 0 and –6.0. There is a high spread of ages between ca.1.90 and 3.40 Ga (Fig. 3.15A).

The initial $^{176}Hf/^{177}Hf$ ratios vary from 0.280444 to 0.282506 calculated on the concordant ages of 329 concordant zircons, such that the ratio increases from older to younger grains (Fig. 3.16A). The zircons have a large spread of ages, varying from sub-chondritic to near *chondritic* and *superchondritic* εHf. The Hf isotopic composition has εHf values between +2.0 and –6.0. The typical increase in the dispersion of εHf values, becoming increasingly negative as the zircons become younger, is indicated in Figure 3.15A.

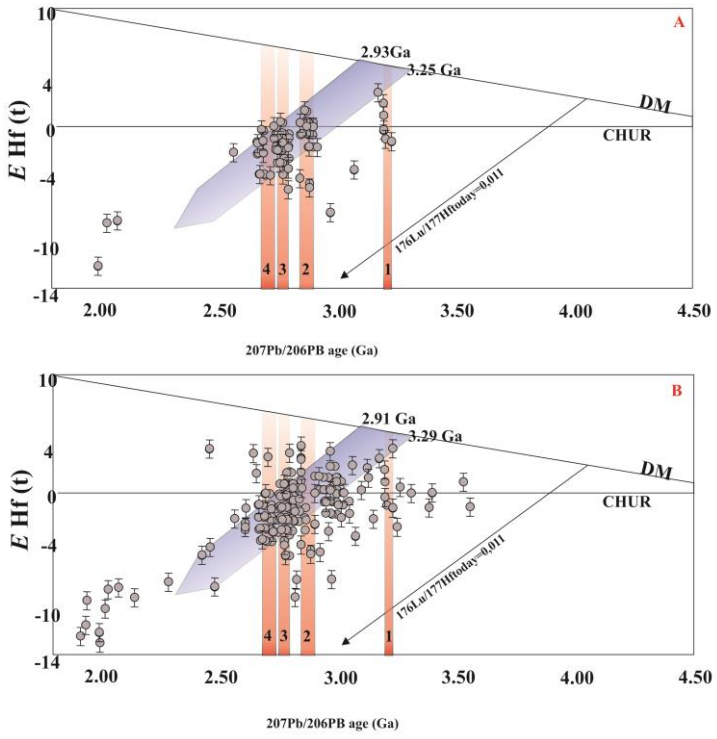


Figure 3.15. Epsilon Hf versus $^{207}Pb/^{206}Pb$ age diagram showing the data obtained from zircon grains for the Cachorro Bravo, Laranjeiras and Carvoaria (Córrego do Sítio lineament) (A); Cuiabá and Lamego (B) deposits. CHUR = chondritic uniform reservoir, DM = depleted mantle. (1) Santa Bárbara, (2) Rio das Velhas I, (3) Rio das Velhas II, (4) Mamona events after Lana et al. (2013).

3.10.2 Northern sector

The zircon grains from samples of the Cuiabá and Lamego deposit area (Fig. 3.15B), with only concordant U-Pb ages of the major age population between ca.2.6 and 2.85 Ga, have εHft between 0 and –6.0. Zircon grains with ages between ca.2.86 and 3.20 Ga generally scatter between εHft of 0 and –5.

The initial $^{176}Hf/^{177}Hf$ ratios range from 0.280678 to 0.281563, calculated based on 49 concordant zircon ages, and these increase from older to younger grains (Fig. 3.16B). Zircons older than 2.90 Ga display mainly *superchondritic* to near *chondrict* εHf, between –0.5 and +4.0, with a variation in the Hf model age (T_{DM}) between 2.90 Ga and 3.20 Ga. The Hf isotopic composition has εHf values between –0.5 and –16.0. The typical increase in the dispersion of εHf values, becoming increasingly negative as zircons become younger, may be verified in Figure 3.15B.

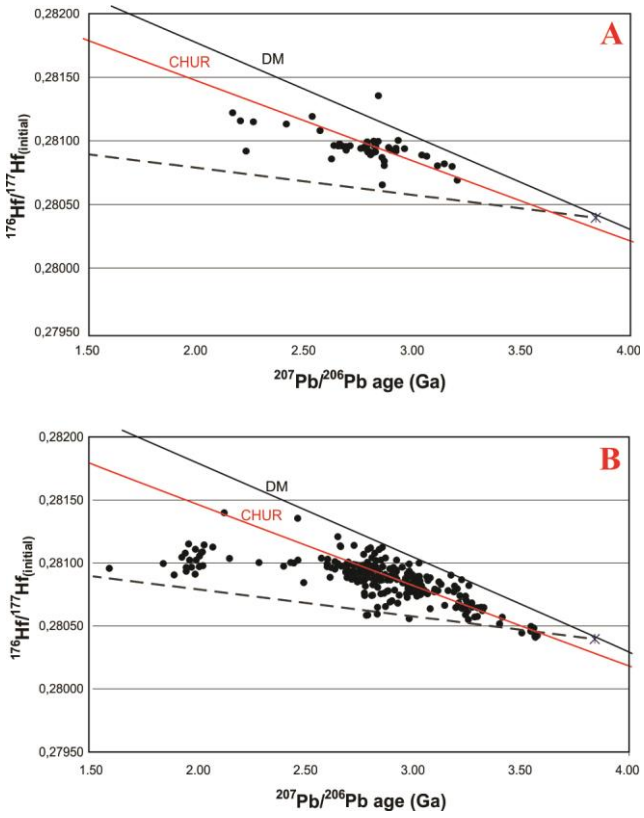


Figure 3.16. Initial $^{176}Hf/^{177}Hf$ versus ^{207}Pb-^{206}Pb age diagram showing the results of combined U-Pb and Lu-Hf isotope analyses on zircons for the Cachorro Bravo, Laranjeiras and Carvoaria (Córrego do Sítio lineament) (A); Cuiabá and Lamego (B) deposits. CHUR = chondritic uniform reservoir; DM = depleted mantle.

3.11 Discussion

3.11.1 Geochemical features, provenance and tectonic setting of the clastic sedimentary association of the eastern and northern sectors

Remnants of Archean rocks are exposed on all continents, with sedimentary rocks preserved in two major settings: as volcaniclastic and chemical sediments interbedded with volcanic rocks and as clastic sedimentary sequence (*e.g.*, Taylor and McLennan, 1985; Helmstaedt, H. and Padgham, 1986; Anhaeusser, 2014). In Archean greenstone belts, these sequences are typically about 1000-5000 m thick (Taylor and McLennan, 1985); calculations by Martins et al. (2016) for the Rio das Velhas greenstone belt of the QF district are compatible with this range, an approximate thickness of 5,550 m of clastic, clastic-chemical and volcaniclastic sedimentary rocks. The turbidite sequences found in the eastern and northern sectors of the QF are representative of other Archean greenstone belts (*e.g.*, Condie, 1981; Helmstaedt, H. and Padgham, 1986), where volcanic sequences overlain by laterally persistent BIF-shale units have thick, terrigenous clastic turbidite deposits overlying them. As previously discussed, Archean metaturbidites are similar to the QF especially the Slave province of Canada, where deposits of the Quetico metasedimentary belt (Sawyer, 1986) and the world-class Roberto deposit (Fontaine et al., 2015) are examples.

The supracrustal rocks of the Nova Lima Group are an important component of the Rio das Velhas greenstone belt, similarly to those of other Archean terrains. This is the case for example of the Yellowknife Supergroup, where sedimentary rocks dominate (*e.g.*, Condie, 1981; Helmstaedt and Padgham, 1986), and are composed of widespread turbidites (Burwash-Wash Formations) derived from granite-gneiss and felsic and mafic volcanic rocks. (Taylor and McLennan, 1985).

Most Archean sedimentary rocks are generally characterized by high mineralogical and geochemical immaturity, high concentration of transition metals, low REE abundance and absence of Eu anomaly (Taylor and McLennan, 1985; Condie and Wronkiewicz, 1990).

According to Zucchetti and Baltazar (2000) and Baltazar and Zucchetti (2007), at least two different sources, mixed and felsic, contributed to the clastic rocks of the clastic sedimentary association of the Rio das Velhas greenstone belt. The relation of source rocks to the composition of these turbidites can help deduce the origin and composition of the clastic precursors of low-grade metamorphosed sediments rocks. In the present study, primary textures are well preserved, and there is no petrographic evidence for large-scale hydrothermal alteration effects, which could potentially have changed bulk geochemical compositions.

The results obtained for major elements (Fig. 3.10A), of all seventeen samples normalized to the NASC (Groumet et al., 1983), show that these lack major geochemical modifications due to hydrothermal alteration. The high Fe_2O_3 content (average 7.92 wt.%) is similar that of Archean metaturbidite deposits elsewhere (Taylor and McLennpan, 1985; Naqvi et al., 1988; Devaraju et al., 2010; Koti et al., 2011). The average 3K/Al ratios in the eastern and northern sectors of 0.48 and 0.33, respectively, may be interpreted as a reflection of the percentage of muscovite in the rocks (48% and 33%). The rocks sampled in the eastern sector recorded hydrothermal minerals than the northern sector, confirming the data of Figure 3.10, which several important differences may be highlighted in hydrothermal alteration, where rocks from the eastern sector have higher contents of MnO, K2O, Rb, Cs and Sb, and wider variation of CaO, Na2O, P2O5 and As. The northern metagraywackes show higher contents of MgO and Ni and lower Th and U contents.

Graywacke and pelite show remarkable similarities in trace element abundances, particularly REE. They are also comparable to the geochemistry of many Archean sedimentary rocks (Taylor and McLennan, 1985; Condie and Wronkiewicz, 1990) in having high LREE content, steep chondrite-normalized patterns, and a slight or absent Eu anomaly; such is the case with analogous Archean metasedimentary rocks from Quetico (Sawyer, 1986), Superior Province, and from the Abitibi (Feng and Kerrich, 1990), both in Canada.

High abundances of As and Sb are registered (Table 2). The analyzed samples are adjacent to orogenic gold deposits in the respective sectors, where gold association with Pb, Te, Se, As, and Sb has in fact been demonstrated (Vial et al., 2007; Porto, 2008; Lima, 2012; Roncato et al., 2015; Martins et al., 2016). Gold has the highest content in the eastern sector (average 20 ppb), with samples in the northern sector having an average of 5 ppb.

The provenance diagram presented in Figures 3.17 uses the discriminant functions calculated based on a set of major elements (Roser and Korsch, 1988), indicating that recycled sources represent quartzose sediments of mature continental provenance, where the sediments could derivate from granite-gneissic terrain (Figs. 3.17). The selected samples plot in the field of the quartzose sedimentary provenance, trending towards the mafic igneous provenance.

The provenance diagrams (Figs. 3.17) point to a mixture of source areas, predominantly sedimentary quartzose, although a mafic igneous source must also be considered, indicating subdivision of the source area. Provenance diagrams for tectonic environments indicate a passive margin (Figs. 3.18 A and B).

The most noticeable differences between the eastern and northern sectors for trace elements (Fig. 3.10B) are depicted by Ba, Rb, Cs, Cr, Co, and Ni abundances, suggesting that these clastic sediments were derived from source regions of contrasting overall composition. Opposite to figure 3.17, the northern sector, with higher MgO, Fe_2O_3, Cr, Ni, and Co, requires a percentage of mafic and ultramafic source rocks reaffirming its bimodal character. Whereas the eastern samples require some proportion of felsic rocks. Larger amounts of Au, Sb, As, K, Al, Rb, and Ba, and correspondingly less of Sr and Ca (Table 3, anexo 2, Figs. 3.10A and B), are characteristic of both sectors.

Compared to other Archean greenstone belt sedimentary rocks (*e.g.* Kalgoorlie, Yellowknife; Taylor and Mclennan, 1985; Feng and Kerrich, 1990), our samples show equivalent REE distribution, but lower La_N/Yb_N values. The Archean sedimentary rocks are characterized by

Eu/Eu* ≈ 1.00 (Taylor and Mclennan, 1985), which is similar to that of the present study (Table 2, Fig. 3.12). Many workers (Taylor and McLennan, 1985; Feng and Kerrich, 1990; Baltazar et al., 1998; Baltazar and Zucchetti, 2007) have shown that the compositions of Archean clastic sedimentary rocks may be modeled as bimodal mixtures of mafic-ultramafic and felsic volcanic rocks (a very steep HREE-depleted pattern; Taylor and McLennan, 1985). The major and trace element geochemical data obtained in the present study do not support a high contrasting provenance between the eastern and northern sectors, but the REE patterns are distinct. The eastern sector samples have higher LREE contents and more accentuated fractionation between LREE and HREE. In eastern graywackes values of Eu/Eu* seem to be higher. Suggesting different sources for the rocks which involve a mixture of felsic and mafic rock.

The lack of an Eu anomaly in both graywackes and pelites is indicative of a passive margin origin associated with intermediate graywackes, whereas Eu negative anomalies confirm the passive margin provenance, environments characteristic of absence of plagioclásios (Taylor and McLennan, 1985), which is the case of the samples under investigation (Figs. 3.12). The data are comparable with the Kalgoorlie Group I sedimentary rocks, having $La_N/Yb_N \leq 6.00$, $Eu/Eu^* \geq 1.00$ (Taylor and McLennan, 1985). The authors specify that Group I is closely associated with mafic volcanic rocks, derived from calc-alkaline island arc volcanic, or a mixture of mafic and felsic rocks.

Based on these geochemical data, the provenance of the eastern and northern sectors turbidites must have had a contribution from both felsic and mafic/ultramafic sources, with the eastern sector having had a higher proportion of mafic/ultramafic inheritance (Lima, 2012; Ribeiro et al., 2015; Roncato et al., 2015). Based on a smaller number of samples, Baltazar and Zucchetti (2007) concluded that the northern sector is derived from a felsic source.

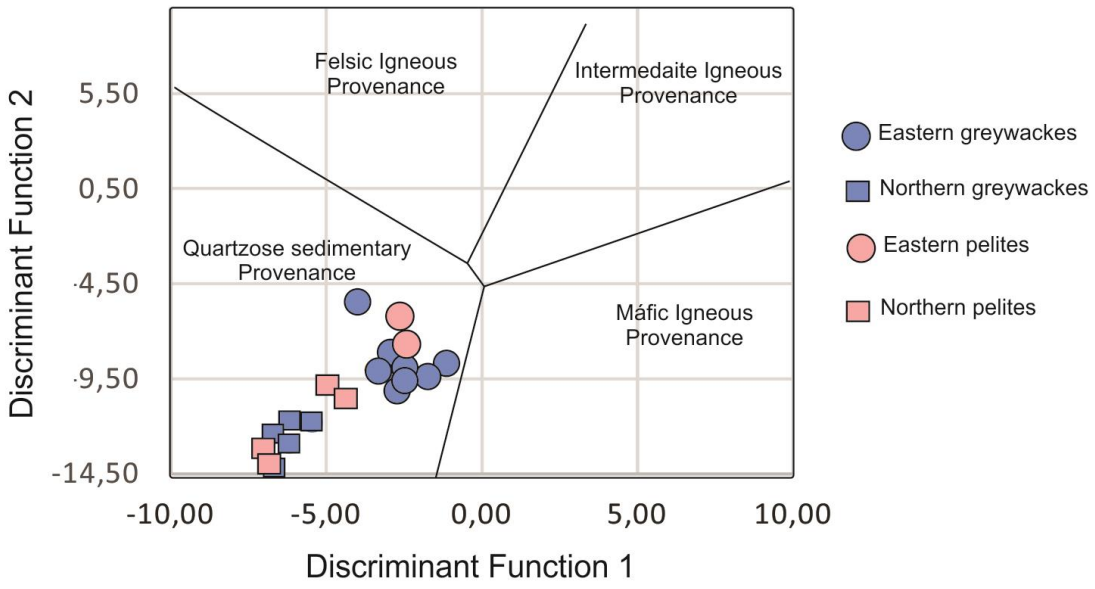


Figure 3.17. Provenance discrimination diagram (after Roser and Korsch, 1988). Discriminant Function 1 = (-1.773 × TiO_2%) + (0.607 × Al_2O_3%) + (0.76 × Fe_2O_{3T}%) + (-1.5 × MgO%) + (0.616 × CaO%) + (0.509 × Na_2O %) + (-1.22 × K_2O %) + (-9.09). Discriminant Function 2= (0.445 × TiO_2%) + (0.07 × Al_2O_3%) + (-0.25 × Fe_2O_{3T}%) + (-1.142 × MgO%) + (0.432 × Na_2O %) + (1.426 × K_2O %) + (-6.861).

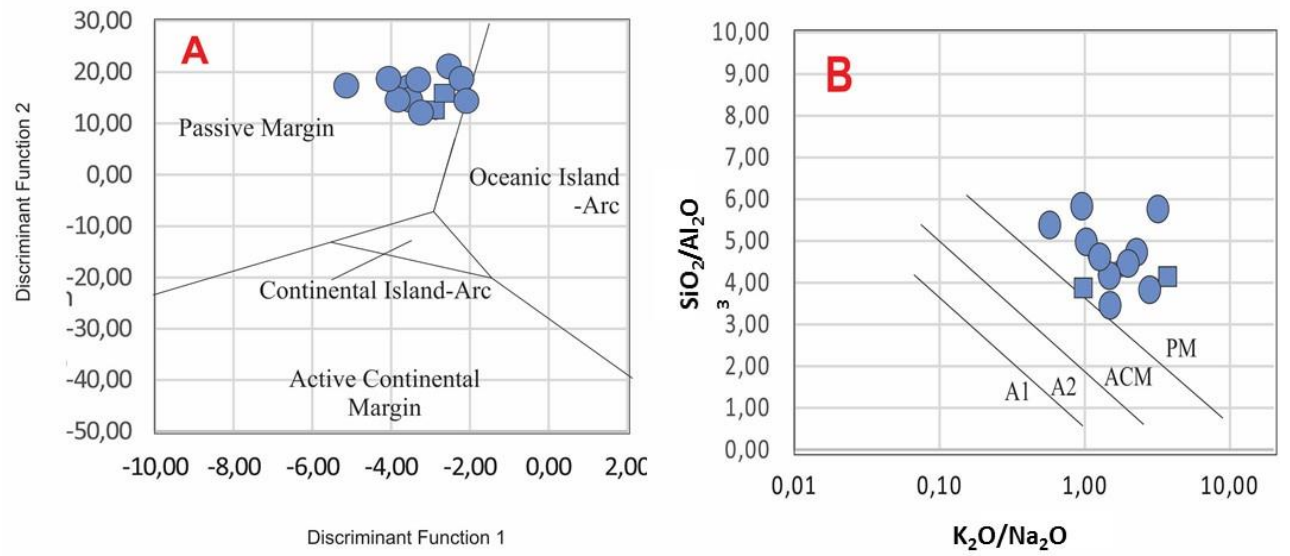


Figure 3.18. Tectonic setting discrimination diagrams based on major element composition. (A) Bivariate discriminant function diagrams (from Bhatia, 1983). Discriminant Function 1 = (-0.0447 × SiO_2%) + (-0.972 × TiO_2%) + (0.008×Al_2O_3%) + (-0.267×Fe_2O_3%) + (0.208×FeO%) + (-3.082×MnO%) + (0.140×MgO%) + (0.195×CaO%) + (0.719×Na_2O%) + (-0.032×K_2O%) + (7.510×P_2O_5%). Discriminant Function 2 = (-0.421×SiO_2%) + (1.988×TiO_2%) + (-0.526×Al_2O_3%) + (-0.551× Fe_2O_3%) + (-1.610×FeO%) + (2.720×MnO%) + (0.881×MgO) + (-0.907×CaO%) + (-0.117×Na_2O%) + (-1.840×K_2O%) + (7.244×P_2O_5%). (B) SiO_2/Al_2O_3 versus K_2O/Na_2Odiagram (Maynard et al., 1982). A1 = arc setting, basaltic and andesitic detritus, A2 = evolved arc setting, felsic-plutonic detritus.

3.11.2 U-Pb geochronology and Lu-Hf signature

The U-Pb data for detrital zircons of the Rio das Velhas greenstone belt clastic sedimentary association are given in the cumulative probability diagrams of the $^{207}Pb/^{206}Pb$ ages (Fig. 3.14). The detrital zircons in the study areas help establish the maximum ages relevant to the source rocks of the Archean gold-hosted deposits of the QF district. The age of deposition of sedimentary rocks based on detrital zircons presents some problems arising from an uncorrected common Pb; Pb loss is caused by metamorphic, tectonic or magmatic events; systematic analytical errors, to mention a few. Spots with high common Pb was not be considered in this results.

Dickinson and Gehrels (2009) calculate the maximum deposition age for sedimentary rocks with the weighted peak age probability of the youngest cluster. Based on this study, the average between the main relative mean ages of the eastern and northern sectors are 2.72 and 2.61 Ga, respectively. The average of the maximum depositional age of both sectors is coherent with published data for the QF (Machado et al., 1996; Noce et al., 2005).

These ages (2.72 and 2.61 Ga) are close to the range of the Rio das Velhas (2.78-2.76 Ga) magmatic event of Baltazar and Zucchetti (2007), and also the Rio das Velhas II (2.80-2.77 Ga) and mainly Mamona (2.76-2.68 Ga) magmatic events of Lana et al. (2013). Also, rocks of the 2.72-2.61 Ga time bracket may be considered to be significant sources of zircons for both sectors. In the eastern sector, where the Santa Bárbara (3.22-3.20 Ga) event of Lana et al. (2013) perseveres (Fig. 3.14), the older ages are more persistent than in the northern sector. This maximum depositional age is similar in many greenstone belts such as in the Superior Province (*e.g.*, Kerrich et al., 1998), Yilgarn Craton (*e.g.*, Pidgeon and Wilde, 1990) and Zimbabwe Craton (*e.g.*, Bolhar et al., 2003).

The Paleoproterozoic record is present in all samples analyzed (Fig. 3.14), with ages ranging from 1.8 to 2.45 Ga, and are best recorded for the Carvoaria deposit, eastern sector. These data are obviously not considered in the calculation of the maximum deposition age of the Nova Lima Group.

The youngest Paleoproterozoic ages (Fig. 3.14) obtained in the present study are compatible with those of detrital zircons from the Sabará Group graywackes, dated at 2.12 ± 0.04 Ma by U-Pb (Machado et al., 1996), marking the end of deposition of the ca. 2.6-2.1 Ga Minas Supergroup (Machado et al., 1996; Hartman et al., 2006). The younger proterozoic ages were not used for maximum deposition age calculations of the Nova Lima Group. They were presented separately only to record the occurrence of possible associations between rocks of different ages.

Reis et al. (2002) and Alkmim and Martins Neto (2012) point out that the Sabará Group diamictites and conglomerates carry lithic fragments of supracrustal sequences (Rio das Velhas and Minas Supergroups, and Mineiro belt) and uplifted basement rocks. The authors also show that these units were tectonically superimposed during the Transamazonian (2.1-1.9 Ga) orogeny (*e.g.*, Alkmin and Marshak, 1998). The geological maps by Dorr (1957) and Renger et al. (2005) also indicate the close contact between rocks of the Nova Lima and Sabará groups near both the eastern and northern sectors. This most likely reveals the tectonic imbrication of the Nova Lima Group and Paleoproterozoic turbidites, explaining the presence of detrital zircons of older and younger ages together, a feature that is expressed in Figure 3.14.

The εHf values from −6 to 0, with crustal residence times from 3.00 to 2.60 Ga, are derived from the reworking of Archean crust. The juvenile zircons have εHf values from 1 to 6, and cover long crustal residence times (from 3.40 to 2.80 Ga), derived from the Archean to Paleoarchean (Fig. 3.15A and B). These isotopic data point to a provenance predominantly from rocks crystallized in the Archean (3.0–2.6 Ga), from either mantle or crustal sources.

Proterozoic zircon grains have exclusively crustal signature, with very negative εHf values (from −20 to −12), and relative crustal residence times (from 2100 to 1800 Ma). The zircon grains from the eastern sector samples record mainly reworked crustal εHft values with minor juvenile εHft values. Similarly, the northern sector has negative εHf values in a consistent derivation from reworked crustal source (Fig. 3.15A).

The turbidites preserved in the clastic sedimentary association were recycled from a prior sedimentary source, supplied by either juvenile or reworked terrains between 3.2 and 2.6 Ga. The Proterozoic age zircons may have been associated with the Sabará Group provenance, which are mainly represented by turbidites of Rhyacian age, where these units were tectonically superimposed during the Transamazonian (2.1-1.9 Ga) orogeny (*e.g.*, Alkmin and Marshak, 1998).

3.11.3 LA-ICP-MS and the host rock signature

The LA-ICP-MS data help indicate the host rock contribution for the genesis of the analyzed sulfide minerals. For example, the presence of both Sb phases, berthierite and stibnite (Ribeiro et al., 2013) in the Córrego do Sítio lineament gold deposits, seems to result from the pronounced availability of this metal in the clastic sedimentary rocks as also verified by Morales et al. (2015).

The in situ LA-ICP-MS data show systematic trace element variations between different sulfide minerals of the Laranjeiras (porous and smooth pyrite - P-Py and S-Py; smooth pyrrhotite - S-Po; porous and smooth arsenopyrite - P-Apy and S-Apy) and Cachorro Bravo (smooth pyrite - S-Py) gold deposits.

3.11.3.1 Sulfide trace element evolution in carbonaceous pelite

The richest average trace element values of the sulfide minerals analyzed by in situ LA-ICP-MS are highlighted. They help establish the hydrothermal stages in carbonaceous pelite, the main host to gold at the Córrego do Sítio lineament.

1- Early hydrothermal (early-ore) stage: It is marked by the development of porous pyrite (P-Py) and arsenopyrite (P-Apy; Figs. 3.7B, D and F). Nickel, Se, Te, Cu, Pb, Ag (in P-Apy) and Pt correspond to the highest trace elements in the early-ore hydrothermal stage (Fig. 3.9) locked in the structures of both P-Py and P-Apy.

2- Main to late hydrothermal stage: It is characterized by the formation of smooth sulfides S-Py, S-Po and S-Apy (Fig. 3.7B, D and E), which develop after the porous sulfides. Cobalt is the highest trace element in S-Py, S-Po and S-Apy, whereas Au, Pb, Sb and As are enriched only in S-Apy.

These phases define the late ore stage typified by enrichment of most elements. Gold increases from stages 1 to 2, and correlates with Pb, Sb and As. The Au-As-Sb association (Fig. 3.9) also increases from 1 to 2.

In summary, Au increases according to a sequence of sulfide development (Figs. 3.7 B, D, E and F): P-Py ~ S-Po ~ S-Py (Laranjeiras deposit) → S-Py (Cachorro Bravo deposit) → P-Apy → S-Apy, suggesting that Au precipitation dominated in the main to late hydrothermal stage.

This may be a potential mechanism for the migration of gold from the early to late hydrothermal stages in the sedimentary rocks of Rio das Velhas greenstone belt sequence, involving newly formed sulfide minerals in greenschist facies conditions, precipitated together with Sb and As.

As pointed out by Large et al. (2011), pyrrhotite does not hold Au and As in its structure. This mineral is particularly more abundant in the Cachorro Bravo deposit, where mafic dikes and sills are closely associated with the host rocks. The presence of these mafic rocks seems to have been responsible for the higher pyrrhotite percentage (*e.g.*, Lima 2012; Roncato et al., 2015). It is thus possible that the conversion of pyrite to pyrrhotite, mainly at Cachorro Bravo, may have been responsible for releasing both Au and As to the hydrothermal fluid.

3.11.3.2 Evolution of sulfide minerals and related host rocks

In comparison to other Archean sedimentary deposits of the Rio das Velhas greenstone belt, those of the turbidite-hosted eastern sector contain a larger variety of ore minerals other than pyrite, arsenopyrite and pyrrhotite. These include sulfide and sulfosalt minerals that contain Sb, Pb, Hg, As, Zn, Cu, as well as Ni, Co and Pt (Fig. 3.5; Lima, 2012; Ribeiro et al., 2015; Roncato et al., 2015). This has been interpreted as a reflection of the variety in sources to the sediments, including mixed and felsic rocks.

Based on rock and isotope geochemistry, a mixed contribution of source rocks has also been demonstrated for the clastic sedimentary association of the eastern sector.

The LA-ICP-MS data on pyrite, pyrrhotite and arsenopyrite reinforce this notion. For instance, gold correlates to Se, As, Sb and Te of sedimentary affiliation, as well as to the mafic-ultramafic elements Co, Ni, and Pt.

The trace elements commonly concentrated in carbonaceous black shales of orogenic gold deposits include As, Cu, Zn, Cr, W, Ni, V, Pb, Sb, Bi, Te, and Mo (Boyle, 1986; Perring et al., 1991; Large et al., 2011); most of them are also concentrated in the sulfide minerals analyzed by LA-ICP-MS in the present study. Several workers (Reich et al., 2005; Large et al., 2009; 2011) have shown that these elements are released by the source rocks, and also concentrated by hydrothermal processes.

Large et al. (2011) pointed out that the Au-As-S association is typical of sedimentary-hosted ores, and inherited from the carbonaceous pelites. This sedimentary record has recently been indicated by LA-ICP-MS analyses on fluid inclusions from the Carvoaria deposit (Morales et al., 2016), where Sb-rich inclusions were detected suggesting leaching of this element from carbonaceous-dominated host rocks. Phillips and Powell (2010), Large et al. (2011), and Pitcairn et al. (2015) also show that gold must have been incorporated into the hydrothermal fluids during metamorphic devolatilization of carbonaceous pelites.

As pointed out by Ribeiro et al. (2015), a metamorphic fluid was responsible for mineralization at the deposits of the Córrego do Sítio lineament. Considering the data presented here, it is possible that the carbonaceous pelite was in part the source for Au, As, S and Sb during hydrothermal interaction, however, this a discuss. Goldfarb and Groves (2015) explain that a sedimentary rock source for gold-bearing metamorphic fluids is plausible for Phanerozoic orogenic gold provinces, where world-class to giant deposits are hosted in thick turbidite sequences, it cannot be a valid option for Archean provinces and it is also unlikely for many Paleoproterozoic provinces. These same authors argued that are impossible the carbonaceous pelite as the source of gold in the sedimentary deposits, because there is no evidence to support their required hypothesis that

significant volumes of pyrite-rich sedimentary rock underlie many of the productive greenstone areas.

Arsenic is the most abundant trace element in Au-bearing P-Py and S-Py, and P-Apy and S-Apy, of the Laranjeiras and Cachorro Bravo deposits, followed by Ni and Co. Fluid-rock interaction involving metamorphic-hydrothermal fluids and mafic-ultramafic rocks may also explain the Ni-Co contents in sulfides.

3.12 Implications for gold exploration

Gold mineralization in the clastic sedimentary association is structurally controlled by a system of veins and veinlets, characterized by quartz-carbonate-sericite and sulfidation of the turbidite host rocks (Vial et al., 2007; Roncato et al., 2015; Beleque, 2016). The present studies introduce insights on the geological characteristics and ore-forming processes associated with turbidite-hosted gold deposits in the Rio das Velhas greenstone sequence, based mainly on rock and isotope geochemistry. The in situ LA-ICP-MS analyses of sulfide minerals suggest a possible genetic model for their evolution. The features summarized below can be used as gold exploration tools in this region:

1) Gold shows a positive correlation with As, Co, Ni, Te, Pb and Sb. Anomaly of these elements in soil or stream sediments may be used as an indicator for exploration of new turbidite-hosted gold orebodies.

2) Carbonaceous pelite has pyrite (P-Py and S-Py) and pyrrhotite (P-Po and S-Po) that are devoid of economic gold, and increase with the intensity of hydrothermal alteration, where this metal is best concentrated in porous arsenopyrite (P-Apy) and mainly in smooth arsenopyrite (S-Apy). The recognition of areas where sulfide-rich, carbonaceus pelite displays arsenopyrite in the proximity of turbidite sequences and-or silicification zones can help identify economic blind orebodies.

3) The U-Pb and Lu-Hf isotope signatures point to a provenance predominantly from rocks crystallized in the Archean (3.0–2.6 Ga), from either mantle or crustal sources. The mantle contribution may have been important to generate a larger diversity of sulfide minerals in the eastern sector. This suggests that sulfur, which complexed with gold, was buffered more efficiently along fluid path. Regions with these isotope data may be used in exploration to indicate favorable turbidite sequences as host to gold.

4) Gold exploration in rocks of the Archean resedimented greenstone belt must take into consideration that younger, Proterozoic turbidites, known to be devoid of gold, are imbricated with them.

3.13 Conclusions

The present synthesis (Table 4, Anexo 4) on the clastic sedimentary association of the Rio das Velhas greenstone belt, and other associated rocks in the QF (Fig. 3.1), highlights the variation of lithological, sedimentological, volcanic, hydrothermal and other evolutionary aspects of the geology of this Archean terrain. The study is particularly relevant bearing in mind that the greenstone belt is dominated by sedimentary rocks (*e.g.*, Baars, 1997).

Focus is given to the age and sedimentary source of the turbidites (greywacke, carbonaceous and micaceous pelite) in the Córrego do Sítio lineament, eastern sector, where these rocks are host to gold, and in the Cuiabá-Lamego gold deposit area, northern sector, where gold diggings are located. The results have been constrained with the use of U-Pb zircon analyses, rock geochemistry, Lu-Hf determinations on zircons of both areas, as well as elemental data with EPMA and quantitative in situ LA-ICP-MS analyses on sulfide minerals from the eastern sector.

The integration of these data with the proposed evolution put forward by Baltazar and Zucchetti (2007) results in the sketch model of Figure 3.19. These authors indicate that the clastic sedimentary associations of the eastern and northern sectors developed during different stages of tectonic evolution of the Rio das Velhas greenstone belt, with the Córrego do Sítio sediments

having been associated with the progression of an island-arc advance, and the Cuiabá-Lamego sediments with a continental arc. The scheme of Figure 3.19 accommodates much of the data obtained in the present contribution, which are summarized below:

1) The turbidite-hosted gold deposits of the eastern sector Córrego do Sítio lineament carries a large variety of ore minerals, other than pyrite, arsenopyrite and pyrrhotite, including sulfide and sulfosalt minerals that contain Sb, Pb, Hg, Cu, Zn, as well as Co and Ni. This has been interpreted as a reflection of the variety in sources to the sediments, including quartzose sources, mixed and felsic rocks (Lima, 2012; Ribeiro et al., 2015; Roncato et al., 2015).
2) Major (Fig. 3.10A) and trace (Fig. 3.10B) elements vary within a narrow range, with the

3) The eastern sector samples geochemistry is comparable to that of many Archean sedimentary rocks in having high LREE content, steep chondrite normalized patterns, and a slight or absent Eu anomaly.
4) Geochemical data for major (Fig. 3.10A), trace (Fig. 3.10B) and REE (Fig. 3.12) elements show that the provenance of the eastern and northern sectors turbidites must have had a contribution from both felsic and mafic sources, with the eastern sector having had a higher proportion of mafic inheritance and the northern sector having had a concentration of important trace elements as Ni and Co.
5) Tectonic setting discrimination diagrams (Fig. 3.18A and B) indicate that the rocks were supplied from a passive margin-type environment, with an orogenic source area having $LaN/YbN \leq 6.00$, $Eu/Eu^* \geq 1.00$, similar to Taylor and McLennan (1985), which specify that this group closely associated with mafic volcanic rocks, derived from calc-alkaline island arc volcanic, or a mixture of mafic and felsic rocks.
6) Rocks formed during the Rio das Velhas (2.78-2.76 Ga) event of Baltazar and Zucchetti (2007), and also the Rio das Velhas II (2.80-2.77 Ga) and mainly Mamona (2.76-2.68 Ga)

magmatic events of Lana et al. (2013; Figs. 3.14 and 3.19), are the most significant source of zircons in both sectors. The ancient Santa Barbara (3.22- 3.20 Ga) magmatic event is best registered in zircons of the Córrego do Sítio sedimentary rocks.

7) Zircons of the clastic sedimentary association turbidites of both sectors are sourced in Paleoarchean to Proterozoic rocks (Fig. 3.14). These Paleoproterozoic data probably reflect the presence of lithic fragments and zircons of the Sabará Group age graywackes in the Archean clastic sedimentary association turbidites. This most likely reveals the tectonic imbrication of the Nova Lima Group and Paleoproterozoic turbidites, explaining the presence of detrital zircons of older and younger ages clearly together.
8) The εHf values point to a provenance predominantly from rocks crystallized in the Archean (3.0–2.6 Ga), from either mantle or crustal sources (Fig. 3.15A and B). The eastern sector samples record mainly reworked crust εHft values with minor juvenile εHft values (Fig. 3.15A). The Lu-Hf results support the assumption that magmas were partially juvenile and incorporated a significant amount of reworked material, for both sectors.
9) In situ LA-ICP-MS analyses are compared in three sulfide minerals of carbonaceous pelites from the Córrego do Sítio lineament. In the Laranjeiras deposit these encompass porous (P-Py) and smooth (S-Py) pyrites, smooth (S-Po) pyrrhotite, porous (P-Apy) and smooth (S-Apy) arsenopyrite. Smooth (S-Py) pyrite of the Cachorro Bravo deposit is also included (Figs. 3.7 and 3.9). Box and whisker plots (Fig. 3.9) show that for 11 (eleven) elements examined there is relevant enrichment or depletion depending on texture, generation and type of mineral.
10) The typical trace elements commonly concentrated in carbonaceous shales around the world (Large et al., 2011), Mo, V, Ni, Cr, Zn, As, Sb, Hg, Cu, Se, Te, Bi, and W, are also found in the sulfide minerals of the analyzed samples (Figs. 3.8 and 3.9).

11) Two hydrothermal stages of evolution for carbonaceous pelites are recognized: (1) Early hydrothermal, marked by the development of porous sulfides (P-Py and P-Apy), during which some gold precipitation took place. (2) Main to late hydrothermal, recognized by the development of smooth sulfides (S-Py, S-Po and S-Apy), with gold peaking its values. This stage is dominated by recrystallization of the porous sulfide phases from (1) to produce smooth sulfides in (2) (Fig. 3.7).

12) The As, Co, Ni, Te, Pb and Sb concentration in arsenopyrite from the main stages of gold mineralization has important implications for the genesis of the deposits. Arsenopyrite and pyrite, which have the highest Au content, also record high As and Co.

13) Cobalt, Sb and Pb are enriched in P-Apy and S-Apy (Fig. 3.9). Gold, As and Sb are best concentrated in the S-Apy; gold precipitation dominates in the main to late hydrothermal stages together with Sb and As.

14) Smooth pyrite (S-Py) at the Cachorro Bravo deposit displays the highest As and Au concentration in comparison to the Laranjeiras deposit. At Cachorro Bravo, where pyrrhotite devoid of gold is more abundant, there is an important association with mafic dikes and sills, and this sulfide seems to have evolved from the metamorphic upgrade of pyrite. This could have been responsible for releasing Au to the hydrothermal fluid.

15) The carbonaceous pelite may have been in part the source for Au, As, S during hydrothermal interaction at the Córrego do Sítio lineament deposits, since these metals are relatively enriched in the original sediment, although it is a questionable by several authors (*e.g.* Goldfarb and Groves, 2015), which support that there is no evidence to significant volumes of pyrite-rich sedimentary rock underlie many of the productive greenstone areas.

16) The mixed source for the host rocks may explain why gold correlates correlates to Se, As, Sb and Te of sedimentary affiliation, as well as to the mafic-ultramafic elements Co, Ni, and Pt.

17) The interaction of the hydrothermal fluid with the host rocks has determined the incorporation and depletion of certain elements in the remaining fluid, detected by in situ LA-ICP-MS analyses on sulfide minerals. Arsenic is the most abundant trace element in Au-bearing porous and smooth pyrite (P-Py and S-Py) and porous and smooth arsenopyrite (P-Apy and S-Apy), of the Laranjeiras and Cachorro Bravo deposits (S-Py), followed by Ni and Co. These elements were probably leached during hydrothermal alteration indicating a local metal and fluid source during gold mineralization.

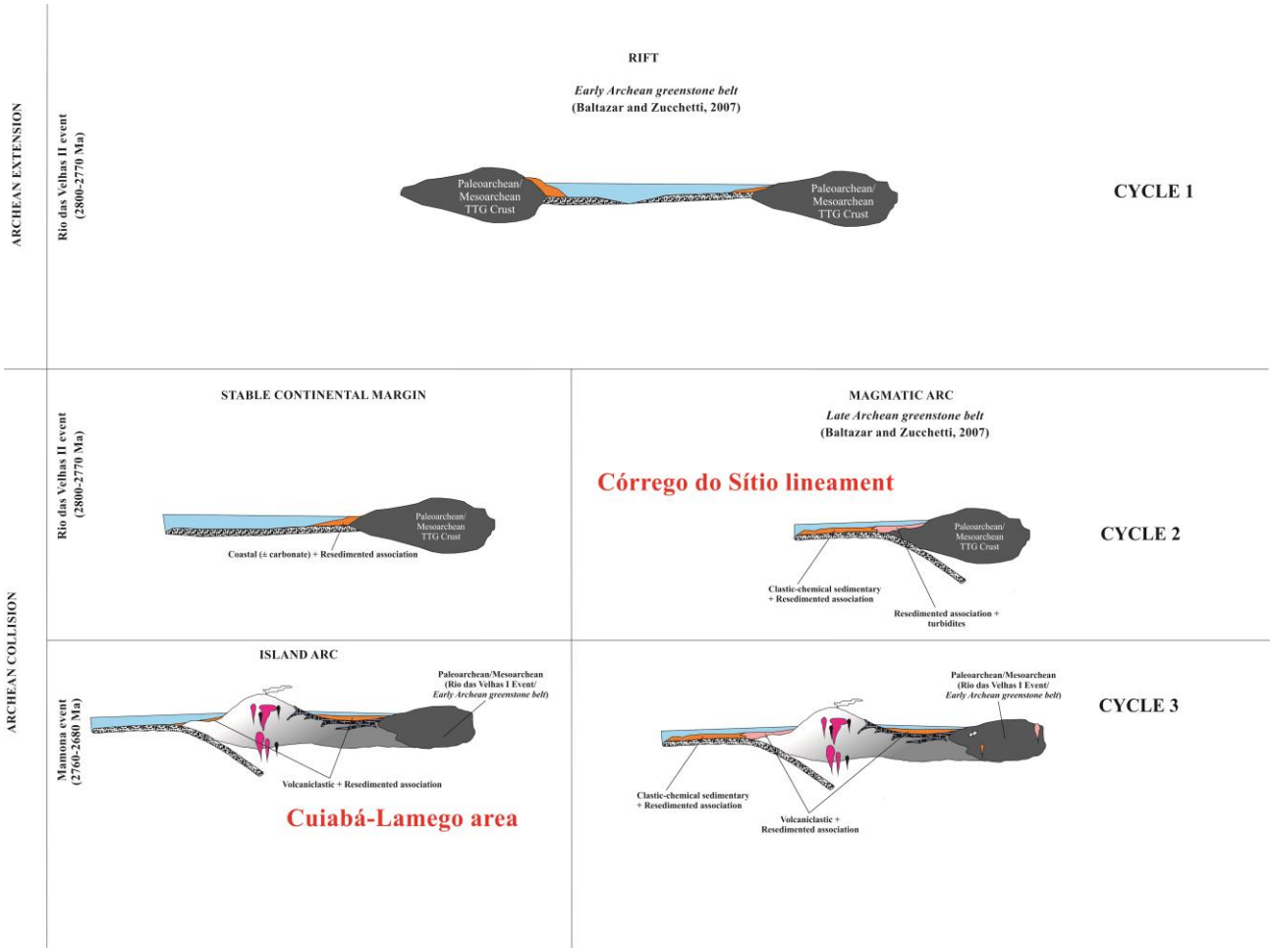


Figure 3.19. Sketch of Archean tectonic environments portrayed for the Cuiabá-Lamego area (northern sector) and Córrego do Sítio lineament (eastern sector), contextualized in the Rio das Velhas greenstone belt evolution and its associated sedimentary cycles, as suggested by Baltazar and Zucchetti (2007), as well as in the magmatic evolution events of Lana et al. (2013).

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PARTE IV - INTEGRAÇÃO E CONCLUSÕES DO TRABALHO

4 CONSIDERAÇÕES FINAIS

As investigações realizadas nas rochas da associação ressedimentada forneceram informações adicionais para um melhor entendimento destas sequências clásticas na região do Quadrilátero Ferrífero, assim como uma melhor avaliação do potencial econômico de depósitos auríferos hospedados em rochas turbidíticas arqueanas. De grande extensão regional, essa associação se destaca pela variação litológica, sedimentológica, vulcânica e hidrotermal, além de outros aspectos evolutivos. O presente estudo é particularmente relevante pelo fato deste *greenstone belt* ser dominado por rochas sedimentares (e.g., Baars, 1997).

Os trabalhos de detalhamento no setor leste representam importante passo na compreensão da mineralização aurífera e da paragênese mineral, fornecendo semelhanças genéticas entre as rochas dessa associação nas jazidas de Cachorro Bravo, Laranjeiras e Carvoaria, balizados por levantamentos geológicos, petrográficos, litoquímicos, geocronológicos (Porto, 2008; Lima, 2012;

Sequetto-Pereira et al., 2015; Roncato et al., 2015; Ribeiro et al., 2015) e por análises de ablação a *laser in situ* ICP-MS em sulfetos. O entendimento da associação ressedimentada é proposto através da comparação das rochas turbidíticas dos setores leste e norte (Figs. 2.1, 3.1, 3.2 e 3.3), que contribuíram na construção do modelo de evolução geodinâmica apresentado na Figura 3.20, através de estudos petrográficos, litoquímicos e geocronológicos, resumidamente apresentados a seguir:

1. Os depósitos de ouro hospedados em sequência turbidítica do lineamento Córrego do Sítio contém variedade de minerais-minério, tais quais pirita, arsenopirita e pirrotita, incluindo sulfetos e sulfossais que contêm Sb, Pb, Hg, Cu, Zn, além de Co e Ni. Do ponto de vista da ambiência geológica, o setor leste tem relação, com as associações de litofácies (Baltazar e Zucchetti, 2007) vulcanoplutônica máfica-ultramáfica, vulcanossedimentar química, sedimentar química-pelítica e, principalmente, sedimentar clástica marinha e sedimentar clástica não-marinha, o que favorece a variedade nas fontes sedimentares.
2. Duas galerias mapeadas nas rochas mineralizadas do depósito Cachorro Bravo (Figs. 2.5 e 2.6), setor leste, mostraram que o aumento da intensidade da alteração hidrotermal com a proximidade dos veios de quartzo torna-se evidente pelo clareamento das rochas hospedeiras e aumento na quantidade de sulfetos disseminados (Fig. 2.8).
3. Os elementos maiores (Fig. 3.11) das rochas clásticas estudadas, normalizados pelo NASC, não apresentam significativas modificações geoquímicas devido à alteração hidrotermal, tanto nos setores leste e norte, onde as rochas foram amostradas na parte distal dos depósitos, distante da mineralização.
4. Elementos maiores (Fig. 3.11A) e tracos (Fig. 3.11B) apresentaram uma pequena variação geoquímica nas amostras dos setores leste e norte. Já os ETR são muito semelhantes para a maioria das amostras, especialmente dentro do mesmo grupo de rochas (Fig. 3.13A e B), evidenciando grande similaridade geoquímica nas rochas clásticas da associação

ressedimentada. Os resultados geoquímicos são comparáveis ao de rochas sedimentares arqueanas, registrando alto conteúdo de ETR pesados, padrões normalizados ao condrito abrupto, e uma incipiente ou ausente anomalia de Eu.

5. Dados geoquímicos para elementos maiores (Fig. 3.11A), traços (Fig. 3.11B) e ETR (Figs. 3.13A e B) mostram que a proveniência das sequências turbidíticas dos setores leste e norte receberam contribuição de fontes félsicas e máficas, tendo o setor leste maior proporção de herança máfica, mais abundante naquele setor do Quadrilátero Ferrífero;
6. O evento Rio das Velhas (2780-2760 Ma) de Baltazar e Zucchetti (2007), e também os eventos Rio das Velhas II (2800-2770 Ma) e, principalmente, Mamona (2760-2680 Ma) de Lana et al. (2013; Figs. 3.15) são os mais significativos períodos-fonte de zircões em ambos os sectores. O evento Santa Barbara (3220 - 3200 Ma), mais antigo, é melhor registrado nos zircões das rochas clásticas do lineamento Córrego do Sítio, cujas estruturas regionais colocam em contato rochas do complexo granito-gnáissico e com as da associação ressedimentada.
7. Zircões provenientes dos turbiditos da associação ressedimentada, de ambos os setores, registram idades desde o Paleoarqueano até o Proterozoico (Fig. 3.15). Os dados (Fig. 3.15, Tabelas anexo 3) paleoproterozoicos provavelmente refletem a presença de fragmentos líticos e zircões das grauvacas com idades semelhantes ao Grupo Sabará nos turbiditos arqueanos.
8. A presença desses fragmentos líticos indica o imbricamento tectônico do Grupo Nova Lima com turbiditos paleoproterozoicos, possivelmente do Grupo Sabará, explicando a presença de zircões detríticos de idades mais avançadas e mais jovens claramente juntos (Reis et al., 2002; Alkmim e Martins-Neto, 2012). Este fato pode ser evidenciado pela grande quantidade de falhas encontradas nos dois setores, mas notadamente estudadas no setor leste, onde quatro eventos deformacionais principais são reconhecidos (Figs. 2.5 e 2.6). O

evento D_1 é caracterizado por uma foliação progressiva S_{1-2}. D_2 é caracterizado por uma clivagem crenulação; D_3 é representado dobras abertas de grande escala que arqueam S_0, S_{1-2} e $S_{3;}$ D_4 é representado por fraturas paralelas e espaçadas.

9. Os valores de εHf apontam para uma proveniência predominantemente de rochas cristalizadas no Arqueano (3,0-2,6 Ga), a partir de fontes mantélicas ou crustais retrabalhadas (Figs. 3.16A e B). As amostras do setor leste registram principalmente valores de εHft para crosta retrabalhada e valores secundários de origem juvenil (Fig. 3.16A). Os resultados isotópicos Lu-Hf suportam a hipótese de que os magmas eram parcialmente juvenis com significante incorporação de material crustal retrabalhado, para ambos os setores.

O detalhamento do setor leste incluiu análises por ablação a *laser in situ* ICP-MS em sulfetos nos depósitos de Laranjeiras e Cachorro Bravo, cujas conclusões estão discriminadas abaixo:

1. Próximo aos diques metamáficos encaixados na associação ressedimentada, especialmente no depósito de Cachorro Bravo, as arsenopiritas porosa (P-Apy) e lisa (S-Apy) se desenvolvem nos veios mineralizados a partir do consumo de pirrotitas (S-Po, P-Po). Arsenopirita formada a partir das piritas porosa (P-Py) e lisa (S-Py) é típica de zonas de alteração hidrotermal distante das rochas metamáficas, onde os veios são dominados por quartzo fumê e carbonato, associados a bertierita, estibnita e ouro.
2. Dois estágios hidrotermais de evolução para os pelitos carbonosos são reconhecidos: (1) estágio cedo hidrotermal, marcado pelo desenvolvimento de sulfetos porosos (P-Py e P-Apy), durante o qual alguma precipitação do ouro ocorreu; (2) Estágio hidrotermal principal a tardio, reconhecido pelo desenvolvimento de sulfetos lisos (S-Py, S-Po e S-Apy), registrando o pico de ouro entre seus valores. Esta fase é dominada por recristalização a partir das fases de sulfetos porosos (1) para produzir sulfetos lisos (2) (Fig. 3.7).
3.

4. As análises *in situ* de LA-ICP-MS são comparadas em três tipos de sulfetos amostrados em pelitos carbonosos da associação ressedimentada, no lineamento Córrego do Sítio. No depósito Laranjeiras foram analisadas piritas porosa (P-Py) e lisa (S-Py), pirrotita lisa (S-Po), arsenopiritas porosa (P-Apy) e lisa (S-Apy). Cristais de pirita lisa (S-Py) do depósito Cachorro Bravo foram também analisadas (Figs. 3.6, 3.7 e 3.8). *Box-whisker* (Fig. 3.9) mostram que para 11 (onze) elementos analisados existe enriquecimento ou empobrecimento relevantes dependendo da textura, geração e tipo de sulfeto.
5. Os elementos traço típicos comumente concentrados em xistos carbonosos em todo o mundo (Large et al., 2011), Mo, V, Ni, Cr, Zn, As, Sb, Hg, Cu, Se, Te, Bi, e W, também foram encontrados nas amostras analisadas (Figs. 3.9 e 3.10).
6. A concentração de As, Co, Ni, Te, Pb e Sb em arsenopirita nas principais fases de mineralização de ouro tem implicações importantes para a gênese dos depósitos do lineamento Córrego do Sítio. Arsenopirita e pirita, sulfetos com maior teor de Au, também registram alto As e Co.
7. Cobalto, Sb e Pb são enriquecidos em P-Apy e S-Apy (Fig. 3.10). Ouro, As e Sb são mais concentrados em S-Apy; precipitação do ouro ocorre principalmente nos estágios hidrotermais tardios juntamente com Sb e As.
8. Pirita lisa (S-Py) do depósito Cachorro Bravo mostra concentração mais elevada de Au e As em comparação com o depósito Laranjeiras. Em Cachorro Bravo, onde a pirrotita carente de ouro é mais abundante, há importante associação do depósito com os diques e *sills* máficos. Este sulfeto parece ter evoluído a partir do sobrecrescimento da P-Py, transformação que pode ser responsável pela liberação de Au para o fluido hidrotermal.
9. O fluido hidrotermal foi provavelmente modificado desde a sua gênese, durante sua ascenção, e consequente interação com as rochas hospedeiras da associação ressedimentada (*e.g.*, Goldfarb et al., 1988; 1991; Goldfarb e Groves, 2015). O pelito carbonoso pode ter

sido, ao menos em parte, fonte para Au, As e S durante a alteração hidrotermal nos depósitos do lineamento Córrego do Sítio, uma vez que estes metais são relativamente enriquecidos nos sedimentos originais. Esse ponto é questionado por outros autores (*e.g.* Goldfarb e Groves, 2015), que afirmam não ter evidências para significantes quantidades de sulfetos nessas rochas sedimentares.

10. A fonte mista para as rochas da associação ressedimentada no setor leste pode ser evidenciada no fato do ouro possuir boa correlação com Se, As, Sb e Te de filiação sedimentar, assim como elementos de afinidade máfica-ultramáfica como Co, Ni e Pt.
11. A interação do fluido hidrotermal com rochas hospedeiras permitiu a incorporação e a depleção de certos elementos no fluido remanescente, detectada por meio de análises *in situ* LA-ICP-MS nos sulfetos. Arsênio é o elemento traço mais abundante, seguido de Ni and Co, nas piritas (P-Py e S-Py), e também nas arsenopiritas (P-Apy e S-Apy). Estes elementos foram provavelmente assimilados durante a alteração hidrotermal indicando fonte local desses elementos durante a mineralização de ouro.

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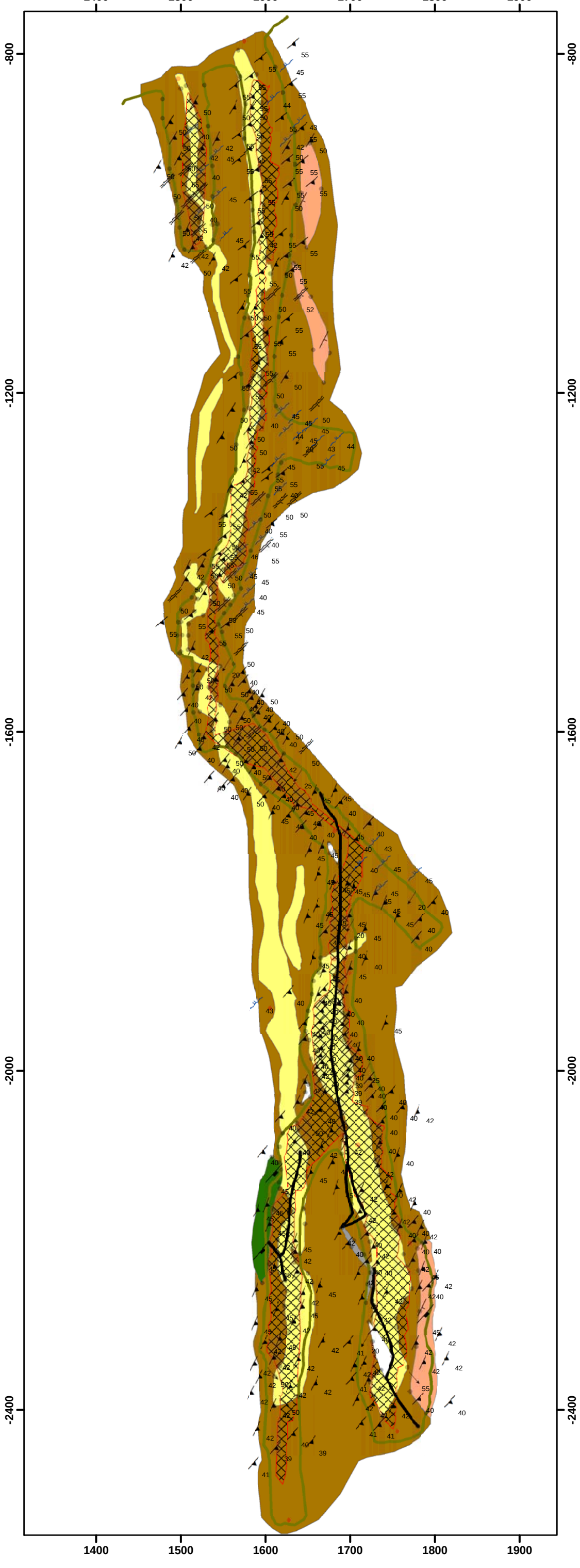
ANEXO 1

DADOS MAPEAMENTO SUBTERRÂNEO

DADOS FUROS DE SONDAGEM

AngloGold Ashanti
Mapa Geológico
Mina de Córrego do Sítio - Nível 658
Depósito Cachorro Bravo
Corpos - 200 / 211 Sul



N

Legenda

PROTEROZÓICO

Rochas Ígneas de Idade Incerta

Rocha Intrusiva Metamorfisada (anfibólio-plagioclásio-carbonato-epidoto-clorita Xisto)

ARQUEANO

Supergrupo Rio das Velhas

NEOARQUEANO

Grupo Nova Lima

Unidade Córrego do Sítio - Intermediária

Venulações mili-centimétricas de quartzo e carbonato

Veios de quartzo fumê com sulfetos e sulfossais de espessuras variável de milímetros a metros.

Veios de quartzo branco com sulfetos e sulfossais de espessuras variável de milímetros a metros.

Zona hidrotermal mineralizada rica em venulações

Plagioclásio-clorita-mica-quartzo Filito Carbonoso, clorita-quartzo-mica Xisto carbonoso, metapelito carbonoso intercalados com subordinadas lentes de metagrauvaca e metapsamito carbonoso Indivisos

Metagrauvaca e metapsamito carbonoso Indivisos

Geologia Estrutural

40 Foliação

50 Lineacao

Falhas e Fraturas

Limite Galeria 658

Foliacao Milonitica

Clivagem Crenulacao

Acamamento

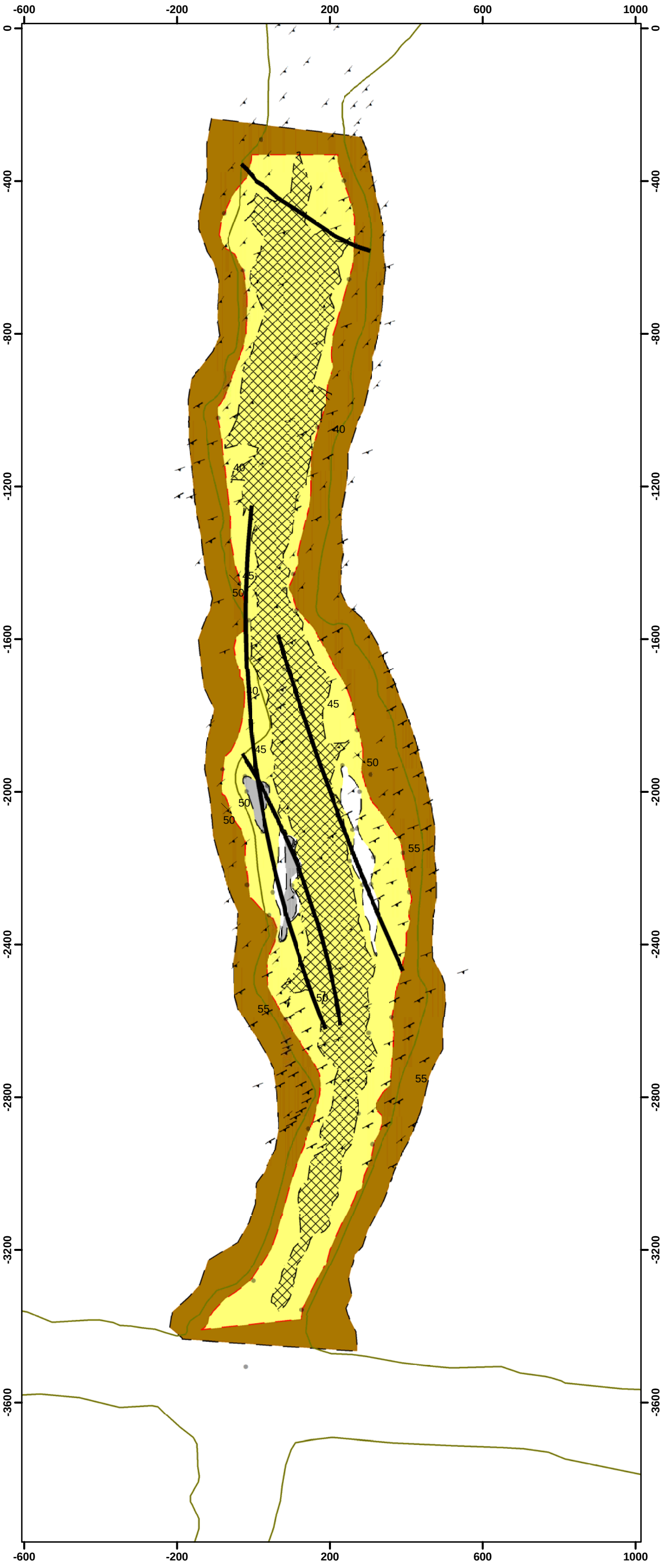
Mergulho Dique

0 100 200 300 m

Sistema de Coordenadas Local

Autor: Jorge G. Roncato Jr.
Orientador: Profa. Dra. Lydia Maria Lobato
Apoio: Vale S/A., AngloGold Ashanti Brasil Mineração Ltda., Capes

AngloGold Ashanti
Mapa Geológico
Mina de Córrego do Sítio - Nível 711
Depósito Cachorro Bravo
Corpos - 200 / 211 Norte



N

Legenda

ARQUEANO

Supergrupo Rio das Velhas

NEOARQUEANO

Grupo Nova Lima

Unidade Córrego do Sítio - Intermediária

Venulações mili-centimétricas de quartzo e carbonato

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Geologia Estrutural

40 Foliação

50 Lineacao

Falhas e Fraturas

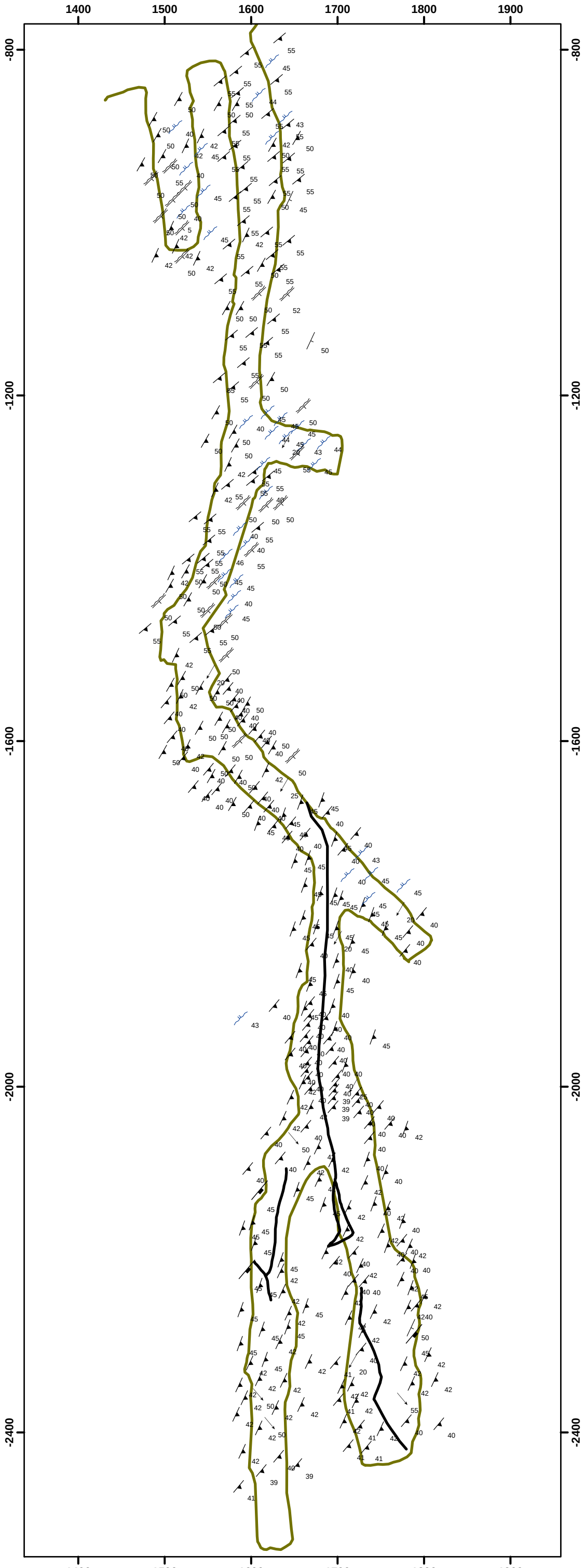
0 100 200 300
m

1:10,000

Sistema de Coordenadas Local

Autor: Jorge G. Roncato Jr.
Orientador: Profa. Dra. Lydia Maria Lobato
Apoio: Vale S/A., AngloGold Ashanti Brasil Mineração Ltda., Capes

AngloGold Ashanti
Mapa Geológico
Mina de Córrego do Sítio - Nível 658
Depósito Cachorro Bravo
Corpos - 200 / 211 Sul



N

Legenda

Geologia Estrutural

- Foliação (40)
- Lineacao (50)
- Falhas e Fraturas
- Limite Galeria 658
- Foliacao Milonitica
- Clivagem Crenulacao
- Acamamento
- Mergulho Dique

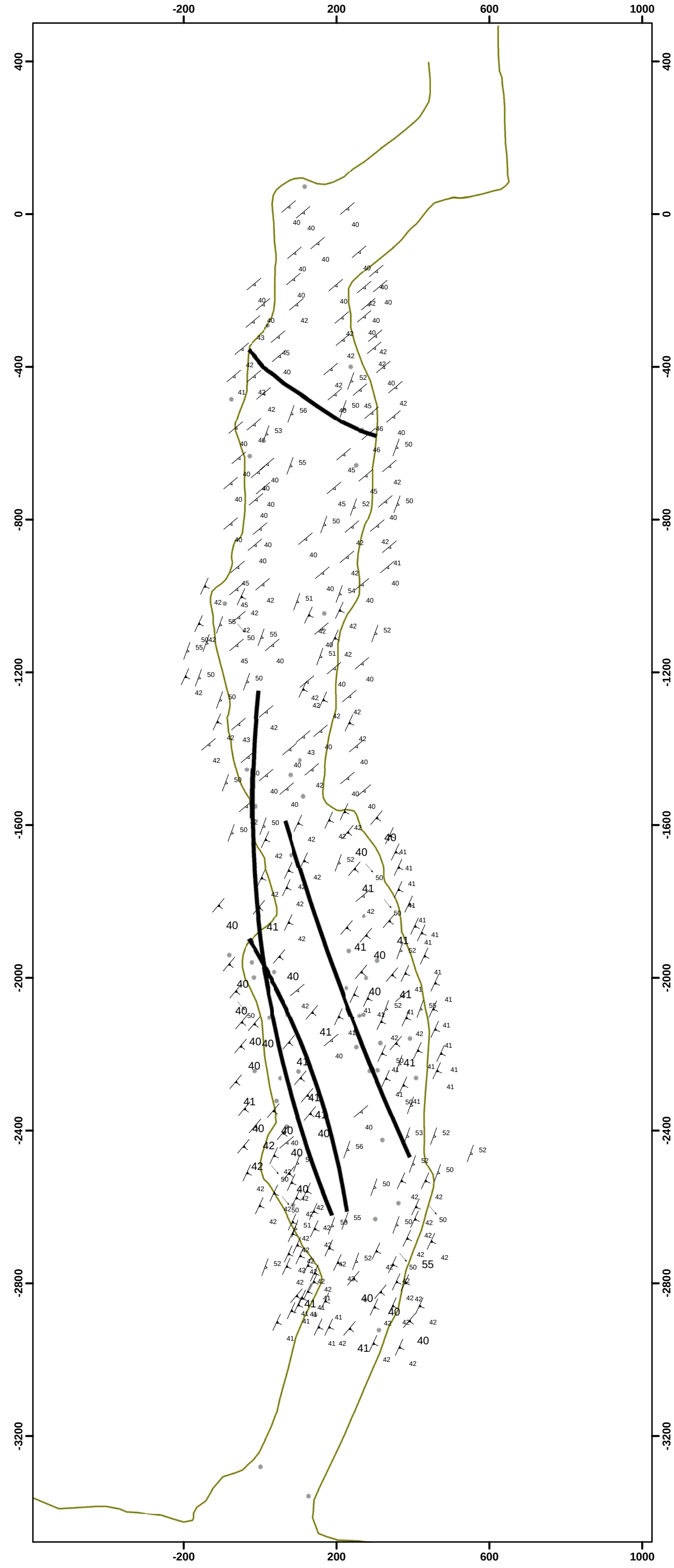
0 100 200 300 m

Sistema de Coordenadas Local

Autor: Jorge G. Roncato Jr.
Orientador: Profa. Dra. Lydia Maria Lobato

Apoio: Vale S/A., AngloGold Ashanti Brasil Mineração Ltda., Capes

AngloGold Ashanti
Mapa Estrutural
Mina de Córrego do Sítio - Nível 711
Depósito Cachorro Bravo
Corpos - 200 / 211 Norte



N

Legenda

Geologia Estrutural

45 Foliação

50 Lineacao

Falhas e Fraturas

40

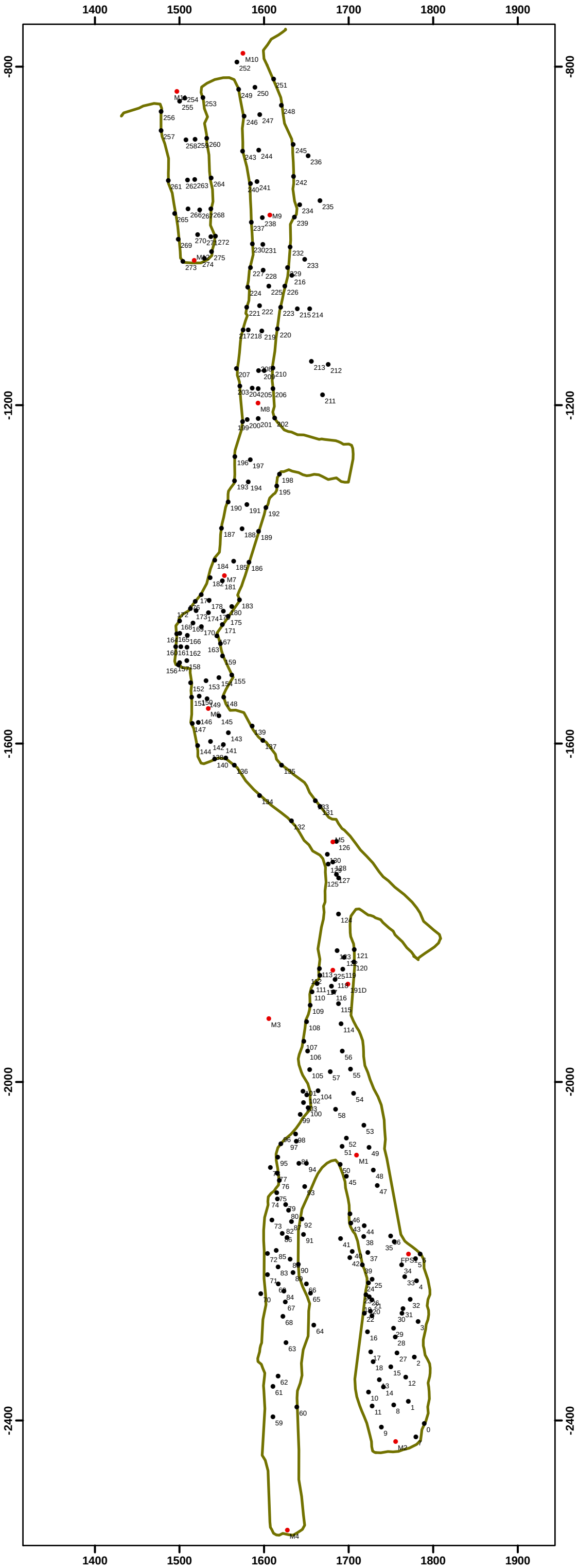
0 100 200 300 m

1:10,000

Sistema de Coordenadas Local

Autor: Jorge G. Roncato Jr.
Orientador: Profa. Dra. Lydia Maria Lobato
Apoio: Vale S/A., AngloGold Ashanti Brasil Mineração Ltda., Capes

AngloGold Ashanti
Mapa Geológico
Mina de Córrego do Sítio - Nível 658
Depósito Cachorro Bravo
Corpos - 200 / 211 Sul



N

Legenda

- Pontos Topográficos
- Estação de Campo

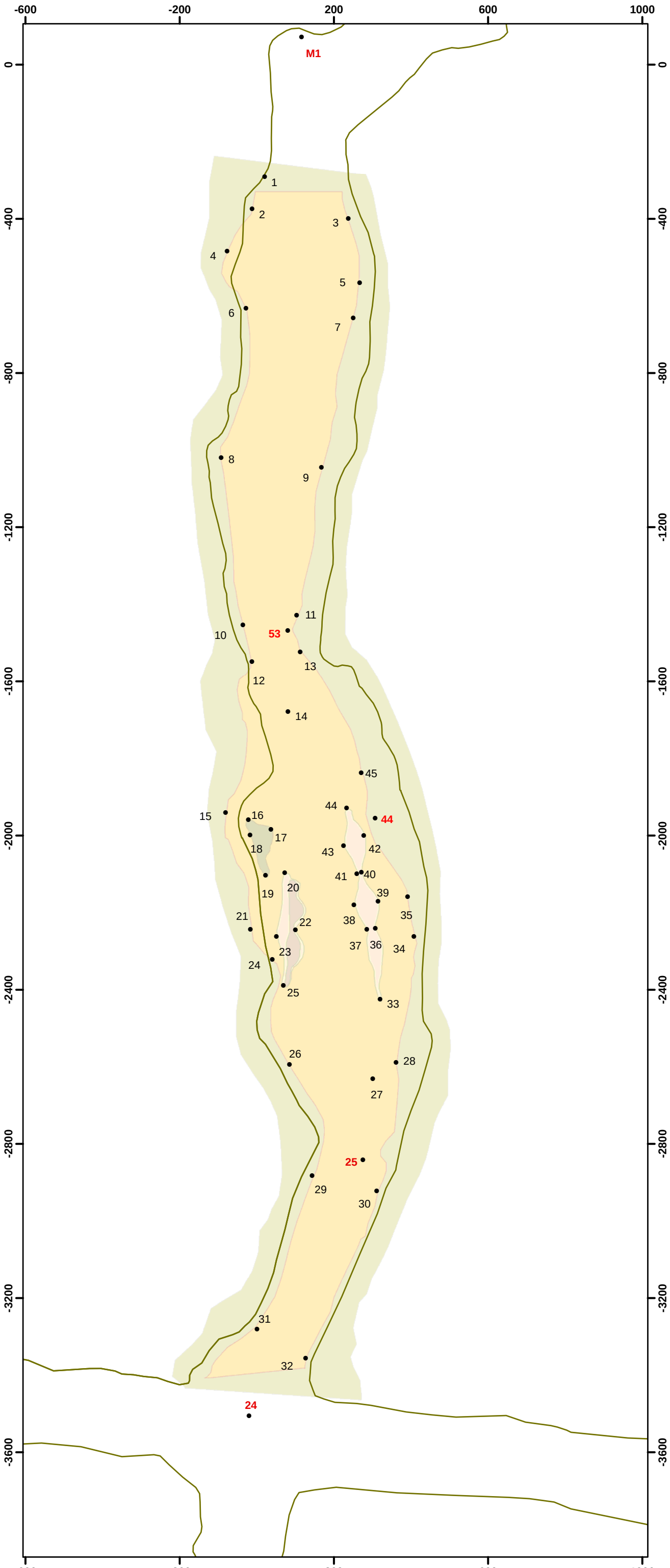
0 100 200 300 m

Sistema de Coordenadas Local

Autor: Jorge G. Roncato Jr.
Orientador: Profa. Dra. Lydia Maria Lobato

Apoio: Vale S/A., AngloGold Ashanti Brasil Mineração Ltda., Capes

AngloGold Ashanti
Mapa de Pontos
Mina de Córrego do Sítio - Nível 711
Depósito Cachorro Bravo
Corpos - 200 / 211 Norte



N

Legenda

1	Estação de campo
44	Ponto Topográfico

0 100 200 300
m
1:10,000

Sistema de Coordenadas Local

Autor: Jorge G. Roncato Jr.
Orientador: Profa. Dra. Lydia Maria Lobato

Apoio: Vale S/A., AngloGold Ashanti Brasil Mineração Ltda., Capes

ANEXO 2

TABELAS ANÁLISES QUÍMICA DE ROCHA

TABELAS ANÁLISES LA-ICP-MS EM SULFETOS

Table 1 - Major, trace and REE values of the selected greywackes and pelites samples of eastern and northern sectors of Quadrilátero Ferrífero.

Origin	Borehole	Sampling Interval (m)	Major Elements										
			SiO_2	TiO_2	Al_2O_3	Fe_2O_3	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	LOI
			%	%	%	%	%	%	%	%	%	%	%
CDS* - Cachorro Bravo Deposit	FCS0756 (MG**+PL***)	48,65 - 91,57	56,09	0,69	16,28	8,23	0,13	4,84	1,10	1,37	2,03	0,09	8,8
CDS - Cachorro Bravo Deposit	FCS1053 (MG)	209,00 - 260,10	62,96	0,50	15,27	5,14	0,12	3,21	2,01	0,90	3,33	0,09	6,1
CDS - Cachorro Bravo Deposit	FCS1273 (MG)	248,00 - 274,55	61,44	0,61	13,42	7,89	0,18	4,21	1,61	0,95	2,09	0,08	7,2
CDS - Cachorro Bravo Deposit	FCS1273 (MG)	283,55 - 316,90	60,28	0,70	15,38	8,15	0,14	4,44	1,10	0,77	2,30	0,10	6,3
CDS - Carvoaria Deposit	FCS1196 (MG)	279,15 - 312,20	65,67	0,70	11,26	8,42	0,22	3,29	1,77	1,33	1,25	0,09	5,7
CDS - Carvoaria Deposit	FCS1261 (MG)	247,75 - 252,65	64,96	0,67	12,08	8,00	0,26	3,30	1,93	2,19	1,27	0,09	5,0
CDS - Carvoaria Deposit	FCS1261 (MG)	258,80 - 283,95	62,37	0,65	13,38	7,81	0,19	3,96	1,56	1,48	1,75	0,09	6,5
CDS - Laranjeiras Deposit	FCS0831 (MG + PL)	267,20 - 296,44	60,31	0,67	14,44	7,19	0,12	4,56	2,69	1,33	1,87	0,18	6,4
CDS - Laranjeiras Deposit	FCS0886 (PL)	331,50 - 361,55	65,37	0,41	12,77	5,96	0,22	3,15	2,31	1,18	2,43	0,04	5,9
CDS - Laranjeiras Deposit	FCS0929 (MG + PL)	191,50 - 257,15	60,55	0,62	14,01	8,20	0,15	4,19	1,18	1,17	2,04	0,09	7,5
CDS - Laranjeiras Deposit	FCS0932 (MG)	127,75 - 175,75	65,43	0,55	11,19	9,13	0,31	3,36	1,57	0,57	1,88	0,06	5,7
Cuiabá Mine	CBABSD00004B (MG)	1,274,10 - 1,310,35	61,72	0,64	11,82	8,01	0,18	5,76	1,90	1,30	1,37	0,08	6,9
Cuiabá Mine	CBABSD00004B (PL)	1,274,05 - 1,279,01	66,61	0,57	9,57	7,65	0,21	4,93	1,75	1,44	1,09	0,07	5,8
Cuiabá Mine	CBABSD00005 (MG)	1,462,40 - 1,520,67	63,71	0,59	10,59	7,41	0,13	6,27	2,03	1,94	0,77	0,08	6,1
Cuiabá Mine	CBABSD0005 (Black PL)	312,32 - 319,94	63,29	0,60	13,47	7,62	0,18	3,94	1,40	1,43	1,94	0,08	5,8
Cuiabá Mine	CBABSD0005 (MG)	1,462,40 - 1,520,67	60,42	0,63	12,04	7,53	0,10	6,62	1,74	1,93	1,34	0,09	7,2
Lamego Mine	CARBSD12A (PL)	471,40 - 548,60	56,19	0,67	13,93	8,81	0,11	8,59	1,93	1,53	1,17	0,09	6,6
Lamego Mine	CARBSD15 (PL)	125,62 - 157,75	54,35	0,79	14,20	8,35	0,12	6,41	1,66	1,90	1,41	0,10	10,3
Lamego Mine	CARBSD17 (MG+PL)	485,29 - 554,82	56,01	0,74	14,53	9,08	0,10	8,03	1,75	1,52	1,47	0,10	6,2
Lamego Mine	CARBSD17 (PL)	586,78 - 598,84	53,66	0,75	14,10	9,73	0,12	9,06	1,95	1,51	1,05	0,10	7,5

* Córrego do Sítio auríferous lineament (Roncato et al,, 2015)

** MG - Greywackes intercalations

*** PL - Pelites intercalations

Table 1 - Major, trace and REE values of the selected grey

Origin	Borehole	Trace Elements														
		Ba	Rb	Sr	Cs	Ga	Tl	Ta	Nb	Hf	Zr	Y	Th	U	Sc	Cr
		PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM
CDS* - Cachorro Bravo Deposit	FCS0756 (MG**+PL***)	321	83,8	126,6	9,2	18,4	0,1	0,8	8,9	3,9	145,2	25,1	9,4	2,7	21	323
CDS - Cachorro Bravo Deposit	FCS1053 (MG)	695	91,0	142,9	6,5	18,2	0,1	0,6	7,6	3,8	121,5	15,6	8,2	2,5	15	697
CDS - Cachorro Bravo Deposit	FCS1273 (MG)	337	74,5	111,6	9,2	15,7	0,1	0,7	6,7	3,0	117,9	18,0	8,1	2,6	17	339
CDS - Cachorro Bravo Deposit	FCS1273 (MG)	381	81,2	90,6	20,0	17,1	0,1	0,8	8,0	3,9	134,0	20,5	7,9	3,1	20	383
CDS - Carvoaria Deposit	FCS1196 (MG)	251	48,8	100,6	5,0	13,0	0,1	0,5	6,7	5,1	202,3	20,8	6,7	2,2	14	253
CDS - Carvoaria Deposit	FCS1261 (MG)	256	49,2	105,2	4,7	13,7	0,1	0,5	7,5	3,9	171,6	21,8	8,0	3,3	15	258
CDS - Carvoaria Deposit	FCS1261 (MG)	307	62,5	100,5	6,8	14,1	0,1	0,9	7,8	4,1	148,6	20,5	7,4	2,3	17	309
CDS - Laranjeiras Deposit	FCS0831 (MG + PL)	316	76,6	146,2	7,3	15,4	0,1	0,7	9,2	4,0	165,6	22,0	12,0	4,0	16	318
CDS - Laranjeiras Deposit	FCS0886 (PL)	331	140,4	105,3	6,7	14,9	0,1	0,9	8,2	4,2	149,1	17,3	8,7	2,9	11	333
CDS - Laranjeiras Deposit	FCS0929 (MG + PL)	315	79,9	117,5	8,5	14,9	0,1	0,9	8,5	3,7	142,2	22,5	9,2	3,0	17	317
CDS - Laranjeiras Deposit	FCS0932 (MG)	298	79,8	104,5	5,9	12,9	0,1	0,7	7,7	3,6	140,2	23,6	7,1	2,4	16	300
Cuiabá Mine	CBABSD00004B (MG)	340	41,8	115,1	2,7	13,2	0,1	0,5	5,7	3,4	130,1	18,3	5,8	2,2	18	342
Cuiabá Mine	CBABSD00004B (PL)	332	28,7	127,8	1,6	11,2	0,1	0,5	6,4	3,8	143,1	19,2	7,9	3,1	13	334
Cuiabá Mine	CBABSD00005 (MG)	220	20,1	141,3	1,1	11,1	0,1	0,5	6,0	3,8	128,2	17,8	4,9	1,8	15	222
Cuiabá Mine	CBABSD0005 (Black PL)	327	72,7	86,5	4,2	15,7	0,1	0,8	7,6	3,7	133,6	18,9	9,2	3,1	16	329
Cuiabá Mine	CBABSD0005 (MG)	338	33,0	150,8	1,9	12,9	0,1	0,7	5,9	3,9	135,0	18,6	4,4	1,3	17	340
Lamego Mine	CARBSD12A (PL)	211	34,8	89,8	2,2	14,0	0,1	0,5	5,7	3,1	107,6	18,2	4,1	1,4	23	213
Lamego Mine	CARBSD15 (PL)	322	43,8	146,8	3,1	16,7	0,1	0,7	5,9	3,7	122,8	18,1	4,7	1,3	23	324
Lamego Mine	CARBSD17 (MG+PL)	300	50,5	98,4	2,7	16,4	0,1	0,6	5,5	3,1	106,7	19,0	4,6	1,5	24	302
Lamego Mine	CARBSD17 (PL)	232	38,5	82,7	2,1	16,2	0,1	0,5	5,5	3,5	120,4	20,5	5,0	1,4	25	234

* Córrego do Sítio auríferous lineament (Roncato et al,, 2015)

** MG - Greywackes intercalations

*** PL - Pelites intercalations

Table 1 - Major, trace and REE values of the selected grey

Origin	Borehole	Trace Elements														
		Pb	Ni	V	Zn	Co	Cu	Bi	Cd	Sn	W	Mo	Be	Ag	Au	Hg
		PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPB	PPM
CDS* - Cachorro Bravo Deposit	FCS0756 (MG**+PL***)	5,7	248,8	153	104	40,2	70,2	0,1	0,1	2	4,8	2,4	2	0,4	37,3	0,67
CDS - Cachorro Bravo Deposit	FCS1053 (MG)	71,1	184,1	101	741	34,3	102,2	0,6	1,5	3	2,0	2,9	3	0,3	1,5	0,12
CDS - Cachorro Bravo Deposit	FCS1273 (MG)	14,9	228,2	123	78	38,9	83,6	0,3	0,2	2	4,2	3,4	1	0,1	2,6	0,20
CDS - Cachorro Bravo Deposit	FCS1273 (MG)	7,1	249,2	148	90	41,5	80,7	0,2	0,1	2	5,4	2,9	3	0,1	1,7	0,09
CDS - Carvoaria Deposit	FCS1196 (MG)	6,6	148,3	118	103	38,0	103,6	0,1	0,2	1	1,7	3,4	2	0,1	0,5	0,12
CDS - Carvoaria Deposit	FCS1261 (MG)	14,4	177,7	120	115	38,7	80,8	0,2	0,5	1	3,7	4,4	1	0,1	95,4	0,26
CDS - Carvoaria Deposit	FCS1261 (MG)	12,2	205,1	123	80	36,4	61,1	0,2	0,2	2	3,4	3,7	1	0,1	11,1	0,18
CDS - Laranjeiras Deposit	FCS0831 (MG + PL)	6,7	193,8	127	98	37,3	52,1	0,1	0,3	2	3,3	2,3	2	0,1	7,7	0,15
CDS - Laranjeiras Deposit	FCS0886 (PL)	19,4	194,6	74	293	29,7	56,5	0,2	0,9	3	4,1	3,5	1	0,2	2,1	0,87
CDS - Laranjeiras Deposit	FCS0929 (MG + PL)	8,0	221,9	125	69	41,0	57,5	0,2	0,2	2	3,1	2,4	2	0,1	11,0	0,12
CDS - Laranjeiras Deposit	FCS0932 (MG)	36,5	225,9	117	94	43,1	73,3	0,2	0,2	2	3,9	4,3	1	0,1	43,7	0,14
Cuiabá Mine	CBABSD00004B (MG)	11,6	308,5	130	111	47,5	66,8	0,2	0,2	1	1,9	2,7	3	0,1	17,9	0,01
Cuiabá Mine	CBABSD00004B (PL)	14,3	260,3	99	104	43,9	57,7	0,2	0,2	1	1,1	3,3	1	0,1	8,3	0,01
Cuiabá Mine	CBABSD00005 (MG)	31,2	301,8	108	136	42,6	64,3	0,3	0,5	1	0,8	1,7	1	0,1	0,5	0,01
Cuiabá Mine	CBABSD0005 (Black PL)	12,3	208,5	118	85	37,2	77,4	0,2	0,1	2	2,8	4,1	1	0,1	15,0	0,16
Cuiabá Mine	CBABSD0005 (MG)	13,6	318,0	125	121	42,6	60,4	0,2	0,5	2	1,1	1,5	2	0,1	1,8	0,01
Lamego Mine	CARBSD12A (PL)	13,3	411,6	152	111	59,8	65,6	0,2	0,2	2	1,2	1,3	1	0,1	0,9	0,01
Lamego Mine	CARBSD15 (PL)	16,6	377,3	165	127	52,1	67,5	0,1	0,2	2	1,6	1,6	1	0,1	0,5	0,01
Lamego Mine	CARBSD17 (MG+PL)	9,1	413,0	168	118	55,4	75,3	0,2	0,2	1	1,6	1,4	2	0,1	0,7	0,01
Lamego Mine	CARBSD17 (PL)	16,6	491,5	165	121	62,5	76,7	0,2	0,3	1	1,4	1,4	2	0,1	2,6	0,01

* Córrego do Sítio auríferous lineament (Roncato et al,, 2015)

** MG - Greywackes intercalations

*** PL - Pelites intercalations

Table 1 - Major, trace and REE values of the selected grey

Origin	Borehole	Trace Elements				Th/Sc	La/Sc	K2O/Na2O
		As	Se	Sb	La			
		PPM	PPM	PPM	PPM			
CDS* - Cachorro Bravo Deposit	FCS0756 (MG**+PL***)	121,5	0,5	24,9	26,4	0,45	1,26	1,48
CDS - Cachorro Bravo Deposit	FCS1053 (MG)	64,3	0,5	2,4	25,5	0,55	1,70	3,70
CDS - Cachorro Bravo Deposit	FCS1273 (MG)	148,4	0,5	12,5	24,7	0,48	1,45	2,20
CDS - Cachorro Bravo Deposit	FCS1273 (MG)	132,0	0,5	4,2	30,3	0,40	1,52	2,99
CDS - Carvoaria Deposit	FCS1196 (MG)	12,0	0,5	3,0	24,9	0,48	1,78	0,94
CDS - Carvoaria Deposit	FCS1261 (MG)	141,7	0,8	26,7	25,2	0,53	1,68	0,58
CDS - Carvoaria Deposit	FCS1261 (MG)	83,9	0,5	38,3	25,2	0,44	1,48	1,18
CDS - Laranjeiras Deposit	FCS0831 (MG + PL)	88,2	0,5	16,3	20,1	0,75	1,26	1,41
CDS - Laranjeiras Deposit	FCS0886 (PL)	86,3	0,5	25,7	28,8	0,79	2,62	2,06
CDS - Laranjeiras Deposit	FCS0929 (MG + PL)	95,7	0,5	79,9	24,5	0,54	1,44	1,74
CDS - Laranjeiras Deposit	FCS0932 (MG)	99,9	0,5	29,1	24,8	0,44	1,55	3,30
Cuiabá Mine	CBABSD00004B (MG)	51,7	0,5	1,3	18,1	0,32	1,01	1,05
Cuiabá Mine	CBABSD00004B (PL)	41,6	0,5	0,9	17,9	0,61	1,38	0,76
Cuiabá Mine	CBABSD00005 (MG)	23,4	0,5	0,5	20,3	0,33	1,35	0,40
Cuiabá Mine	CBABSD0005 (Black PL)	44,7	0,5	8,2	22,3	0,58	1,39	1,36
Cuiabá Mine	CBABSD0005 (MG)	34,9	0,5	0,9	21,3	0,26	1,25	0,69
Lamego Mine	CARBSD12A (PL)	38,0	0,5	1,7	18,8	0,18	0,82	0,76
Lamego Mine	CARBSD15 (PL)	27,4	0,5	0,4	20,6	0,20	0,90	0,74
Lamego Mine	CARBSD17 (MG+PL)	30,2	0,5	0,8	19,2	0,19	0,80	0,97
Lamego Mine	CARBSD17 (PL)	15,6	0,5	2,0	17,4	0,20	0,70	0,70

* Córrego do Sítio auríferous lineament (Roncato et al,, 2015)

** MG - Greywackes intercalations

*** PL - Pelites intercalations

Table 2 - REE values of the selected greywackes samples of eastern and northern sectors of Quadrilátero Ferrífero with their normalized data.

SAMPLES	La	Ce	Nd	Sm	Eu	Gd	Dy	Er	Yb	Lu	La/YbN
	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	
Cuiabá depósit	18,10	32,70	16,40	3,46	0,90	3,21	3,33	2,02	1,74	0,31	2,29
Cuiabá depósit	17,90	33,80	15,80	3,30	0,90	3,05	3,22	1,94	1,79	0,28	2,20
Cuiabá depósit	20,30	37,10	16,40	3,23	0,88	3,50	3,46	1,76	2,03	0,29	2,20
Lamego deposit	18,80	37,10	15,80	3,36	0,98	3,63	3,64	1,85	2,23	0,29	1,85
CDS* lower Laranjeiras	20,10	38,10	18,10	3,73	0,86	3,73	3,97	2,26	2,27	0,38	1,95
CDS Intermediate Laranjeiras	28,80	54,60	28,60	5,24	1,33	4,86	4,03	2,27	2,17	0,36	2,92
CDS Intermediate Laranjeiras	24,50	43,30	20,10	3,89	0,93	3,92	3,85	2,16	2,05	0,36	2,63
CDS Intermediate Carvoaria	24,90	45,30	23,30	4,32	1,11	3,89	3,48	2,14	2,10	0,36	2,61
CDS Intermediate Carvoaria	25,20	47,20	21,70	3,89	1,02	4,04	3,72	2,08	2,14	0,32	2,59
CDS Intermediate Carvoaria	25,20	44,00	19,80	4,04	1,12	3,90	3,42	1,95	1,89	0,31	2,93
CDS Intermediate Cachorro Bravo	26,40	48,60	23,50	4,69	1,10	4,61	4,20	2,45	2,30	0,37	2,53
CDS Intermediate Cachorro Bravo	25,50	45,40	17,50	3,49	1,00	3,49	3,28	1,84	1,96	0,27	2,86
CDS Intermediate Cachorro Bravo	24,70	45,80	18,30	3,65	1,02	3,74	3,53	2,32	2,11	0,34	2,58
CDS Upper Cachoro Bravo	30,30	54,20	19,90	3,75	0,96	3,36	2,99	1,57	1,63	0,25	4,09
Média de Valores	23,62	43,37	19,66	3,86	1,01	3,78	3,58	2,04	2,03	0,32	2,59
Max	30,30	54,60	28,60	5,24	1,33	4,86	4,20	2,45	2,30	0,38	4,09
Min	17,90	32,70	15,80	3,23	0,86	3,05	2,99	1,57	1,63	0,25	1,85
Nakamura (1974)	**0,33**	**0,87**	**0,63**	**0,20**	**0,08**	**0,28**	**0,34**	**0,23**	**0,22**	**0,03**	

*** Córrego do Sítio lineament deposits**

AMOSTRAS / Chondrite	La	Ce	Nd	Sm	Eu	Gd	Dy	Er	Yb	Lu	$(Ce/Yb)_N$	(Gd/Yb)n	(La/Sm)n	Eu/Eu*
Cuiabá depósit	55,02	37,80	26,03	17,04	11,69	11,63	9,71	8,98	7,91	9,14	26,83	8,56	12,41	0.96
Cuiabá depósit	54,41	39,08	25,08	16,26	11,69	11,05	9,39	8,62	8,14	8,26	30,70	9,17	12,27	0.95
Cuiabá depósit	61,70	42,89	26,03	15,91	11,43	12,68	10,09	7,82	9,23	8,55	32,54	9,51	14,23	0.91
Lamego deposit	57,14	42,89	25,08	16,55	12,73	13,15	10,61	8,22	10,14	8,55	32,54	10,00	11,84	0.91
CDS lower Laranjeiras	61,09	44,05	28,73	18,37	11,17	13,51	11,57	10,04	10,32	11,21	25,50	8,33	14,42	1.10
CDS Intermediate Laranjeiras	87,54	63,12	45,40	25,81	17,27	17,61	11,75	10,09	9,86	10,62	38,57	8,92	13,36	0.89
CDS Intermediate Laranjeiras	74,47	50,06	31,90	19,16	12,08	14,20	11,22	9,60	9,32	10,62	30,59	8,52	16,25	0.98
CDS Intermediate Carvoaria	75,68	52,37	36,98	21,28	14,42	14,09	10,15	9,51	9,55	10,62	32,00	7,71	13,84	1.01
CDS Intermediate Carvoaria	76,60	54,57	34,44	19,16	13,25	14,64	10,85	9,24	9,73	9,44	37,51	9,27	15,24	1.03
CDS Intermediate Carvoaria	76,60	50,87	31,43	19,90	14,55	14,13	9,97	8,67	8,59	9,14	36,10	8,79	13,88	1.00
CDS Intermediate Cachorro Bravo	80,24	56,18	37,30	23,10	14,29	16,70	12,24	10,89	10,45	10,91	33,41	9,05	14,81	0.99
CDS Intermediate Cachorro Bravo	77,51	52,49	27,78	17,19	12,99	12,64	9,56	8,18	8,91	7,96	42,77	9,68	15,73	0.96
CDS Intermediate Cachorro Bravo	75,08	52,95	29,05	17,98	13,25	13,55	10,29	10,31	9,59	10,03	34,26	8,28	14,94	0.96
CDS Upper Cachoro Bravo	92,10	62,66	31,59	18,47	12,47	12,17	8,72	6,98	7,41	7,37	55,14	9,53	19,47	0.95

Table 2 - REE values of the selected pelites samples of eastern and northern sectors of Quadrilátero Ferrífero with their normalized data.

AMOSTRAS	La	Ce	Nd	Sm	Eu	Gd	Dy	Er	Yb	Lu	La/Yb
	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	
Cuiabá	22,30	39,40	19,20	3,46	0,88	3,61	3,41	1,94	1,90	0,31	2,58
Lamego Carruagem	20,60	40,50	16,00	3,49	1,01	3,65	3,46	1,94	2,27	0,28	2,00
Lamego Carruagem	19,20	37,50	16,90	3,41	0,99	3,93	3,79	1,96	2,40	0,29	1,76
Lamego Carruagem / MAN	17,40	32,60	13,80	3,17	0,90	3,17	3,21	1,95	1,82	0,29	2,10
CDS Inter Laranjeiras	24,80	43,50	19,90	3,54	0,92	3,28	2,87	1,74	1,59	0,27	3,43
CDS Sup Cachoro Bravo	25,50	45,80	18,20	3,51	0,96	3,57	3,30	1,76	2,16	0,27	2,60
Média de Valores	21,63	39,88	17,33	3,43	0,94	3,54	3,34	1,88	2,02	0,29	2,41
Max	25,50	45,80	19,90	3,54	1,01	3,93	3,79	1,96	2,40	0,31	3,43
Min	17,40	32,60	13,80	3,17	0,88	3,17	2,87	1,74	1,59	0,27	1,76
Nakamura (1974)	**0,33**	**0,87**	**0,63**	**0,20**	**0,08**	**0,28**	**0,34**	**0,23**	**0,22**	**0,03**	

AMOSTRAS/Nasc	La	Ce	Nd	Sm	Eu	Gd	Dy	Er	Yb	Lu	$(Ce/Yb)_N$	(Gd/Yb)n	(La/Sm)n	Eu/Eu*
Cuiabá	67,78	45,55	30,48	17,04	11,43	13,08	9,94	8,62	8,64	9,14	32,33	8,77	15,64	0.94
Lamego Carruagem	62,61	46,82	25,40	17,19	13,12	13,22	10,09	8,62	10,32	8,26	36,79	9,85	12,58	0.96
Lamego Carruagem	58,36	43,35	26,83	16,80	12,86	14,24	11,05	8,71	10,91	8,55	32,89	10,42	11,97	0.96
Lamego Carruagem / MAN	52,89	37,69	21,90	15,62	11,69	11,49	9,36	8,67	8,27	8,55	28,59	8,82	11,93	1.12
CDS Inter Laranjeiras	75,38	50,29	31,59	17,44	11,95	11,88	8,37	7,73	7,23	7,96	40,98	8,47	16,63	1.02
CDS Sup Cachoro Bravo	77,51	52,95	28,89	17,29	12,47	12,93	9,62	7,82	9,82	7,96	43,14	9,74	16,39	0.98

Table 3: Trace Element Contents (ppm) of sulfide minerals.

SampleName	Borehole	Cr53	Co59	Ni60	Cu65	Zn66	Se77	Mo95
Arsenopyrite (P-Apy) - Lj	F871-306,70 m	0,23128	54,55754	54,83191	2,00320	1,69305	6,40120	0,05162
Arsenopyrite (S-Apy) - Lj	F871-306,70 m	0,09870	392,19244	166,76888	1,02670	0,28141	5,40229	0,11517
Arsenopyrite (S-Apy) - Lj	FCS910-319,15 m	0,57488	1725,89827	390,37383	2,11481	0,20118		0,85720
Arsenopyrite (P-Apy) - Lj	FCS910-319,15 m		618,18977	435,30031	10,94470	1,18361		
Pyrrhotite (S-Po) - Lj	F871-306,70 m		55,27824	543,73319	123,22245	0,43154	6,38392	0,00000
Pyrrhotite (S-Po) - Lj	F865-287,30 m	13,75892	67,14215	421,81924	364,48359	1,61479	7,72867	0,00000
Pyrrhotite (S-Po) - Lj	FCS910-319,15 m	458,06000	38,41472	236,83731	747,10640	34,29838	6,35772	0,03877
Pyrite (S-Py) - CB	FCS718 - 201,50 m	0,25346	1,49099	101,24349	0,06646	0,29163	63,52575	0,00667
Pyrite (S-Py) - CB	FCS718 - 201,50 m	2,05761	0,12657	29,00994	0,71868	0,58799	43,10545	
Pyrite (S-Py) - Lj	F871-306,70 m	3,12682	52,45165	32,81163	0,40962	0,63944	4,50713	
Pyrite (S-Py) - Lj	FCS910-319,15 m	21,04244	18,38449	2,97705	0,61323	13,44873	4,87110	0,00232
Pyrite (S-Py) - Lj	F871-306,69 m	0,01285	0,27532	27,17935	0,17301	0,48220	4,33160	0,00449
Pyrite (P-Py) - Lj	F871-306,70 m	0,10383	30,42898	227,84496	0,23069	0,22798	33,73303	0,00000
Pyrite (P-Py) - Lj	FCS910-319,15 m	34,64129	11,71321	46,18610	7,17779	7,30885	41,00810	0,03187
Pyrite (P-Py) - Lj	FCS910-319,16 m	3,42648	228,85069	1332,82336	0,90203	5,98445	31,30654	0,00709
Pyrite (P-Py) - Lj	F865-287,30 m	1,48708	187,29538	1278,84156	0,11762	6,47281	34,03794	0,00000
Pyrite (P-Py) - Lj	F865-287,31 m	0,70189	193,86282	1261,40693	41,40828	1,29196	31,83072	0,03033

CB - Cachorro Bravo Deposit

Lj - Laranjeiras Deposit

*(**As)** data are from micropobe (EPMA)

Table 3: Trace Element Contents (ppm)

SampleName	Borehole	Ag107	Cd111	Sn118	Sb121	Te125	Gd157	W182
Arsenopyrite (P-Apy) - Lj	F871-306,70 m	0,42764	0,03558	0,23223	263,86294	1,38431		2,27392
Arsenopyrite (S-Apy) - Lj	F871-306,70 m	0,44772	0,01989	0,24197	646,28538	6,38785	0,00000	0,32852
Arsenopyrite (S-Apy) - Lj	FCS910-319,15 m	1,31249	3,76185	0,07245	0,03485	746,38932	31,49381	0,00536
Arsenopyrite (P-Apy) - Lj	FCS910-319,15 m	7,61095	5,63439	0,01379	0,05976	2305,28471	102,85847	
Pyrrhotite (S-Po) - Lj	F871-306,70 m	0,19274	0,00000	0,43845	1,43147	0,16261	0,00000	0,00651
Pyrrhotite (S-Po) - Lj	F865-287,30 m	3,57529	0,00000	0,42294	2,24380	0,25964	0,04690	0,10638
Pyrrhotite (S-Po) - Lj	FCS910-319,15 m	0,56670	0,00963	4,42691	17,24268	0,52134	0,00000	0,92353
Pyrite (S-Py) - CB	FCS718 - 201,50 m	0,02492		0,09219	0,20219	0,16005	0,00000	0,00000
Pyrite (S-Py) - CB	FCS718 - 201,50 m	0,02650	0,00000	0,15481	1,84797	0,10900	0,00605	0,00953
Pyrite (S-Py) - Lj	F871-306,70 m	0,33024	0,01128	0,15533	2,92633		1,55425	1,24788
Pyrite (S-Py) - Lj	FCS910-319,15 m	0,67070	0,01380	0,18203	3,52615		1,17178	0,07350
Pyrite (S-Py) - Lj	F871-306,69 m	1,70230		0,13959			0,00000	0,00253
Pyrite (P-Py) - Lj	F871-306,70 m	0,01455		0,13523	0,54724	0,27064	0,00000	
Pyrite (P-Py) - Lj	FCS910-319,15 m	0,46552		1,01474	55,54733	25,11136	0,05665	0,18030
Pyrite (P-Py) - Lj	FCS910-319,16 m	0,84953	0,01407	0,39355	3,70912	0,66863	0,00000	0,02377
Pyrite (P-Py) - Lj	F865-287,30 m	0,79038		0,37638	2,40866	0,53962		0,01428
Pyrite (P-Py) - Lj	F865-287,31 m	0,44987		0,29884	1,14122	0,34025	0,05372	0,04148

CB - Cachorro Bravo Deposit

Lj - Laranjeiras Deposit

*(**As)** data are from micropobe (EPMA)

Table 3: Trace Element Contents (ppm)

SampleName	Borehole	Pt195	Au197	Pb207	*As74
Arsenopyrite (P-Apy) - Lj	F871-306,70 m	0,01444	135,37091	11,67265	445007,00
Arsenopyrite (S-Apy) - Lj	F871-306,70 m		1,17394	74,51976	438266,00
Arsenopyrite (S-Apy) - Lj	FCS910-319,15 m	0,03278	0,00746	0,00868	442244,00
Arsenopyrite (P-Apy) - Lj	FCS910-319,15 m	0,02376	0,01471		
Pyrrhotite (S-Po) - Lj	F871-306,70 m	0,03886	0,00431	0,28953	358,24
Pyrrhotite (S-Po) - Lj	F865-287,30 m		0,05283	6,36755	
Pyrrhotite (S-Po) - Lj	FCS910-319,15 m		0,01061	11,45622	
Pyrite (S-Py) - CB	FCS718 - 201,50 m		0,10814	0,30366	1595,58
Pyrite (S-Py) - CB	FCS718 - 201,50 m		0,03216	3,05585	924,33
Pyrite (S-Py) - Lj	F871-306,70 m	0,00863	0,00241	2,27123	462,43
Pyrite (S-Py) - Lj	FCS910-319,15 m		0,02301	3,84221	777,22
Pyrite (S-Py) - Lj	F871-306,69 m	0,00939	0,00047	0,00186	436,51
Pyrite (P-Py) - Lj	F871-306,70 m	0,00827	0,01807	0,37118	516,72
Pyrite (P-Py) - Lj	FCS910-319,15 m	0,03055	0,73553	45,65042	738,82
Pyrite (P-Py) - Lj	FCS910-319,16 m		0,01219	19,13189	2998,29
Pyrite (P-Py) - Lj	F865-287,30 m	0,00148	0,00032	11,61138	334,11
Pyrite (P-Py) - Lj	F865-287,31 m			5,88459	248,84

CB - Cachorro Bravo Deposit

Lj - Laranjeiras Deposit

*(**As)** data are from micropobe (EPMA)

ANEXO 3

DADOS ANÁLISES GEOCRONOLÓGICAS

FILE NAME	CORRECT	0																								
	Pb206*	Pb207*	Th/U	207/206	1s	206/238	1s	207/235	1s	206/207		206/238		207/235		208/232		Conc	207/235		206/238		RHO	Disc.
Padrões Primários																										
4.sSMPABC001	42445,9	2604,475	0,010362	0,06021	0,00076	0,09775	0,00078	0,81126	0,00845	611,13	26,95	601,2	4,58	603,2	4,74	834,6	51,67	99,66733	0,81126	0,00845	0,09775	0,00078	0,766092	-0,33156
4.sSMPABC002	40191,63	2079,482	0,010494	0,06013	0,00075	0,09798	0,00078	0,81205	0,00832	608,256	26,66	602,5	4,57	603,6	4,66	732,2	47,51	99,81743	0,81205	0,00832	0,09798	0,00078	0,776992	-0,18224
4.sSMPABC003	44242	2668	0,010374	0,06036	0,00075	0,09984	0,00079	0,83058	0,00847	616,505	26,55	613,5	4,66	613,9	4,7	776,7	46	99,9348	0,83058	0,00847	0,09984	0,00079	0,775926	-0,06516
4.sSMPABC006	50327,23	3280,859	0,010258	0,0625	0,00076	0,09745	0,00077	0,83951	0,00828	691,262	25,57	599,5	4,53	618,9	4,57	810,1	43,21	96,76397	0,83951	0,00828	0,09745	0,00077	0,801133	-3,13459
4.sSMPABC007	51765	3065	0,010245	0,05921	0,00072	0,0972	0,00077	0,79324	0,00786	574,826	26,14	598	4,51	593	4,45	261,3	39,24	100,8361	0,79324	0,00786	0,0972	0,00077	0,799478	0,84317
4.sSMPABC008	50459	2981	0,010362	0,05911	0,00072	0,09807	0,00078	0,79893	0,00802	571,15	26,42	603,1	4,55	596,2	4,53	439,8	40,48	101,1441	0,79893	0,00802	0,09807	0,00078	0,792306	1,15733
4.sSMPABC034	62746,21	3592,423	0,010031	0,06013	0,00072	0,09634	0,00076	0,79856	0,00784	608,256	25,73	592,9	4,49	596	4,43	707	51,16	99,47715	0,79856	0,00784	0,09634	0,00076	0,803523	-0,52013
4.sSMPABC035	64325	3851	0,009928	0,0596	0,00072	0,09584	0,00076	0,78745	0,00779	589,083	25,91	590	4,48	589,7	4,42	229,5	46,57	100,0508	0,78745	0,00779	0,09584	0,00076	0,80159	0,050873
4.sSMPABC068	62985,9	3553,521	0,010177	0,0596	0,00076	0,09911	0,00081	0,81432	0,00874	589,083	27,43	609,2	4,73	604,9	4,89	904,7	94,19	100,7058	0,81432	0,00874	0,09911	0,00081	0,761467	0,710861
4.sSMPABC069	60759,49	3671,091	0,010305	0,0617	0,00083	0,09763	0,00079	0,83024	0,00943	663,727	28,65	600,5	4,65	613,7	5,23	540,4	78,3	97,80183	0,83024	0,00943	0,09763	0,00079	0,712419	-2,15089
Padrões Secundários																										
4.sSMPABC004	30023,88	1282,494	0,075937	0,05905	0,00097	0,09382	0,00084	0,76355	0,0111	568,94	35,51	578,1	4,95	576,1	6,39	451,2	21,76	100,346	0,76355	0,0111	0,09382	0,00084	0,615883	0,347162
4.sSMPABC005	21132,86	1430,362	0,079869	0,05895	0,00126	0,09231	0,0009	0,75007	0,01448	565,25	46,02	569,2	5,29	568,3	8,4	469,2	33,21	100,1581	0,75007	0,01448	0,09231	0,0009	0,505041	0,158367
4.sSMPABC036	67923,68	3210,853	0,073417	0,05205	0,00065	0,09155	0,00073	0,65684	0,00691	287,607	28,25	564,7	4,33	512,7	4,23	333,7	17,36	109,2084	0,65684	0,00691	0,09155	0,00073	0,75796	10,14238
4.sSMPABC037	83431,44	5031,679	0,073844	0,0589	0,00072	0,09084	0,00073	0,73743	0,00746	563,402	26,47	560,5	4,3	560,9	4,36	611,1	31,83	99,92864	0,73743	0,00746	0,09084	0,00073	0,794379	-0,07131
4.sSMPABC070	42682,74	2170,574	0,070529	0,05562	0,00076	0,09258	0,00077	0,70976	0,00836	437,231	29,54	570,8	4,57	544,6	4,96	699,4	59,29	104,59	0,70976	0,00836	0,09258	0,00077	0,70612	4,81087
4.sSMPABC071	51110,85	2978,14	0,072965	0,06115	0,00081	0,08983	0,00075	0,75727	0,00857	644,514	28,27	554,5	4,41	572,4	4,95	853,8	82,13	96,77187	0,75727	0,00857	0,08983	0,00075	0,737751	-3,12718
Amostras																										
4.sSMPABC092	228352	39779	0,256535	0,18017	0,0052	0,55115	0,00747	13,64979	0,36782	2654,44	47,1	2829,9	31,05	2725,7	25,49	3242	1255,14	103,6821	13,64979	0,36782	0,55115	0,00747	0,502969	3,822871
4.sSMPABC072	90967	17415	0,353067	0,19047	0,00262	0,5747	0,00507	15,09169	0,17816	2746,22	22,42	2927,1	20,75	2821	11,24	3215,2	355,52	103,6247	15,09169	0,17816	0,5747	0,00507	0,747299	3,761078
4.sSMPABC087	1470103	121115	0,04894	0,07903	0,00201	0,2192	0,00275	2,387	0,05747	1172,89	49,56	1277,6	14,54	1238,7	17,23	******	1485,23	103,0448	2,387	0,05747	0,2192	0,00275	0,521079	3,140389
4.sSMPABC077	48441	10335	0,460618	0,21163	0,00344	0,60849	0,00592	17,73491	0,25072	2918,07	26,04	3064	23,71	2975,5	13,59	4129,4	683,54	102,8884	17,73491	0,25072	0,60849	0,00592	0,68819	2,97429
4.sSMPABC078	100944	20664	0,288335	0,20016	0,00305	0,58346	0,0054	16,10347	0,21613	2827,5	24,65	2962,8	21,99	2883	12,83	4631,5	813,01	102,6934	16,10347	0,21613	0,58346	0,0054	0,689584	2,76795
4.sSMPABC088	146400	30288	0,320787	0,20485	0,0067	0,57988	0,00846	16,3711	0,49019	2865,23	52,18	2948,3	34,52	2898,7	28,65	******	6720,11	101,6823	16,3711	0,49019	0,57988	0,00846	0,487243	1,711112
4.sSMPABC051	135456	26480	0,308047	0,19584	0,0027	0,56031	0,00514	15,12079	0,18066	2791,84	22,38	2867,9	21,22	2822,9	11,38	2926	268,06	101,5691	15,12079	0,18066	0,56031	0,00514	0,767798	1,594105
4.sSMPABC079	112057	22689	0,352239	0,20115	0,00293	0,57109	0,00539	15,83211	0,20472	2835,55	23,55	2912,3	22,1	2866,7	12,35	3628,4	463,16	101,5658	15,83211	0,20472	0,57109	0,00539	0,729899	1,590679
4.sSMPABC089	169068	34161	0,320327	0,19701	0,00336	0,56092	0,00504	15,22998	0,22673	2801,59	27,61	2870,4	20,8	2829,7	14,18	3481,5	548,52	101,4179	15,22998	0,22673	0,56092	0,00504	0,603559	1,438315
4.sSMPABC081	145847	28588	0,3997	0,19276	0,00284	0,54905	0,00482	14,5938	0,18597	2765,85	23,94	2821,2	20,07	2789,1	12,11	3802,8	569,22	101,1378	14,5938	0,18597	0,54905	0,00482	0,688907	1,150909
4.sSMPABC031	91989	18213	0,308783	0,19744	0,0028	0,5565	0,00533	15,13471	0,18539	2805,15	22,97	2852,1	22,09	2823,8	11,67	2725,2	185,26	100,9923	15,13471	0,18539	0,5565	0,00533	0,781898	1,002196
4.sSMPABC095	277124	44132	0,244599	0,15398	0,00309	0,45858	0,00515	9,72651	0,1847	2390,6	33,81	2433,3	22,77	2409,2	17,48	-315,9	95,1	100,9904	9,72651	0,1847	0,45858	0,00515	0,591401	1,000332
4.sSMPABC093	181083	47677	0,229979	0,25621	0,00447	0,66095	0,00608	23,334	0,35751	3223,55	27,27	3270,8	23,58	3241	14,92	******	1427,31	100,9111	23,334	0,35751	0,66095	0,00608	0,600393	0,919469
4.sSMPABC055	91319	18881	0,642684	0,20574	0,00248	0,56897	0,00472	16,13629	0,16033	2872,28	19,47	2903,6	19,41	2884,9	9,5	3145,2	222,43	100,644	16,13629	0,16033	0,56897	0,00472	0,834914	0,648203
4.sSMPABC080	192083,5	37774,77	0,386884	0,19768	0,00284	0,55311	0,00483	15,07289	0,18721	2807,14	23,29	2838,1	20,05	2819,9	11,83	3340,5	416,06	100,6413	15,07289	0,18721	0,55311	0,00483	0,703077	0,645413
4.sSMPABC097	326804,3	55749,22	0,301458	0,16853	0,00277	0,4899	0,00482	11,37844	0,17199	2543,1	27,33	2570,3	20,83	2554,7	14,11	1907,4	535,97	100,6069	11,37844	0,17199	0,4899	0,00482	0,650907	0,610639
4.sSMPABC029	121218,1	32846,04	0,362997	0,26791	0,00305	0,67113	0,00544	24,78508	0,22626	3293,83	17,76	3310,2	20,99	3299,8	8,91	2812	127,85	100,3142	24,78508	0,22626	0,67113	0,00544	0,887922	0,315171
4.sSMPABC027	197572,7	51606,64	0,501687	0,25973	0,00279	0,65834	0,00519	23,56906	0,20001	3245,07	16,82	3260,7	20,18	3250,7	8,27	2930,2	107,71	100,3067	23,56906	0,20001	0,65834	0,00519	0,928983	0,307626
4.sSMPABC013	86836,85	22279,84	0,283377	0,25574	0,00277	0,65081	0,00513	22,9398	0,19317	3220,65	16,99	3231,4	20,02	3224,4	8,19	2770,6	90,72	100,2166	22,9398	0,19317	0,65081	0,00513	0,93608	0,217095
4.sSMPABC099	193501	37945	0,090916	0,18997	0,00389	0,53012	0,00606	13,85767	0,26544	2741,9	33,28	2742	25,54	2740	18,14	******	1082,55	100,0729	13,85767	0,26544	0,53012	0,00606	0,596791	0,072993
4.sSMPABC038	115635,9	23545,96	0,473164	0,20244	0,00236	0,55568	0,00447	15,50591	0,14531	2845,97	18,89	2848,7	18,51	2846,8	8,94	2846,3	155,47	100,0667	15,50591	0,14531	0,55568	0,00447	0,85839	0,066742
4.sSMPABC057	249744	56517	0,273317	0,22262	0,00289	0,592	0,00495	18,17085	0,19869	2999,74	20,71	2997,5	20,02	2998,8	10,52	3383,5	335,69	99,95663	18,17085	0,19869	0,592	0,00495	0,764685	-0,04335
4.sSMPABC020	142306	28111	0,490939	0,19629	0,00233	0,542	0,00481	14,6655	0,14822	2795,59	19,29	2791,8	20,1	2793,8	9,61	2729	120,55	99,92836	14,6655	0,14822	0,542	0,00481	0,878084	-0,07159
4.sSMPABC028	173417	48449	0,370517	0,26614	0,00556	0,66074	0,00892	24,21717	0,46649	3283,42	32,41	3270	34,63	3277,2	18,78	1994	187,79	99,77982	24,21717	0,46649	0,66074	0,00892	0,700834	-0,2197
4.sSMPABC022	151979,7	33443,56	0,255317	0,21935	0,00235	0,58332	0,0046	17,63664	0,14867	2975,93	17,13	2962,3	18,73	2970,1	8,1	2536	84,71	99,73669	17,63664	0,14867	0,58332	0,0046	0,935499	-0,26262
4.sSMPABC045	105086	19750	0,546691	0,18697	0,00226	0,52006	0,00422	13,40305	0,13127	2715,69	19,76	2699,4	17,88	2708,5	9,25	2486,7	164,43	99,66289	13,40305	0,13127	0,52006	0,00422	0,828509	-0,33598
4.sSMPABC030	77117,19	16785,7	0,293908	0,22112	0,00342	0,5843	0,0056	17,79639	0,23372	2988,86	24,64	2966,3	22,79	2978,8	12,63	3078,2	293,15	99,5786	17,79639	0,23372	0,5843	0,0056	0,729774	-0,41963
4.sSMPABC054	168190,7	34302,19	0,716169	0,20115	0,00258	0,54749	0,0046	15,18473	0,16379	2835,55	20,78	2814,7	19,17	2826,9	10,28	3232,9	300,08	99,56656	15,18473	0,16379	0,54749	0,0046	0,778935	-0,43157
4.sSMPABC012	106481,9	26940,62	0,344344	0,25438	0,00408	0,6402	0,00675	22,47908	0,31511	3212,23	25,12	3189,8	26,54	3204,7	13,63	2489,7	194,51	99,53289	22,47908	0,31511	0,6402	0,00675	0,75215	-0,46494
4.sSMPABC059	82395	15948	0,432081	0,19051	0,00262	0,52566	0,00445	13,80077	0,15817	2746,57	22,41	2723,1	18,79	2736,1	10,85	3230,9	369,58	99,5226	13,80077	0,15817	0,52566	0,00445	0,738642	-0,47513
4.sSMPABC052	119719	22945	0,417208	0,19204	0,00358	0,5264	0,00527	13,92428	0,22874	2759,71	30,28	2726,2	22,27	2744,6	15,56	3378	668,56	99,32507	13,92428	0,22874	0,5264	0,00527	0,609432	-0,67041
4.sSMPABC044	171962	44529	0,535705	0,25565	0,00489	0,63763	0,00662	22,46517	0,3864	3220,1	29,88	3179,7	26,08	3204,1	16,72	3253,2	548,54	99,23263	22,46517	0,3864	0,63763	0,00662	0,603618	-0,76152
4.sSMPABC017	128492,1	29187,87	0,294036	0,22586	0,0027	0,58831	0,00475	18,30792	0,17411	3022,94	19,03	2982,6	19,29	3006,1	9,16	2718,9	138,99	99,2121	18,30792	0,17411	0,58831	0,00475	0,84899	-0,78174
4.sSMPABC100	72677	16154	0,239911	0,21217	0,00487	0,56102	0,0075	16,3856	0,35891	2922,19	36,7	2870,8	30,95	2899,6	20,96	1978	813,82	98,9968	16,3856	0,35891	0,56102	0,0075	0,610323	-0,99324
4.sSMPABC060	296634	67528	0,417271	0,21847	0,00343	0,5724	0,0052	17,23369	0,23792	2969,45	25,1	2917,7	21,31	2947,9	13,25	5146,4	1158,32	98,96494	17,23369	0,23792	0,5724	0,0052	0,658038	-1,02446
4.sSMPABC018	156263,2	34373,29	0,283522	0,21941	0,00262	0,57328	0,00457	17,33689	0,16466	2976,37	19,14	2921,3	18,74	2953,7	9,12	2745,7	145,33	98,8909	17,33689	0,16466	0,57328	0,00457	0,83933	-1,09693
4.sSMPABC024	126739	26016	0,449027	0,20485	0,00233	0,5445	0,00424	15,37536	0,13646	2865,23	18,35	2802,3	17,72	2838,8	8,46	2475,2	113,09	98,6975	15,37536	0,13646	0,5445	0,00424	0,87738	-1,28575
4.sSMPABC085	73265	13801	0,33849	0,18315	0,00346	0,50182	0,00527	12,67437	0,21586	2681,6	30,87	2621,6	22,63	2655,8	16,03	4570,2	1398,1	98,69545	12,67437	0,21586	0,50182	0,00527	0,616619	-1,28775
4.sSMPABC050	175206	34530,55	0,47071	0,19268	0,00299	0,51889	0,00473	13,77886	0,18536	2765,17	25,21	2694,5	20,08	2734,6	12,74	3069,9	422,68	98,51178	13,77886	0,18536	0,51889	0,00473	0,677615	-1,46639
4.sSMPABC025	20251	4660	0,323133	0,22879	0,00298	0,58204	0,00561	18,35435	0,20117	3043,6	20,73	2957,1	22,85	3008,5	10,55	2636,2	112,74	98,26181	18,35435	0,20117	0,58204	0,00561	0,879399	-1,70849
4.sSMPABC101	255049	51215,87	0,326664	0,19514	0,00261	0,52081	0,00469	14,00347	0,16715	2785,97	21,75	2702,6	19,89	2749,9	11,31	2111,9	207,4	98,24983	14,00347	0,16715	0,52081	0,00469	0,754437	-1,72006
4.sSMPABC040	224767	59228	0,332452	0,26457	0,00447	0,63472	0,00586	23,15016	0,3424	3274,13	26,34	3168,2	23,11	3233,3	14,4	7978,9	1048,09	97,94521	23,15016	0,3424	0,63472	0,00586	0,624217	-2,01342
4.sSMPABC053	124379	24961	0,325489	0,20303	0,00372	0,53124	0,00527	14,84002	0,23759	2850,71	29,53	2746,7	22,18	2805	15,23	2916,5	406,62	97,87745	14,84002	0,23759	0,53124	0,00527	0,619621	-2,07843
4.sSMPABC063	211000,7	44177,71	0,28831	0,19523	0,00452	0,51242	0,00677	13,71299	0,29805	2786,73	37,39	2667	28,87	2730,1	20,57	1856,6	249,39	97,63405	13,71299	0,29805	0,51242	0,00677	0,607863	-2,31127
4.sSMPABC096	174099	67722	0,298792	0,3589	0,00813	0,73343	0,0088	36,25486	0,76313	3745,2	34	3546,2	32,72	3673,4	20,8	******	*******	96,41306	36,25486	0,76313	0,73343	0,0088	0,570022	-3,46273
4.sSMPABC046	145447	28090	0,313155	0,18685	0,00341	0,48341	0,00504	12,44633	0,20263	2714,63	29,74	2542,1	21,91	2638,7	15,3	3904,5	826,61	96,19999	12,44633	0,20263	0,48341	0,00504	0,640402	-3,66089
4.sSMPABC048	132214	26090	0,542126	0,19605	0,00277	0,49996	0,0042	13,50583	0,15881	2793,59	22,9	2613,6	18,05	2715,7	11,12	2991,3	322,32	96,09351	13,50583	0,15881	0,49996	0,0042	0,714426	-3,75962
4.sSMPABC026	30980	7218	0,363511	0,22751	0,00468	0,55226	0,00801	17,32213	0,32249	3034,61	32,6	2834,6	33,25	2952,8	17,87	2772,2	289,08	95,8301	17,32213	0,32249	0,55226	0,00801	0,779065	-4,00298
4.sSMPABC049	301421,4	58092,41	0,275023	0,18869	0,00346	0,48189	0,00521	12,53162	0,21049	2730,78	29,86	2535,5	22,67	2645,1	15,79	2498,4	308,81	95,67738	12,53162	0,21049	0,48189	0,00521	0,643673	-4,14351
4.sSMPABC102	200325	39276	0,338328	0,1983	0,00426	0,49736	0,005	13,58022	0,2581	2812,26	34,68	2602,4	21,55	2720,9	17,97	3501,9	1074,43	95,44651	13,58022	0,2581	0,49736	0,005	0,528954	-4,35518

FILE NAME	CORRECT	0																								
	Pb206*	Pb207*	Th/U	207/206	1s	206/238	1s	207/235	1s	206/207		206/238		207/235		208/232		Conc	207/235		206/238		RHO	Disc.
4.sSMPABC014	222691,6	45782,87	0,250885	0,20536	0,00291	0,50942	0,00497	14,41593	0,18021	2869,28	22,88	2654,2	21,24	2777,5	11,87	2434	163,55	95,35453	14,41593	0,18021	0,50942	0,00497	0,780448	-4,43924
4.sSMPABC047	112153,3	21213,34	0,32704	0,19019	0,00277	0,47031	0,00399	12,3252	0,14992	2743,81	23,73	2484,9	17,51	2629,5	11,42	2423	248,9	94,18085	12,3252	0,14992	0,47031	0,00399	0,697466	-5,49914
4.sSMPABC061	151262	34426	0,276072	0,22065	0,00601	0,50972	0,00755	15,49048	0,39507	2985,44	43,19	2655,5	32,24	2845,9	24,33	2497,7	456,19	92,82998	15,49048	0,39507	0,50972	0,00755	0,580773	-6,69033
4.sSMPABC062	127037,6	25066,79	0,34364	0,19501	0,0026	0,46119	0,00379	12,39225	0,13711	2784,88	21,69	2444,8	16,74	2634,6	10,4	3056,6	357,22	92,23658	12,39225	0,13711	0,46119	0,00379	0,742746	-7,20413
4.sSMPABC015	142294,3	29886,93	0,322294	0,20992	0,00234	0,47842	0,00369	13,84393	0,11901	2904,93	17,92	2520,4	16,09	2739,1	8,14	1962,4	76,56	91,32281	13,84393	0,11901	0,47842	0,00369	0,897208	-7,98437
4.sSMPABC058	121993	24105,71	0,375054	0,19555	0,00254	0,44605	0,00361	12,01941	0,12793	2789,41	21,09	2377,7	16,11	2605,9	9,98	2923,3	293,34	90,40249	12,01941	0,12793	0,44605	0,00361	0,760387	-8,75705
4.sSMPABC110	-114224	166729,7	0,012854	0,56617	0,0074	0,80631	0,00676	62,93088	0,70805	4423,49	18,95	3811,7	24,12	4221,8	11,25	******	3827,15	89,24102	62,93088	0,70805	0,80631	0,00676	0,745151	-9,71387
4.sSMPABC074	270020,6	51729,19	0,503721	0,19252	0,00291	0,40359	0,00361	10,71134	0,14194	2763,81	24,56	2185,5	16,6	2498,4	12,31	2164	260,59	85,68291	10,71134	0,14194	0,40359	0,00361	0,675003	-12,524
4.sSMPABC043	162051	32918	0,399564	0,20111	0,00241	0,39945	0,00325	11,07515	0,10819	2835,23	19,38	2166,5	14,95	2529,5	9,1	2297,8	151,25	83,24486	11,07515	0,10819	0,39945	0,00325	0,832882	-14,3507
4.sSMPABC021	196482,9	40859,51	0,291499	0,20626	0,00217	0,39956	0,00314	11,35967	0,0941	2876,38	17	2167	14,45	2553,1	7,73	1721,9	52,65	82,18274	11,35967	0,0941	0,39956	0,00314	0,948689	-15,1228
4.sSMPABC023	160144	32910	0,249025	0,20219	0,00257	0,38841	0,0036	10,82817	0,11936	2843,96	20,54	2115,5	16,71	2508,5	10,25	1777,1	90,31	81,42283	10,82817	0,11936	0,38841	0,0036	0,84083	-15,6667
4.sSMPABC098	216412	41236,34	0,423855	0,18437	0,00295	0,34442	0,00301	8,74708	0,12162	2692,58	26,21	1907,9	14,41	2312	12,67	2430	551,83	78,81964	8,74708	0,12162	0,34442	0,00301	0,628545	-17,4784
4.sSMPABC086	1087074	211358,2	0,068857	0,18576	0,00384	0,34021	0,00384	8,70588	0,17021	2704,98	33,74	1887,7	18,46	2307,7	17,81	******	6982,17	77,7507	8,70588	0,17021	0,34021	0,00384	0,577314	-18,1999
4.sSMPABC073	410734	83917	0,292394	0,20426	0,00296	0,36535	0,0033	10,28669	0,1311	2860,54	23,36	2007,5	15,56	2460,9	11,79	1729	226,32	77,41469	10,28669	0,1311	0,36535	0,0033	0,708725	-18,4242
4.sSMPABC039	224649	46226	0,255121	0,20436	0,00364	0,36509	0,00345	10,28498	0,16136	2861,34	28,68	2006,2	16,29	2460,8	14,52	3955,7	597,18	77,34025	10,28498	0,16136	0,36509	0,00345	0,602319	-18,4737
4.sSMPABC075	423216	80572	0,656716	0,19428	0,00329	0,31542	0,00297	8,43934	0,12647	2778,74	27,5	1767,3	14,54	2279,4	13,6	2099,4	295,12	71,0236	8,43934	0,12647	0,31542	0,00297	0,628331	-22,4664
4.sSMPABC042	867430	238533	0,253284	0,27277	0,00373	0,38473	0,00349	14,46891	0,17488	3322,02	21,26	2098,4	16,23	2781	11,48	6454,5	503,31	67,47045	14,46891	0,17488	0,38473	0,00349	0,750525	-24,5451
4.sSMPABC016	219711,1	45261,82	0,484163	0,20576	0,00219	0,30223	0,00234	8,5711	0,07097	2872,44	17,18	1702,4	11,6	2293,5	7,53	1325,9	42,27	65,27843	8,5711	0,07097	0,30223	0,00234	0,935061	-25,7728
4.sSMPABC010	37101	7508	0,222917	0,20131	0,00293	0,29025	0,00284	8,05131	0,09727	2836,85	23,55	1642,8	14,19	2236,8	10,91	1179	62,67	63,84222	8,05131	0,09727	0,29025	0,00284	0,809904	-26,5558
4.sSMPABC041	766026,2	158484,9	0,519623	0,20643	0,00264	0,2907	0,00226	8,27016	0,08598	2877,72	20,65	1645	11,31	2261,1	9,42	3170,3	281,84	62,54711	8,27016	0,08598	0,2907	0,00226	0,74779	-27,2478
4.sSMPABC019	299143,9	47939,49	0,317242	0,16216	0,00191	0,21255	0,00159	4,75087	0,04339	2478,31	19,78	1242,4	8,47	1776,3	7,66	1004,4	60,89	57,02672	4,75087	0,04339	0,21255	0,00159	0,819067	-30,0569
4.sSMPABC065	384423	65673	0,392724	0,16903	0,00205	0,22129	0,00188	5,15433	0,05344	2548,06	20,16	1288,7	9,94	1845,1	8,82	1349,8	110,31	56,82471	5,15433	0,05344	0,22129	0,00188	0,819411	-30,1555
4.sSMPABC076	315241	51316	0,314073	0,16019	0,00193	0,20741	0,00173	4,58061	0,04674	2457,67	20,26	1215	9,22	1745,7	8,5	1698	181,45	56,32099	4,58061	0,04674	0,20741	0,00173	0,817431	-30,4004
4.sSMPABC084	450018,7	80319,64	0,360753	0,17562	0,00308	0,22483	0,00227	5,44162	0,08758	2611,94	28,87	1307,4	11,94	1891,4	13,81	3363,7	1159,22	55,33119	5,44162	0,08758	0,22483	0,00227	0,627328	-30,8766
4.sSMPABC083	205512	32263	0,375973	0,15692	0,00332	0,18968	0,00207	4,1045	0,08032	2422,74	35,48	1119,6	11,2	1655,2	15,98	1335,3	280,98	52,16149	4,1045	0,08032	0,18968	0,00207	0,55768	-32,3586
4.sSMPABC064	368895,4	60609,45	0,406343	0,16353	0,00189	0,19444	0,00154	4,38327	0,04124	2492,49	19,34	1145,4	8,33	1709,2	7,78	1237,9	105,27	50,77702	4,38327	0,04124	0,19444	0,00154	0,841811	-32,9862
4.sSMPABC056	351726	53502	0,294756	0,14993	0,00204	0,16695	0,00141	3,45145	0,03998	2345,13	23,06	995,3	7,78	1516,2	9,12	1281	146,22	47,66402	3,45145	0,03998	0,16695	0,00141	0,729107	-34,3556
4.sSMPABC082	447101,1	86012,97	0,286737	0,18741	0,00303	0,20816	0,00208	5,37495	0,08007	2719,56	26,43	1219	11,08	1880,9	12,75	2242,8	230,54	45,70139	5,37495	0,08007	0,20816	0,00208	0,670765	-35,1906
4.sSMPABC009	87465	17886	0,313825	0,20091	0,0044	0,2213	0,00298	6,11806	0,11781	2833,6	35,25	1288,8	15,72	1992,8	16,8	1243,7	152,89	45,37554	6,11806	0,11781	0,2213	0,00298	0,699305	-35,3272
4.sSMPABC011	398159,2	80632,82	0,368125	0,20215	0,00217	0,22016	0,00167	6,13463	0,05066	2843,63	17,37	1282,7	8,84	1995,2	7,21	1887,6	63,86	44,45311	6,13463	0,05066	0,22016	0,00167	0,918547	-35,7107
4.sSMPABC106	236227,2	214684,4	0,075186	0,67601	0,01336	0,46449	0,00471	43,26522	0,7731	4680,55	28,16	2459,3	20,74	3848,5	17,73	******	*******	43,51238	43,26522	0,7731	0,46449	0,00471	0,567476	-36,0972
4.sSMPABC067	155911,2	22193,68	0,469502	0,14318	0,00261	0,13024	0,00132	2,56904	0,04245	2266,02	31,08	789,2	7,54	1291,9	12,08	695,4	102,98	36,30258	2,56904	0,04245	0,13024	0,00132	0,61337	-38,9117
4.sSMPABC094	203889	47045,55	0,340994	0,22499	0,00472	0,20623	0,0021	6,38697	0,11882	3016,75	33,25	1208,7	11,21	2030,5	16,33	3807,2	1081,48	32,0096	6,38697	0,11882	0,20623	0,0021	0,54736	-40,4728
4.sSMPABC066	359975	64103	0,622458	0,18193	0,0035	0,16528	0,00151	4,13999	0,06859	2670,54	31,46	986	8,38	1662,2	13,55	765,9	138,09	31,41988	4,13999	0,06859	0,16528	0,00151	0,551436	-40,681
4.sSMPABC091	256704	49980	0,174603	0,18819	0,00396	0,16469	0,00189	4,26907	0,08476	2726,41	34,2	982,8	10,48	1687,4	16,33	4373,8	1019,75	28,30688	4,26907	0,08476	0,16469	0,00189	0,578012	-41,7565
4.sSMPABC112	54119,92	6876,644	0,071558	0,15356	0,00222	0,10539	0,00091	2,23087	0,0281	2385,95	24,37	645,9	5,32	1190,8	8,83	4564,2	865,22	15,6371	2,23087	0,0281	0,10539	0,00091	0,685504	-45,7592

FILE NAME	CORRECTED	0																							
	Pb206*	Pb207*	Th/U	207/206	1s	206/238	1s	207/235	1s	206/207		206/238		207/235		208/232		Conc	207/235		206/238		RHO	Disc.	
Padrões Primários																									
4.sSMPABC001	54921	3372	0,012447844	0,0617	0,00074	0,10041	0,0008	0,85322	0,00837	663,7267	25,42	616,8	4,7	626,4	4,59	616,3	50,85	98,44358	0,85322	0,00837	0,10041	0,0008	0,812173	-1,53257	
4.sSMPABC002	47533	2927	0,011299218	0,06188	0,00076	0,09952	0,0008	0,84803	0,00857	669,9641	25,96	611,6	4,68	623,6	4,71	958,2	70,08	98,03793	0,84803	0,00857	0,09952	0,0008	0,795445	-1,92431	
4.sSMPABC003	47634	2860	0,010886986	0,06026	0,00074	0,09964	0,0008	0,8269	0,00842	612,9234	26,31	612,3	4,69	611,9	4,68	707,7	66,17	100,0653	0,8269	0,00842	0,09964	0,0008	0,788492	0,06537	
4.sSMPABC007	47164	2849	0,010290126	0,06096	0,00075	0,0976	0,00077	0,8194	0,00827	637,823	26,31	600,3	4,52	607,7	4,61	903,9	83,66	98,76728	0,8194	0,00827	0,0976	0,00077	0,781684	-1,21771	
4.sSMPABC008	47187	2835	0,010244699	0,06063	0,00075	0,0983	0,00077	0,82077	0,00832	626,1333	26,46	604,4	4,54	608,5	4,64	597,9	81,24	99,32164	0,82077	0,00832	0,0983	0,00077	0,772743	-0,67379	
4.sSMPABC009	51321,97482	2979,30	0,010397066	0,06091	0,00074	0,09818	0,00077	0,82352	0,00814	636,0573	25,98	603,7	4,5	610	4,53	825,6	75,75	98,95644	0,82352	0,00814	0,09818	0,00077	0,793446	-1,03279	
4.sSMPABC022	61131,71924	3631,821	0,009895726	0,06104	0,00073	0,0964	0,00075	0,8104	0,00788	640,6439	25,6	593,3	4,4	602,7	4,42	546,3	78,59	98,41564	0,8104	0,00788	0,0964	0,00075	0,800124	-1,55965	
4.sSMPABC023	66184	3663	0,009897608	0,05566	0,00068	0,09627	0,00074	0,73798	0,00734	438,8314	26,44	592,5	4,38	561,2	4,29	-656,6	82,57	105,2827	0,73798	0,00734	0,09627	0,00074	0,772839	5,577334	
4.sSMPABC039	56796,27619	3592,425	0,010208394	0,06085	0,00074	0,0965	0,00075	0,80868	0,00794	633,936	25,84	593,9	4,42	601,7	4,46	503,2	65,02	98,68665	0,80868	0,00794	0,0965	0,00075	0,791572	-1,29633	
4.sSMPABC057	56806	3285	0,010049855	0,05782	0,00072	0,09713	0,00076	0,77339	0,00786	522,9479	27,18	597,5	4,44	581,7	4,5	40,8	66,23	102,6444	0,77339	0,00786	0,09713	0,00076	0,769903	2,716177	
4.sSMPABC058	57450,91538	3668,263	0,009947986	0,06213	0,00074	0,09877	0,00079	0,84508	0,00831	678,5864	25,39	607,2	4,61	621,9	4,57	1037,5	61,73	97,57905	0,84508	0,00831	0,09877	0,00079	0,81339	-2,36372	
4.sSMPABC075	51968,69214	2513,117	0,010352256	0,06177	0,00075	0,0991	0,00079	0,84304	0,00838	666,1553	25,67	609,2	4,62	620,8	4,62	1278,7	67,41	98,09586	0,84304	0,00838	0,0991	0,00079	0,801969	-1,86856	
4.sSMPABC076	63909	3971	0,009913902	0,06189	0,00074	0,09719	0,00075	0,82838	0,00798	670,3099	25,35	597,9	4,43	612,7	4,43	1214,5	69,6	97,52467	0,82838	0,00798	0,09719	0,00075	0,801062	-2,41554	
4.sSMPABC089	65746,50161	3810,546	0,009972869	0,06212	0,00074	0,09627	0,00075	0,82368	0,00791	678,2424	25,25	592,5	4,39	610,1	4,41	318,2	39,83	97,02954	0,82368	0,00791	0,09627	0,00075	0,811246	-2,88477	
4.sSMPABC090	67259	4153	0,009807672	0,06112	0,00073	0,09903	0,00078	0,83354	0,00811	643,4598	25,37	608,7	4,6	615,6	4,49	982	55,49	98,86644	0,83354	0,00811	0,09903	0,00078	0,809531	-1,12086	
4.sSMPABC106	59377	3481	0,010054025	0,05789	0,00071	0,09982	0,00079	0,79592	0,00801	525,6013	26,83	613,4	4,66	594,5	4,53	526,8	41,41	103,0812	0,79592	0,00801	0,09982	0,00079	0,786405	3,179142	
4.sSMPABC107	54234,34087	3153,918	0,010094245	0,06056	0,00074	0,09712	0,00077	0,81003	0,00812	623,6426	26,07	597,5	4,55	602,5	4,56	684,2	44,04	99,16318	0,81003	0,00812	0,09712	0,00077	0,79091	-0,82988	
4.sSMPABC124	58793,38745	3229,244	0,010116763	0,05878	0,00073	0,09789	0,00078	0,79247	0,00808	558,9573	26,67	602	4,57	592,6	4,58	130,5	35,93	101,5615	0,79247	0,00808	0,09789	0,00078	0,781498	1,58623	
4.sSMPABC125	57851,75837	3054,251	0,010057071	0,06039	0,00074	0,09847	0,00078	0,81914	0,0082	617,5773	26,07	605,5	4,6	607,6	4,58	726,5	44	99,65318	0,81914	0,0082	0,09847	0,00078	0,791289	-0,34562	
Padrões Secundários																									
4.sSMPABC004	26869	1565	0,087267492	0,05919	0,00136	0,09035	0,00089	0,73672	0,01549	574,0917	49,02	557,6	5,26	560,5	9,06	1514,7	194,69	99,47991	0,73672	0,01549	0,09035	0,00089	0,468504	-0,5174	
4.sSMPABC005	25628	1493	0,084037411	0,05915	0,00114	0,08914	0,0008	0,72647	0,01262	572,6215	41,38	550,5	4,76	554,5	7,42	1321,8	105,26	99,27339	0,72647	0,01262	0,08914	0,0008	0,516625	-0,72137	
4.sSMPABC006	27004	1500	0,08385147	0,05583	0,00085	0,08979	0,00076	0,69042	0,00925	445,6142	33,04	554,3	4,49	533,1	5,56	478,3	24,51	103,8246	0,69042	0,00925	0,08979	0,00076	0,631767	3,97674	
4.sSMPABC024	74071,05532	3544,698	0,073440199	0,05946	0,00068	0,09049	0,00071	0,74093	0,00681	583,9802	24,49	558,4	4,21	563	3,97	605,2	20,44	99,17622	0,74093	0,00681	0,09049	0,00071	0,853666	-0,81705	
4.sSMPABC025	76750	4506	0,076377004	0,05934	0,00088	0,09074	0,00074	0,74142	0,00925	579,5929	31,74	559,9	4,37	563,2	5,39	1033,5	91,85	99,41061	0,74142	0,00925	0,09074	0,00074	0,653665	-0,58594	
4.sSMPABC041	33008	1908	0,078964218	0,05804	0,00085	0,08865	0,00072	0,70864	0,00889	531,2722	32,22	547,5	4,28	543,9	5,28	566,8	31,44	100,6575	0,70864	0,00889	0,08865	0,00072	0,647407	0,661886	
4.sSMPABC042	33034,06674	1581,324	0,079641175	0,05892	0,00116	0,09074	0,00084	0,73638	0,01293	564,1413	42,14	559,9	4,94	560,3	7,56	818,7	80,93	99,92856	0,73638	0,01293	0,09074	0,00084	0,52721	-0,07139	
4.sSMPABC059	55720	3304	0,075350981	0,05904	0,00072	0,09133	0,00073	0,74263	0,00744	568,5714	25,92	563,4	4,3	563,9	4,34	574,3	22,6	99,91125	0,74263	0,00744	0,09133	0,00073	0,797827	-0,08867	
4.sSMPABC060	62097	3717	0,076027239	0,0597	0,00073	0,09043	0,00071	0,74365	0,00737	592,7186	25,76	558,1	4,2	564,5	4,29	619,6	27,13	98,85325	0,74365	0,00737	0,09043	0,00071	0,792222	-1,13375	
Amostras																									
4.sSMPABC080	30874	6324	1,350593256	0,20825	0,00618	1,0926	0,03486	31,35295	1,14205	2891,975	47,38	4760,1	107,4	3530,2	35,84	4537	834,39	125,8377	31,35295	1,14205	1,0926	0,03486	0,87591	34,83939	
4.sSMPABC027	212728	57681	0,506736647	0,27198	0,00286	0,68817	0,00543	25,77884	0,2128	3317,478	16,37	3375,6	20,74	3338,2	8,07	3685,5	118,39	101,108	25,77884	0,2128	0,68817	0,00543	0,955863	1,120364	
4.sSMPABC017	157428	40003	0,171559654	0,25552	0,0027	0,65991	0,0051	23,22751	0,18893	3219,294	16,6	3266,8	19,82	3236,5	7,92	4085,9	157,86	100,9275	23,22751	0,18893	0,65991	0,0051	0,950139	0,936197	
4.sSMPABC049	94136	25811	0,562809015	0,27316	0,0029	0,68369	0,00544	25,71956	0,21432	3324,259	16,53	3358,5	20,81	3335,9	8,14	3245,3	103,67	100,6729	25,71956	0,21432	0,68369	0,00544	0,954862	0,677478	
4.sSMPABC018	102469,3189	26200,74	0,235351482	0,25601	0,00272	0,65683	0,0052	23,16025	0,19197	3222,319	16,64	3254,8	20,23	3233,7	8,07	3849,2	131,02	100,6483	23,16025	0,19197	0,65683	0,0052	0,955125	0,652503	
4.sSMPABC102	211309,3646	47744,31	0,081603216	0,22327	0,00253	0,60045	0,00467	18,45433	0,16496	3004,423	18,12	3031,6	18,82	3013,7	8,61	2902,1	148,96	100,5904	18,45433	0,16496	0,60045	0,00467	0,870081	0,593954	
4.sSMPABC093	61277	11717	0,367260718	0,18863	0,00248	0,53227	0,00455	13,82838	0,14878	2730,253	21,51	2751	19,15	2738	10,19	2467,8	159,42	100,4726	13,82838	0,14878	0,53227	0,00455	0,794522	0,474799	
4.sSMPABC028	261340,3844	64745,05	0,011413594	0,248	0,00259	0,64062	0,00501	21,88034	0,17831	3172,044	16,45	3191,5	19,67	3178,4	7,91	3335,6	145,81	100,4105	21,88034	0,17831	0,64062	0,00501	0,959656	0,412157	
4.sSMPABC019	115923,9223	30380,93	0,350429243	0,26342	0,0029	0,66428	0,00551	24,11082	0,21368	3267,277	17,19	3283,7	21,33	3272,9	8,64	4238,1	167,21	100,3289	24,11082	0,21368	0,66428	0,00551	0,935941	0,329983	
4.sSMPABC071	99795	25338	0,628766114	0,25238	0,00303	0,64564	0,00522	22,44161	0,21347	3199,758	18,87	3211,2	20,44	3203	9,25	3433,3	212,15	100,2554	22,44161	0,21347	0,64564	0,00522	0,849958	0,25601	
4.sSMPABC072	106005	27007	0,491363644	0,2528	0,0027	0,64527	0,00512	22,46536	0,18918	3202,387	16,81	3209,7	20,05	3204,1	8,19	3106	106,89	100,1745	22,46536	0,18918	0,64527	0,00512	0,942251	0,174776	
4.sSMPABC010	1065420,868	130794,6	0,055960508	0,1184	0,00148	0,34939	0,00314	5,68497	0,06243	1932,217	22,16	1931,7	15,02	1929,1	9,48	1985,3	105,45	100,1346	5,68497	0,06243	0,34939	0,00314	0,818378	0,134778	
4.sSMPABC127	144035	28800	0,337293641	0,19623	0,00252	0,54358	0,00483	14,69292	0,1613	2795,094	20,86	2798,4	20,16	2795,6	10,44	2736,8	167,41	100,1001	14,69292	0,1613	0,54358	0,00483	0,809389	0,100157	
4.sSMPABC016	121844	31094	0,512432447	0,25582	0,00271	0,64685	0,00517	22,79108	0,19038	3221,147	16,61	3215,9	20,24	3218,1	8,13	3504,4	107,98	99,93159	22,79108	0,19038	0,64685	0,00517	0,956821	-0,06836	
4.sSMPABC030	55843	12026	0,373944511	0,21764	0,00287	0,58177	0,0055	17,44309	0,19276	2963,313	21,13	2956	22,4	2959,5	10,61	4116,8	271	99,8816	17,44309	0,19276	0,58177	0,0055	0,855496	-0,11826	
4.sSMPABC086	128382	33288	0,403974974	0,25462	0,00354	0,6436	0,00572	22,54298	0,26187	3213,722	21,78	3203,1	22,42	3207,4	11,29	3644,4	303,95	99,86576	22,54298	0,26187	0,6436	0,00572	0,765078	-0,13406	
4.sSMPABC015	125681,3196	32402,7	0,455278766	0,26132	0,00292	0,65361	0,00535	23,53407	0,20977	3254,681	17,5	3242,3	20,87	3249,3	8,68	4375,8	198,94	99,7841	23,53407	0,20977	0,65361	0,00535	0,918309	-0,21543	
4.sSMPABC069	55116,96007	11280,96	0,423875382	0,20207	0,00307	0,55105	0,00551	15,33552	0,19863	2842,989	24,56	2829,5	22,91	2836,3	12,35	2979,8	273,51	99,75967	15,33552	0,19863	0,55105	0,00551	0,771995	-0,23975	
4.sSMPABC052	105284	22888	0,228884878	0,21891	0,00249	0,58169	0,0047	17,54195	0,1583	2972,691	18,21	2955,7	19,17	2965	8,67	2320,2	113,99	99,68535	17,54195	0,1583	0,58169	0,0047	0,895371	-0,31366	
4.sSMPABC029	214952	52829	0,012327613	0,2457	0,00257	0,62731	0,00493	21,22655	0,17377	3157,269	16,49	3138,9	19,52	3149	7,94	2249,9	121,02	99,67823	21,22655	0,17377	0,62731	0,00493	0,959996	-0,32074	
4.sSMPABC134	76554	14283	0,337900401	0,17964	0,00335	0,50438	0,00595	12,4784	0,20996	2649,55	30,64	2632,6	25,5	2641,1	15,82	1807,2	172,84	99,67713	12,4784	0,20996	0,50438	0,00595	0,701102	-0,32184	
4.sSMPABC085	138399,9509	36281,89	0,565881212	0,25907	0,00286	0,64528	0,00541	23,02605	0,21016	3241,059	17,31	3209,7	21,2	3228	8,88	2307,4	86,65	99,42985	23,02605	0,21016	0,64528	0,00541	0,918583	-0,56691	
4.sSMPABC088	87074,78836	17107,51	0,369887974	0,19505	0,00218	0,53331	0,00444	14,32918	0,13134	2785,218	18,22	2755,4	18,68	2771,8	8,7	2418,2	90,19	99,40481	14,32918	0,13134	0,53331	0,00444	0,908296	-0,59167	
4.sSMPABC081	210851	44679	0,211758599	0,21076	0,00234	0,56328	0,00457	16,35398	0,14675	2911,398	17,86	2880,2	18,84	2897,7	8,59	3133,8	139,59	99,3924	16,35398	0,14675	0,56328	0,00457	0,904143	-0,60393	
4.sSMPABC053	86549,51953	19392,42	0,188313778	0,22442	0,00247	0,58511	0,00481	18,08784	0,15968	3012,676	17,53	2969,6	19,55	2994,4	8,49	3187,8	114,84	99,16487	18,08784	0,15968	0,58511	0,00481	0,931202	-0,82821	
4.sSMPABC063	87202	16899	0,339474373	0,19476	0,00227	0,52964	0,00434	14,20903	0,13226	2782,78	18,94	2739,9	18,29	2763,8	8,83	3011,6	146,06	99,12771	14,20903	0,13226	0,52964	0,00434	0,880329	-0,86475	
4.sSMPABC067	97430	17449	0,138693452	0,1788	0,0036	0,4967	0,00579	12,24802	0,22014	2641,771	33,06	2599,6	24,93	2623,6	16,87	6752,4	2277,13	99,07678	12,24802	0,22014	0,4967	0,00579	0,648562	-0,91477	
4.sSMPABC077	154976	35209	0,11229333	0,22201	0,00334	0,57889	0,00528	17,67034	0,22465	2995,326	23,99	2944,2	21,54	2972	12,22	3396	358,93	99,05577	17,67034	0,22465	0,57889	0,00528	0,717425	-0,9354	
4.sSMPABC091	110890	22463	0,410245324	0,19814	0,00275	0,53515	0,00463	14,59963	0,16796	2810,936	22,53	2763,1	19,43	2789,5	10,93	2777,6	234,43	99,04455	14,59963	0,16796	0,53515	0,00463	0,752041	-0,94641	
4.sSMPABC011	1005636,371	124145	0,023602588	0,12514	0,00141	0,36128	0,00284	6,23007	0,05619	2030,778	19,86	1988,2	13,45	2008,7	7,89	5083,3	326,44	98,96892	6,23007	0,05619	0,36128	0,00284	0,871582	-1,02056	
4.sSMPABC104	130810	35718	0,320442261	0,26833	0,00332	0,65148	0,00528	24,05468	0,23918	3296,292	19,3	3234	20,62	3270,6	9,69	3225,3	198,68	98,86827	24,05468	0,23918	0,65148	0,00528	0,815094	-1,11906	
4.sSMPABC035	120355	24162	0,327079259	0,20119	0,00227	0,53811	0,00452	14,91698	0,13754	2835,874	18,3	2775,5	18,93	2810	8,77	3423,9	140,23	98,75698	14,91698	0,13754	0,53811	0,00452	0,911002	-1,22776	
4.sSMPABC051	137399	27589	0,264286325	0,20089	0,00224	0,53454	0,0044	14,79533	0,1335	2833,441	18,06	2760,6	18,49	2802,2	8,58	3535,1	148,69	98,49308	14,79533	0,1335	0,53454	0,0044	0,912254	-1,48455	
4.sSMPABC021	175463	34556	0,38849604	0,19708	0,00207	0,5258	0,0042	14,27133	0,11928	2802,166	17,12	2723,8	17,73	2767,9	7,93	2882	86,88	98,38094	14,27133	0,11928	0,5258	0,0042	0,955709	-1,59327	
4.sSMPABC100	59915	15387	0,496590448	0,25445	0,00289	0,62429	0,00527	21,8816	0,20277	3212,667	17,81	3127	20,9	3178,5	9	2690,3	104,08	98,35305	21,8816	0,20277	0,62429	0,00527	0,910961	-1,62026	
4.sSMPABC054	66656,92768	13289,57	0,284411231	0,19987	0,00243	0,53075	0,0044	14,60673	0,14107	2825,135	19,68	2744,6	18,51	2790	9,18	3297,1	197,87	98,34584	14,60673	0,14107	0,53075	0,0044	0,858383	-1,62724	
4.sSMPABC105	170125	45175	0,156157727	0,26048	0,00338	0,62727	0,00511	22,49203	0,23664	3249,611	20,27	3138,8	20,23	3205,2	10,23	2881,2	182,89	97,88454	22,49203	0,23664	0,62727	0,00511	0,774296	-2,07163	
4.sSMPABC121	33374	6724	0,406625623	0,19391	0,0036	0,51382	0,00598	13,70816	0,22417	2775,611	30,1	2672,9	25,45	2729,8	15,48	2522,9	299,77	97,87123	13,70816	0,22417	0,51382	0,00598	0,711692	-2,0844	
4.sSMPABC094	62606,84124	11408,44	0,223109666	0,17912	0,00427	0,48157	0,00668	11,80092	0,25236	2644,739	38,99	2534,1	29,06	2588,7	20,02	3432,8	745,33	97,84539	11,80092	0,25236	0,48157	0,00668	0,648653	-2,10917	
4.sSMPABC061	93553	18078	0,265183874	0,19241	0,00286	0,50223	0,00532	13,30001	0,1762	2762,872	24,18	2623,4	22,81	2701,2	12,51	2444,1	140,85	97,03438	13,30001	0,1762	0,50223	0,00532	0,799567	-2,8802	
4.sSMPABC087	106093,1919	21879,23	0,386871585	0,2045	0,00237	0,52397	0,0041	14,75407	0,13407	2862,452	18,77	2716	17,35	2799,5	8,64	2796,1	150,9	96,92563	14,75407	0,13407	0,52397	0,0041	0,861108	-2,98268	
4.sSMPABC068	231090,3142	45979,57	0,525267768	0,20321	0,00307	0,51837	0,00509	14,50214	0,19284	2852,153	24,4	2692,3	21,6	2783,1	12,63	2617,3	259,96	96,62742	14,50214	0,19284	0,51837	0,00509	0,738436	-3,26255	
4.sSMPABC055	65920,88683	12776,51	0,365833593	0,19074	0,00289	0,49156	0,00482	12,91862	0,16615	2748,553	24,73	2577,4	20,82	2673,7	12,12	3677,1	408,17	96,26368	12,91862	0,16615	0,49156	0,00482	0,762406	-3,60175	
4.sSMPABC096	204553	64395	0,878892306	0,31452	0,00372	0,67727	0,00554	29,33953	0,28194	3543,243	18,12	3333,9	21,28	3464,9	9,44	3646,5	212,45	96,07067	29,33953	0,28194	0,67727	0,00554	0,851225	-3,78077	
4.sSMPABC044	185644	38263	0,540007982	0,20763	0,00238	0,5201	0,00424	14,87733	0,13682	2887,136	18,45	2699,6	18	2807,4	8,75	3423,6	178,14	96,00682	14,87733	0,13682	0,5201	0,00424	0,88645	-3,83985	
4.sSMPABC108	204049	40864	0,503783773	0,19613	0,00247	0,49807	0,00394	13,4425	0,13609	2794,26	20,5	2605,5	16,97	2711,3	9,57	2321,5	155,27	95,93936	13,4425	0,13609	0,49807	0,00394	0,781375	-3,90219	
4.sSMPABC038	69253	13857	0,317243672	0,20108	0,0023	0,49982	0,00417	13,84751	0,12731	2834,982	18,51	2613	17,91	2739,3	8,71	3363,9	137,08	95,16648	13,84751	0,12731	0,49982	0,00417	0,907469	-4,61067	

FILE NAME	CORRECTED	0																										
	Pb206*	Pb207*	Th/U	207/206	1s	206/238	1s	207/235	1s	206/207		206/238		207/235		208/232		Conc	207/235		206/238		RHO	Disc.				
4.sSMPABC062	143142,703	26968,25	0,293826676	0,18999	0,00247	0,47439	0,00418	12,41101	0,13486	2742,075	21,2	2502,8	18,26	2636	10,21	3114,6	219,44	94,67796	12,41101	0,13486	0,47439	0,00418	0,810895	-5,05311				
4.sSMPABC098	133790,8604	27264,61	0,353744602	0,20367	0,00273	0,49601	0,00417	13,9176	0,15321	2855,834	21,68	2596,6	17,96	2744,1	10,43	2413,2	169,06	94,31949	13,9176	0,15321	0,49601	0,00417	0,7637	-5,37517				
4.sSMPABC097	220828,2164	60596,28	0,197309368	0,27439	0,00347	0,60368	0,00504	22,81018	0,23788	3331,292	19,68	3044,7	20,26	3218,9	10,14	5375,3	386,16	94,27858	22,81018	0,23788	0,60368	0,00504	0,800561	-5,41179				
4.sSMPABC099	152299	32973	0,507037205	0,21821	0,00315	0,51254	0,0045	15,40248	0,18595	2967,53	23,09	2667,4	19,2	2840,5	11,51	2799,4	235,7	93,51053	15,40248	0,18595	0,51254	0,0045	0,727242	-6,094				
4.sSMPABC065	121185,6263	23449,19	0,515356791	0,19257	0,0024	0,46696	0,0038	12,37696	0,12332	2764,236	20,3	2470,2	16,71	2633,4	9,36	2543,3	169,38	93,39325	12,37696	0,12332	0,46696	0,0038	0,816741	-6,19731				
4.sSMPABC110	248731,4935	50269,86	0,285424315	0,19843	0,00248	0,47581	0,00371	12,99405	0,12959	2813,326	20,28	2509	16,2	2679,2	9,4	2155,2	135,96	93,21642	12,99405	0,12959	0,47581	0,00371	0,781832	-6,35264				
4.sSMPABC020	156966	30917	0,550400729	0,19958	0,00255	0,46555	0,00412	12,8018	0,13595	2822,765	20,68	2464	18,14	2665,2	10	3446,2	249,69	91,83442	12,8018	0,13595	0,46555	0,00412	0,833341	-7,54915				
4.sSMPABC109	290757	62127	0,288534452	0,21136	0,00251	0,48443	0,00403	14,10315	0,13923	2916,002	19,13	2546,5	17,5	2756,7	9,36	2960,4	158,02	91,74553	14,10315	0,13923	0,48443	0,00403	0,84267	-7,62506				
4.sSMPABC082	77204	15132	0,350979735	0,19416	0,0023	0,45021	0,0036	12,03688	0,11243	2777,724	19,3	2396,2	16	2607,3	8,76	2475,6	135,72	91,19022	12,03688	0,11243	0,45021	0,0036	0,856089	-8,0965				
4.sSMPABC026	171783	46265	0,358574265	0,27022	0,0032	0,56053	0,00438	20,88118	0,19178	3307,302	18,43	2868,8	18,09	3133,1	8,9	4227,4	383,91	90,78709	20,88118	0,19178	0,56053	0,00438	0,850799	-8,43573				
4.sSMPABC073	164520	33114	0,115785161	0,19686	0,0028	0,44766	0,00382	12,139	0,1436	2800,339	23,08	2384,8	17	2615,2	11,1	2696,4	324,98	90,33881	12,139	0,1436	0,44766	0,00382	0,721346	-8,81003				
4.sSMPABC131	225381,5621	54398,4	0,410184507	0,23776	0,00273	0,50612	0,00422	16,57837	0,1587	3105,037	18,2	2640	18,06	2910,8	9,17	1840,6	85,1	89,74242	16,57837	0,1587	0,50612	0,00422	0,871011	-9,30328				
4.sSMPABC031	60309,2071	12085,8	0,293407162	0,20164	0,00245	0,44941	0,00378	12,47973	0,12107	2839,517	19,66	2392,6	16,8	2641,2	9,12	3686,1	219,29	89,60963	12,47973	0,12107	0,44941	0,00378	0,866997	-9,41239				
4.sSMPABC078	61242,35803	13619,57	0,183356826	0,22018	0,00292	0,46983	0,00409	14,24212	0,15396	2982,008	21,22	2482,8	17,95	2766	10,26	1897,3	131,31	88,59352	14,24212	0,15396	0,46983	0,00409	0,805284	-10,2386				
4.sSMPABC079	145055	27536	0,810958459	0,18766	0,00224	0,41251	0,00363	10,66388	0,10811	2721,762	19,56	2226,4	16,55	2494,3	9,41	1205,6	56,04	87,96712	10,66388	0,10811	0,41251	0,00363	0,868004	-10,7405				
4.sSMPABC095	27691,22624	8725,346	0,353837487	0,30001	0,00488	0,56561	0,00633	23,36662	0,32815	3470,275	24,99	2889,8	26,05	3242,3	13,67	3921,1	414,45	87,80192	23,36662	0,32815	0,56561	0,00633	0,796912	-10,8719				
4.sSMPABC132	207808,2648	51058,53	0,323906266	0,24445	0,00349	0,49689	0,00444	16,71372	0,2047	3149,173	22,51	2600,4	19,11	2918,6	11,73	2193	186,01	87,76342	16,71372	0,2047	0,49689	0,00444	0,729589	-10,9025				
4.sSMPABC101	153832	32024	0,585196426	0,20572	0,00248	0,43985	0,00342	12,45873	0,11805	2872,125	19,44	2350	15,31	2639,6	8,91	1030,9	63,27	87,6766	12,45873	0,11805	0,43985	0,00342	0,820596	-10,9714				
4.sSMPABC149	183441	38440	0,305088449	0,20329	0,00317	0,43092	0,00419	12,06366	0,16558	2852,794	25,19	2309,9	18,87	2609,4	12,87	986,9	78,78	87,03407	12,06366	0,16558	0,43092	0,00419	0,708416	-11,4777				
4.sSMPABC084	316836,317	76721,66	0,013899012	0,2374	0,00287	0,47799	0,00428	15,61952	0,16483	3102,622	19,17	2518,5	18,69	2853,8	10,07	1028,7	67,44	86,68652	15,61952	0,16483	0,47799	0,00428	0,848509	-11,7492				
4.sSMPABC036	206802,2389	41505,65	0,503753506	0,20179	0,00217	0,42108	0,00319	11,70445	0,09578	2840,729	17,43	2265,4	14,46	2581,1	7,66	2814,9	128,34	86,06427	11,70445	0,09578	0,42108	0,00319	0,925768	-12,2312				
4.sSMPABC136	164596,5274	33380,45	0,402193255	0,2022	0,00307	0,42073	0,00364	11,72355	0,14885	2844,037	24,49	2263,8	16,52	2582,6	11,88	1778,5	143,27	85,91748	11,72355	0,14885	0,42073	0,00364	0,68141	-12,3441				
4.sSMPABC144	137208	27043	0,294628825	0,20079	0,00748	0,40756	0,00704	11,22153	0,40273	2832,629	59,5	2203,8	32,25	2541,7	33,46	2232,9	871,04	84,66739	11,22153	0,40273	0,40756	0,00704	0,481304	-13,2943				
4.sSMPABC092	129419	27076	0,41436174	0,20466	0,00273	0,39418	0,00324	11,11178	0,12065	2863,725	21,57	2142,2	14,97	2532,5	10,11	2325	200,93	81,78041	11,11178	0,12065	0,39418	0,00324	0,757019	-15,4116				
4.sSMPABC043	70739	14211	0,418793538	0,20175	0,00284	0,38545	0,00367	10,7145	0,12593	2840,406	22,74	2101,7	17,07	2498,7	10,92	3502,5	304,22	81,11053	10,7145	0,12593	0,38545	0,00367	0,810104	-15,8883				
4.sSMPABC112	276080,3683	46151,17	0,231575031	0,1637	0,00197	0,31032	0,00268	6,99672	0,07166	2494,24	20,08	1742,3	13,2	2111	9,1	1338	64,54	78,83832	6,99672	0,07166	0,31032	0,00268	0,843224	-17,4657				
4.sSMPABC034	85006	16978	0,19498879	0,20131	0,00243	0,36636	0,00297	10,15593	0,09606	2836,847	19,55	2012,2	13,99	2449,1	8,74	3988	274,97	78,28745	10,15593	0,09606	0,36636	0,00297	0,857088	-17,8392				
4.sSMPABC123	184531,4943	44231,67	0,521434561	0,23604	0,00271	0,41182	0,00346	13,39053	0,12831	3093,463	18,19	2223,3	15,8	2707,6	9,05	1780,6	80,23	78,21706	13,39053	0,12831	0,41182	0,00346	0,876811	-17,8867				
4.sSMPABC070	151093,3812	29030,46	0,328926099	0,19221	0,00212	0,35068	0,00268	9,28235	0,07901	2761,164	18,03	1937,8	12,81	2366,3	7,8	2148,3	101,47	77,88729	9,28235	0,07901	0,35068	0,00268	0,897841	-18,1084				
4.sSMPABC047	191393,0195	39895,02	0,344443477	0,20912	0,00234	0,36608	0,00278	10,54285	0,09027	2898,738	18,06	2010,9	13,11	2483,7	7,94	2554,4	149,17	76,48814	10,54285	0,09027	0,36608	0,00278	0,886918	-19,0361				
4.sSMPABC037	198716,0222	37251,17	0,171623147	0,18951	0,00219	0,33665	0,00259	8,78398	0,0785	2737,914	18,91	1870,6	12,47	2315,8	8,15	2648,1	184	76,20015	8,78398	0,0785	0,33665	0,00259	0,86088	-19,2245				
4.sSMPABC048	189228	40122	0,188158322	0,21228	0,00244	0,36802	0,00283	10,75545	0,09557	2923,032	18,51	2020,1	13,34	2502,2	8,25	2607,5	162,1	76,13484	10,75545	0,09557	0,36802	0,00283	0,86541	-19,267				
4.sSMPABC148	144051	27111	0,478978271	0,18626	0,00275	0,32928	0,00299	8,44035	0,10736	2709,416	24,15	1834,9	14,52	2279,5	11,55	1488	131,1	75,7698	8,44035	0,10736	0,32928	0,00299	0,713878	-19,5043				
4.sSMPABC064	173977,8934	35131,38	0,36265507	0,20167	0,00226	0,34389	0,00263	9,54958	0,08213	2839,759	18,12	1905,4	12,6	2392,3	7,9	1922	98,78	74,44631	9,54958	0,08213	0,34389	0,00263	0,889239	-20,3528				
4.sSMPABC143	289936	64163	0,510314334	0,21703	0,00242	0,36006	0,00282	10,7638	0,09584	2958,786	17,9	1982,5	13,37	2502,9	8,27	1331,4	60,48	73,75032	10,7638	0,09584	0,36006	0,00282	0,879616	-20,7919				
4.sSMPABC046	223623	53432	0,275910089	0,23912	0,00253	0,37565	0,0029	12,37285	0,10112	3114,122	16,75	2056	13,58	2633,1	7,68	1685,9	66,1	71,93093	12,37285	0,10112	0,37565	0,0029	0,944599	-21,9171				
4.sSMPABC119	194311	44075	0,201771687	0,22024	0,00298	0,35172	0,00283	10,67023	0,11811	2982,446	21,63	1942,8	13,49	2494,8	10,28	1564	133,59	71,5874	10,67023	0,11811	0,35172	0,00283	0,726903	-22,126				
4.sSMPABC140	136927	34592	0,563967108	0,24803	0,00285	0,36887	0,00287	12,60092	0,11427	3172,235	18,09	2024,1	13,52	2650,3	8,53	1036,1	53,04	69,06279	12,60092	0,11427	0,36887	0,00287	0,857983	-23,6275				
4.sSMPABC111	132829,0956	20433,25	0,227768102	0,15345	0,00217	0,24104	0,00206	5,09338	0,05996	2384,731	23,92	1392,1	10,7	1835	9,99	1523,8	125,28	68,18476	5,09338	0,05996	0,24104	0,00206	0,725976	-24,1362				
4.sSMPABC120	146823	32028	0,127436001	0,21083	0,00298	0,32114	0,00267	9,32583	0,1086	2911,936	22,69	1795,3	13,03	2370,6	10,68	1242,9	114,44	67,95522	9,32583	0,1086	0,32114	0,00267	0,713961	-24,2681				
4.sSMPABC146	191518	34842	0,368124927	0,18103	0,00307	0,28043	0,00258	6,99096	0,10125	2662,329	27,78	1593,5	13,01	2110,3	12,87	1584,1	201,57	67,56825	6,99096	0,10125	0,28043	0,00258	0,635239	-24,4894				
4.sSMPABC126	68080	13871	0,259675797	0,20009	0,00233	0,30388	0,00245	8,37344	0,07794	2826,931	18,91	1710,5	12,11	2272,3	8,44	2111,7	98,19	67,1558	8,37344	0,07794	0,30388	0,00245	0,866179	-24,7238				
4.sSMPABC074	74808	16125	0,33271048	0,21441	0,00238	0,31477	0,0025	9,29543	0,08074	2939,177	17,8	1764,1	12,27	2367,6	7,96	2424,7	98,6	65,78992	9,29543	0,08074	0,31477	0,0025	0,914381	-25,4899				
4.sSMPABC147	250342	43319	0,454230471	0,17046	0,00254	0,25703	0,00243	6,03168	0,0797	2562,165	24,68	1474,6	12,49	1980,4	11,51	916,8	64,46	65,69917	6,03168	0,0797	0,25703	0,00243	0,715488	-25,5403				
4.sSMPABC115	663687,8001	92195,63	0,194142677	0,137	0,00156	0,1992	0,0016	3,75957	0,03483	2189,62	19,62	1171	8,6	1584,2	7,43	765,5	41,55	64,71392	3,75957	0,03483	0,1992	0,0016	0,866993	-26,0826				
4.sSMPABC103	173182,3292	33033,56	0,357776875	0,19067	0,00232	0,2774	0,00226	7,28384	0,07204	2747,949	19,88	1578,2	11,39	2146,8	8,83	1379,3	86,12	63,97161	7,28384	0,07204	0,2774	0,00226	0,823737	-26,4859				
4.sSMPABC083	277234	61482	0,043970121	0,21812	0,00252	0,30304	0,00261	9,10404	0,08906	2966,865	18,48	1706,4	12,91	2348,5	8,95	555,1	27,24	62,37107	9,10404	0,08906	0,30304	0,00261	0,880424	-27,3409				
4.sSMPABC122	313050,638	63891,63	0,177235577	0,20156	0,00231	0,27929	0,00228	7,75538	0,07294	2838,87	18,56	1587,8	11,48	2203	8,46	1322,5	66,92	61,25457	7,75538	0,07294	0,27929	0,00228	0,867994	-27,9256				
4.sSMPABC014	283750	56476	0,083467191	0,20452	0,00263	0,2783	0,00241	7,84455	0,08397	2862,612	20,8	1582,8	12,14	2213,3	9,64	5612,1	392,06	60,16553	7,84455	0,08397	0,2783	0,00241	0,808999	-28,4869				
4.sSMPABC128	157662,0491	29380,51	0,900532252	0,18503	0,00223	0,25413	0,00205	6,47746	0,06333	2698,48	19,81	1459,8	10,52	2042,8	8,6	536,3	31,53	60,06302	6,47746	0,06333	0,25413	0,00205	0,825075	-28,5393				
4.sSMPABC117	134642	19093	0,057354064	0,14042	0,00163	0,1872	0,00151	3,62163	0,03407	2232,394	19,98	1106,2	8,18	1554,3	7,48	1670,4	81,5	59,49195	3,62163	0,03407	0,1872	0,00151	0,857439	-28,8297				
4.sSMPABC138	210038,9733	30890,4	0,327706303	0,14575	0,00186	0,19587	0,00161	3,93228	0,04152	2296,65	21,77	1153,1	8,69	1620,4	8,55	1252,3	89,23	59,47446	3,93228	0,04152	0,19587	0,00161	0,778476	-28,8386				
4.sSMPABC116	444571,5747	70983,52	0,187976123	0,15721	0,00176	0,21281	0,00162	4,6072	0,04023	2425,872	18,85	1243,8	8,6	1750,6	7,29	1549,2	77,36	59,2539	4,6072	0,04023	0,21281	0,00162	0,871786	-28,9501				
4.sSMPABC141	98932	24632	0,487678975	0,24611	0,00354	0,31725	0,00276	10,75793	0,12827	3159,914	22,62	1776,3	13,5	2502,4	11,08	1030,5	80,63	59,1229	10,75793	0,12827	0,31725	0,00276	0,729644	-29,0161				
4.sSMPABC056	186555,9987	46444,48	0,087798133	0,24767	0,00297	0,3128	0,00242	10,67307	0,09973	3169,933	18,89	1754,5	11,89	2495,1	8,68	2740,3	226,32	57,78854	10,67307	0,09973	0,3128	0,00242	0,827965	-29,6822				
4.sSMPABC114	529175,6568	92116,06	0,163755058	0,17265	0,00221	0,22533	0,00197	5,35883	0,05903	2583,5	21,18	1310	10,38	1878,3	9,43	1604,3	91,35	56,61832	5,35883	0,05903	0,22533	0,00197	0,793678	-30,2561				
4.sSMPABC013	625440	131703	0,108092401	0,20094	0,00266	0,25291	0,00237	6,96441	0,08182	2833,847	21,41	1453,5	12,17	2106,9	10,43	3827,8	228,91	55,04644	6,96441	0,08182	0,25291	0,00237	0,797641	-31,0124				
4.sSMPABC066	88128	13232	0,705127873	0,14964	0,00178	0,17919	0,00139	3,69283	0,03411	2341,816	20,24	1062,6	7,58	1569,8	7,38	456,6	28,1	52,26802	3,69283	0,03411	0,17919	0,00139	0,839805	-32,3098				
4.sSMPABC139	153287,4641	30148,04	0,131378102	0,19234	0,00219	0,23352	0,00182	6,18671	0,05567	2762,274	18,56	1352,9	9,49	2002,6	7,87	758,6	38,13	51,97723	6,18671	0,05567	0,23352	0,00182	0,866136	-32,4428				
4.sSMPABC142	232293,8836	49629,22	1,184143363	0,20256	0,00414	0,24287	0,00245	6,74742	0,11947	2846,935	32,91	1401,6	12,7	2078,9	15,66	904,7	163,16	51,67666	6,74742	0,11947	0,24287	0,00245	0,569733	-32,5797				
4.sSMPABC012	398319,3332	61582,97	0,208439802	0,15456	0,00161	0,18415	0,00146	3,91962	0,03245	2396,999	17,64	1089,6	7,94	1617,7	6,7	1197,4	36,87	51,53267	3,91962	0,03245	0,18415	0,00146	0,957658	-32,6451				
4.sSMPABC150	261361,763	39682,02	0,491316835	0,14942	0,00221	0,17217	0,00162	3,54196	0,04652	2339,299	25,13	1024,1	8,91	1536,6	10,4	806,7	56,29	49,95606	3,54196	0,04652	0,17217	0,00162	0,71641	-33,3529				
4.sSMPABC032	101683,4728	19942,22	0,295594612	0,19738	0,00213	0,22381	0,00177	6,08399	0,05117	2804,654	17,56	1302	9,31	1988	7,33	1785	61,91	47,31183	6,08399	0,05117	0,22381	0,00177	0,940301	-34,507				
4.sSMPABC137	279503,7851	44604,42	0,28619943	0,157	0,00199	0,1666	0,00143	3,60334	0,03887	2423,605	21,4	993,3	7,89	1550,3	8,57	958,5	63,16	43,92429	3,60334	0,03887	0,1666	0,00143	0,795704	-35,9285				
4.sSMPABC129	185459,1722	55604,15	0,498963192	0,28864	0,00711	0,2781	0,00352	11,041	0,24916	3410,298	37,79	1581,8	17,77	2526,6	21,01	0	0	40,27058	11,041	0,24916	0,2781	0,00352	0,560882	-37,3941				
4.sSMPABC045	71989	12659	0,279849084	0,1805	0,00349	0,16968	0,00191	4,21662	0,06975	2657,47	31,74	1010,4	10,53	1677,3	13,58	1116	182,84	33,99644	4,21662	0,06975	0,16968	0,00191	0,680492	-39,7603				
4.sSMPABC135	26478	4663	0,224351304	0,17593	0,00747	0,16188	0,00368	3,91673	0,1468	2614,872	68,98	967,2	20,43	1617,1	30,32	1324,5	396,84	32,80604	3,91673	0,1468	0,16188	0,00368	0,60653	-40,1892				
4.sSMPABC113	400591,967	152391	0,282447171	0,34962	0,00375	0,24997	0,00193	12,03776	0,10159	3705,343	16,26	1438,3	9,97	2607,4	7,91	2634,2	104,74	18,71654	12,03776	0,10159	0,24997	0,00193	0,91488	-44,8378				
4.sSMPABC130	281039,7368	57490,87	0,239979428	0,20119	0,00229	0,12924	0,00098	3,5813	0,03183	2835,874	18,41	783,5	5,62	1545,4	7,05	685,8	36,41	2,75686	3,5813	0,03183	0,12924	0,00098	0,853165	-49,3012				
4.sSMPABC118	91676,7447	14493,29	0,169847165	0,15803	0,00214	0,07716	0,00062	1,67978	0,01839	2434,691	22,75	479,1	3,71	1000,9	6,97	1044,4	77,96	-8,91254	1,67978	0,01839	0,07716	0,00062	0,733956	-52,1331				

FILE NAME	CORRECTED	0																								
	Pb206*	Pb207*	Th/U	207/206	1s	206/238	1s	207/235	1s	206/207		206/238		207/235		208/232		Conc	207/235		206/238		RHO	Disc.		
Padrões Primários																										
4.sSMPABC001	41157,41397	2275,677	0,011107	0,06056	0,00074	0,10046	0,00077	0,83838	0,00814	623,643	26,05	617,1	4,51	618,3	4,49	630,2	26,87	99,80554	0,83838	0,00814	0,10046	0,00077	0,789431	-0,19408		
4.sSMPABC002	51999,69209	3032,253	0,010906	0,06037	0,00072	0,09754	0,00074	0,81158	0,00763	616,862	25,54	600	4,34	603,3	4,28	666,8	23,99	99,45	0,81158	0,00763	0,09754	0,00074	0,806967	-0,54699		
4.sSMPABC003	59738,79336	3710,527	0,010921	0,06023	0,00071	0,09935	0,00075	0,82464	0,00759	611,848	25,13	610,6	4,41	610,6	4,22	621,8	23,02	100	0,82464	0,00759	0,09935	0,00075	0,820193	0		
4.sSMPABC006	61049	3683	0,01079	0,06073	0,00071	0,09745	0,00074	0,8157	0,00745	629,685	24,93	599,5	4,33	605,6	4,17	611	21,26	98,98249	0,8157	0,00745	0,09745	0,00074	0,831427	-1,00727		
4.sSMPABC020	62759,49373	3562,469	0,010274	0,05991	0,0007	0,09781	0,00074	0,8076	0,00735	600,326	24,95	601,6	4,35	601,1	4,13	513,3	21,57	100,0831	0,8076	0,00735	0,09781	0,00074	0,831299	0,083181		
4.sSMPABC021	63219,07409	3701,083	0,010121	0,06003	0,0007	0,09612	0,00073	0,79523	0,00723	604,656	24,88	591,6	4,29	594,1	4,09	595,1	23,01	99,57742	0,79523	0,00723	0,09612	0,00073	0,835341	-0,4208		
4.sSMPABC034	69966	4210	0,01036	0,06051	0,0007	0,09689	0,00074	0,80807	0,00728	621,861	24,59	596,2	4,33	601,4	4,09	562,3	20,75	99,12781	0,80807	0,00728	0,09689	0,00074	0,847755	-0,86465		
4.sSMPABC035	71805	4222	0,010172	0,05909	0,00069	0,09807	0,00074	0,79873	0,0073	570,414	24,63	603,1	4,34	596,1	4,12	586,3	24,05	101,1607	0,79873	0,0073	0,09807	0,00074	0,825606	1,1743		
4.sSMPABC050	78488	4653	0,01043	0,05959	0,00068	0,10004	0,00076	0,82163	0,00741	588,719	24,64	614,6	4,48	609	4,13	547,2	20,97	100,9112	0,82163	0,00741	0,10004	0,00076	0,84236	0,91954		
4.sSMPABC051	74727	4485	0,010077	0,06032	0,00069	0,09713	0,00074	0,8075	0,00724	615,073	24,46	597,6	4,36	601,1	4,07	857,3	25,19	99,41432	0,8075	0,00724	0,09713	0,00074	0,849733	-0,58227		
4.sSMPABC066	79029	4689	0,0097	0,05958	0,00068	0,09783	0,00075	0,80339	0,00725	588,355	24,6	601,7	4,41	598,7	4,08	614,1	21,82	100,4986	0,80339	0,00725	0,09783	0,00075	0,849528	0,501086		
4.sSMPABC067	76778,76233	4655,943	0,009967	0,0611	0,0007	0,0961	0,00073	0,8092	0,00728	642,756	24,4	591,5	4,32	602	4,09	589,1	21,82	98,22485	0,8092	0,00728	0,0961	0,00073	0,844353	-1,74419		
4.sSMPABC080	68414,08073	3826,984	0,009891	0,0601	0,0007	0,09711	0,00075	0,80443	0,00742	607,177	24,96	597,4	4,39	599,3	4,18	587,7	23,19	99,68196	0,80443	0,00742	0,09711	0,00075	0,837301	-0,31704		
4.sSMPABC081	76903	4606	0,010018	0,06015	0,00069	0,09639	0,00074	0,79909	0,00727	608,975	24,67	593,2	4,35	596,3	4,1	608	21,6	99,47741	0,79909	0,00727	0,09639	0,00074	0,843842	-0,51987		
4.sSMPABC099	69723,80566	3692,309	0,010175	0,06054	0,0007	0,09785	0,00076	0,81639	0,00757	622,93	24,83	601,8	4,46	606	4,23	660,2	23,74	99,30209	0,81639	0,00757	0,09785	0,00076	0,837635	-0,69307		
4.sSMPABC100	64511	3863	0,010295	0,05993	0,00074	0,09596	0,00074	0,7926	0,00781	601,048	26,37	590,7	4,34	592,6	4,42	618,5	27,66	99,67835	0,7926	0,00781	0,09596	0,00074	0,782608	-0,32062		
4.sSMPABC117	72983,16861	4034,74	0,009797	0,06048	0,0007	0,098	0,00077	0,81693	0,00766	620,791	24,95	602,7	4,5	606,3	4,28	643,8	24,7	99,40269	0,81693	0,00766	0,098	0,00077	0,837955	-0,59377		
4.sSMPABC118	73832,70416	3968,233	0,009735	0,05922	0,00069	0,09764	0,00076	0,79694	0,00747	575,193	25,11	600,6	4,49	595,1	4,22	467,3	23,89	100,9158	0,79694	0,00747	0,09764	0,00076	0,830407	0,924214		
4.sSMPABC136	75201,48878	4171,439	0,009863	0,06071	0,00071	0,09741	0,00077	0,81513	0,00773	628,975	25,03	599,2	4,51	605,3	4,32	638,4	23,8	98,98198	0,81513	0,00773	0,09741	0,00077	0,833556	-1,00776		
4.sSMPABC137	72625,82929	4085,073	0,009542	0,06012	0,00071	0,09752	0,00077	0,80804	0,00772	607,896	25,23	599,9	4,52	601,4	4,33	652,8	26,01	99,74996	0,80804	0,00772	0,09752	0,00077	0,826442	-0,24942		
4.sSMPABC153	76256	4544	0,009729	0,05972	0,00071	0,09953	0,00079	0,8192	0,00793	593,445	25,3	611,7	4,64	607,6	4,43	576,6	24,24	100,6703	0,8192	0,00793	0,09953	0,00079	0,819955	0,674786		
4.sSMPABC154	74149,35025	4092,416	0,009344	0,0602	0,00071	0,09822	0,00078	0,81485	0,00788	610,771	25,36	603,9	4,58	605,2	4,41	612,3	25,49	99,78473	0,81485	0,00788	0,09822	0,00078	0,821195	-0,21481		
Padrões Secundários																										
4.sSMPABC004	66229,71892	4166,648	0,079372	0,06082	0,00084	0,08801	0,00069	0,73758	0,00839	632,874	29,6	543,8	4,1	561	4,9	493,9	13,04	96,83707	0,73758	0,00839	0,08801	0,00069	0,68923	-3,06595		
4.sSMPABC005	80035,4569	4652,206	0,076164	0,05852	0,00066	0,09002	0,00067	0,7261	0,00639	549,285	24,61	555,7	3,99	554,3	3,76	448,5	7,47	100,2519	0,7261	0,00639	0,09002	0,00067	0,845729	0,252571		
4.sSMPABC008	77075,85127	4199,105	0,077358	0,05582	0,00076	0,0899	0,0007	0,6916	0,00778	445,216	29,71	555	4,14	533,8	4,67	409,2	11,09	103,8198	0,6916	0,00778	0,0899	0,0007	0,692172	3,971525		
4.sSMPABC009	81856,48441	4567,042	0,075259	0,0592	0,00067	0,08941	0,00067	0,72945	0,00638	574,459	24,38	552	3,97	556,2	3,75	461,2	7,6	99,23913	0,72945	0,00638	0,08941	0,00067	0,856769	-0,75512		
4.sSMPABC022	88412,07342	5075,816	0,075785	0,05863	0,00066	0,0902	0,00068	0,72884	0,00636	553,384	24,37	556,7	4,01	555,9	3,73	452,3	7,46	100,1437	0,72884	0,00636	0,0902	0,00068	0,863928	0,143911		
4.sSMPABC023	86316,67006	5002,947	0,076429	0,05816	0,00065	0,08945	0,00068	0,71707	0,00626	535,794	24,94	552,3	4	548,9	3,7	453	7,29	100,6156	0,71707	0,00626	0,08945	0,00068	0,870795	0,619421		
4.sSMPABC036	92808	5348	0,076714	0,05787	0,00067	0,08933	0,00068	0,71248	0,00653	524,844	25,63	551,5	4	546,2	3,87	454,6	8,76	100,961	0,71248	0,00653	0,08933	0,00068	0,83056	0,970341		
4.sSMPABC037	99430,04419	6046,635	0,075034	0,05866	0,00065	0,09039	0,00069	0,73089	0,00631	554,5	24,03	557,9	4,05	557,1	3,7	459,6	7,36	100,1434	0,73089	0,00631	0,09039	0,00069	0,884202	0,143601		
4.sSMPABC052	98272	5594	0,075188	0,05692	0,00082	0,08789	0,00073	0,68926	0,0085	488,435	32,05	543	4,35	532,4	5,11	520,3	17,88	101,9521	0,68926	0,0085	0,08789	0,00073	0,673515	1,990984		
4.sSMPABC053	117943,8208	6722,335	0,071927	0,05687	0,00067	0,0893	0,00071	0,6999	0,00674	486,496	26,1	551,4	4,22	538,7	4,02	501,7	10,57	102,3032	0,6999	0,00674	0,0893	0,00071	0,825625	2,357527		
4.sSMPABC068	102649,5025	5965,126	0,073822	0,05915	0,00069	0,08869	0,0007	0,72299	0,00681	572,621	25,16	547,8	4,14	552,4	4,01	472,8	9,98	99,16028	0,72299	0,00681	0,08869	0,0007	0,837932	-0,83273		
4.sSMPABC069	93623,06929	5561,861	0,075858	0,05749	0,00073	0,08768	0,00069	0,6947	0,00715	510,38	27,33	541,8	4,07	535,6	4,28	441,7	11,63	101,1443	0,6947	0,00715	0,08768	0,00069	0,76461	1,15758		
4.sSMPABC082	86423	5012	0,076032	0,05791	0,0008	0,08608	0,00069	0,68703	0,00787	526,359	30,16	532,3	4,11	531	4,74	423,1	13,69	100,2442	0,68703	0,00787	0,08608	0,00069	0,699758	0,244821		
4.sSMPABC083	95625	5683	0,075708	0,05955	0,00073	0,0878	0,00069	0,72059	0,00719	587,263	26,47	542,5	4,09	551	4,25	445,3	11,53	98,43318	0,72059	0,00719	0,0878	0,00069	0,787615	-1,54265		
4.sSMPABC101	100682,8968	6113,964	0,073296	0,05853	0,00066	0,08956	0,00069	0,72253	0,00651	549,658	24,6	553	4,09	552,2	3,84	476,5	10,2	100,1447	0,72253	0,00651	0,08956	0,00069	0,855086	0,144875		
4.sSMPABC102	65938,17065	2957,047	0,078823	0,05852	0,00078	0,08809	0,00068	0,7104	0,00775	549,285	28,94	544,2	4,04	545	4,6	438,5	14,81	99,853	0,7104	0,00775	0,08809	0,00068	0,707593	-0,14679		
4.sSMPABC119	87288	5189	0,074299	0,05949	0,00076	0,08926	0,00069	0,73192	0,00754	585,075	27,45	551,2	4,06	557,7	4,42	453	14,81	98,82075	0,73192	0,00754	0,08926	0,00069	0,750386	-1,1655		
4.sSMPABC120	104710	6098	0,073341	0,0584	0,00067	0,08924	0,00069	0,71834	0,00653	544,801	24,73	551	4,1	549,7	3,86	463,7	10,92	100,2359	0,71834	0,00653	0,08924	0,00069	0,850563	0,236493		
Amostras																										
4.sSMPABC091	101391,9336	29019,56	0,349398	-6,79025	415,492	0	0	0	0	#NÚM!	7999,9	0	0	0	0	#NOME?	NaN	#DIV/0!	0	0	0	0	#DIV/0!	#DIV/0!		
4.sSMPABC058	135523	26088	0,39786	0,19409	0,00221	0,54725	0,00449	14,63567	0,13352	2777,13	18,57	2813,7	18,71	2791,9	8,67	2264,6	51,47	100,7748	14,63567	0,13352	0,54725	0,00449	0,899346	0,78083		
4.sSMPABC017	93727	18433	0,339331	0,19755	0,00216	0,55325	0,00421	15,06362	0,12321	2806,06	17,72	2838,7	17,47	2819,3	7,79	2157,1	35,69	100,6834	15,06362	0,12321	0,55325	0,00421	0,930345	0,688114		
4.sSMPABC046	74356,2287	14135,99	0,380581	0,1933	0,00238	0,54397	0,00444	14,48639	0,13934	2770,44	20,06	2800,1	18,56	2782,1	9,14	2034,7	55,63	100,6428	14,48639	0,13934	0,54397	0,00444	0,848579	0,646993		
4.sSMPABC088	109564,7353	23142,21	0,298283	0,21148	0,0025	0,57952	0,00519	16,89279	0,16973	2916,92	18,97	2946,8	21,18	2928,8	9,63	2174,8	54,9	100,6108	16,89279	0,16973	0,57952	0,00519	0,891337	0,614586		
4.sSMPABC064	112716	22023	0,599014	0,1954	0,00221	0,54647	0,00427	14,71626	0,12828	2788,15	18,4	2810,5	17,8	2797,1	8,29	2096,3	46,16	100,4768	14,71626	0,12828	0,54647	0,00427	0,896396	0,479068		
4.sSMPABC042	248177	53734	0,300864	0,21686	0,00225	0,5877	0,00452	17,56659	0,14017	2957,52	16,67	2980,1	18,35	2966,3	7,67	2148,8	28,78	100,4631	17,56659	0,14017	0,5877	0,00452	0,963863	0,465226		
4.sSMPABC093	214256,2342	39292,52	0,369361	0,18383	0,00221	0,52233	0,00466	13,23497	0,13698	2687,73	19,71	2709	19,74	2696,6	9,77	1591,6	48,11	100,4577	13,23497	0,13698	0,52233	0,00466	0,861999	0,459838		
4.sSMPABC131	127209,9275	20943,06	0,317686	0,16733	0,00292	0,48497	0,00469	11,16905	0,16968	2531,11	28,95	2548,9	20,37	2537,3	14,16	1648,9	124,07	100,4551	11,16905	0,16968	0,48497	0,00469	0,636566	0,457179		
4.sSMPABC079	71980	9688	0,135984	0,13504	0,00193	0,40227	0,00353	7,48356	0,08851	2164,53	24,74	2179,5	16,23	2171	10,59	1717,8	76,12	100,39	7,48356	0,08851	0,40227	0,00353	0,741947	0,391525		
4.sSMPABC086	153356	39325	0,326537	0,25869	0,00304	0,65361	0,00561	23,3014	0,22621	3238,75	18,4	3242,3	21,86	3239,6	9,45	2637,4	75,4	100,0833	23,3014	0,22621	0,65361	0,00561	0,884126	0,083344		
4.sSMPABC016	132805	26115	0,624184	0,19969	0,00237	0,54897	0,00423	15,10128	0,13556	2823,66	19,24	2820,9	17,6	2821,6	8,55	1889,9	47,85	99,97519	15,10128	0,13556	0,54897	0,00423	0,858369	-0,02481		
4.sSMPABC115	275339	53973	0,170286	0,19576	0,00235	0,54004	0,00481	14,57073	0,15206	2791,17	19,52	2783,6	20,15	2787,6	9,92	1346,4	45,69	99,8563	14,57073	0,15206	0,54004	0,00481	0,853465	-0,14349		
4.sSMPABC018	59487,18219	11714,21	0,388417	0,19912	0,00237	0,54513	0,00444	14,957	0,1379	2819	19,34	2804,9	18,51	2812,5	8,77	2083,6	44,69	99,72905	14,957	0,1379	0,54513	0,00444	0,883412	-0,27022		
4.sSMPABC010	88495,25734	13782,95	0,386079	0,1559	0,00178	0,4494	0,0035	9,65559	0,08467	2411,67	19,29	2392,6	15,59	2402,5	8,07	1743,4	33,44	99,58622	9,65559	0,08467	0,4494	0,0035	0,888146	-0,41207		
4.sSMPABC065	108844,3226	21227,95	0,599548	0,19657	0,00256	0,53826	0,00454	14,57728	0,15236	2797,93	21,12	2776,2	19,03	2788,1	9,93	1997,6	70,25	99,57136	14,57728	0,15236	0,53826	0,00454	0,806992	-0,42681		
4.sSMPABC070	86661	17543	0,297485	0,20358	0,00284	0,55163	0,00499	15,47293	0,17855	2855,11	22,56	2832	20,74	2844,8	11,01	2259,6	97,23	99,54802	15,47293	0,17855	0,55163	0,00499	0,783909	-0,44994		
4.sSMPABC124	101991	13248	0,511898	0,12806	0,00242	0,37457	0,00413	6,60637	0,11257	2071,51	32,98	2050,9	19,39	2060,2	15,03	878,3	60,85	99,54654	6,60637	0,11257	0,37457	0,00413	0,647079	-0,45141		
4.sSMPABC127	69772	9433	0,541837	0,13503	0,00176	0,39387	0,00337	7,32891	0,07914	2164,4	22,59	2140,7	15,58	2152,3	9,65	1617,4	55,13	99,45812	7,32891	0,07914	0,39387	0,00337	0,792356	-0,53896		
4.sSMPABC141	184596,7353	32397,94	0,318707	0,17652	0,0021	0,49462	0,00406	12,03139	0,1174	2620,44	19,64	2590,6	17,53	2606,9	9,15	1971,3	64,75	99,3708	12,03139	0,1174	0,49462	0,00406	0,841205	-0,62526		
4.sSMPABC032	69092	13640	0,358253	0,19975	0,00249	0,54218	0,00447	14,91956	0,14485	2824,15	20,2	2792,5	18,68	2810,1	9,24	2064,1	57,14	99,36974	14,91956	0,14485	0,54218	0,00447	0,849183	-0,62631		
4.sSMPABC040	136626,8904	27339,81	0,259392	0,20118	0,00232	0,54479	0,0042	15,10109	0,13251	2835,79	18,69	2803,5	17,51	2821,6	8,36	1935,6	47,94	99,35438	15,10109	0,13251	0,54479	0,0042	0,878577	-0,64148		
4.sSMPABC123	175059	22668	0,442007	0,13351	0,003	0,38766	0,00482	7,1218	0,14738	2144,64	38,79	2112	22,4	2126,8	18,43	1556,8	135,86	99,29924	7,1218	0,14738	0,38766	0,00482	0,600824	-0,69588		
4.sSMPABC038	115519,4466	23553,04	0,441811	0,20465	0,00221	0,54996	0,00417	15,5125	0,1259	2863,65	17,46	2825	17,35	2847,3	7,74	2043,1	34,38	99,21062	15,5125	0,1259	0,54996	0,00417	0,934246	-0,7832		
4.sSMPABC056	64285	12504	0,415528	0,19511	0,00256	0,52965	0,00473	14,23589	0,15221	2785,72	21,35	2740	19,92	2765,6	10,14	2037,5	61,86	99,06569	14,23589	0,15221	0,52965	0,00473	0,835244	-0,92566		
4.sSMPABC019	131643	25206	0,350794	0,19321	0,00225	0,52399	0,00403	13,94758	0,12301	2769,68	18,99	2716,1	17,05	2746,2	8,36	1894,1	44,39	98,89179	13,94758	0,12301	0,52399	0,00403	0,872048	-1,09606		
4.sSMPABC047	99405	19266	0,38616	0,19455	0,00211	0,52547	0,00403	14,08999	0,11598	2781,01	17,67	2722,3	17,03	2755,8	7,8	1975,9	33,42	98,76942	14,08999	0,11598	0,52547	0,00403	0,931718	-1,21562		
4.sSMPABC164	114668	16057	0,61943	0,13989	0,00173	0,39858	0,00327	7,68404	0,07833	2225,85	21,31	2162,5	15,08	2194,7	9,16	1024,1	38,09	98,51098	7,68404	0,07833	0,39858	0,00327	0,804811	-1,46717		
4.sSMPABC098	113385,9127	15444,79	0,369885	0,13673	0,00201	0,38868	0,00339	7,32195	0,08992	2186,19	25,3	2116,7	15,74	2151,5	10,97	1612,2	79,5	98,35593	7,32195	0,08992	0,38868	0,00339	0,710196	-1,61748		
4.sSMPABC024	163028	22437	0,130576	0,13794	0,00144	0,39197	0,00296	7,45243	0,05883	2201,5	18,04	2131,9	13,69	2167,3	7,07	1355,3	18,19	98,33951	7,45243	0,05883	0,39197	0,00296	0,956617	-1,63337		
4.sSMPABC054	20547,49633	2799,672	0,263397	0,14267	0,00184	0,38954	0,0034	7,66012	0,08042	2259,87	22,1	2120,7	15,76	2191,9	9,43	1636,1	35,87	96,64262	7,66012	0,08042	0,38954	0,0034	0,831378	-3,24832		
4.sSMPABC092	185851	39043	0,314641	0,20298	0,00282	0,51231	0,00514	14,32635	0,17811	2850,31	22,45	2666,5	21,92	2771,6	11,8	2042	73,83	96,0585	14,32635	0,17811	0,51231	0,00514	0,807007	-3,79203		
4.sSMPABC011	110134	18787	0,341861	0,17099	0,00192	0,4494	0,00339	10,59048	0,08879	2567,36	18,61	2392,6	15,09	2487,9	7,78	1157,9	22,88	96,01689	10,59048	0,08879	0,4494	0,00339	0,899742	-3,83054		
4.sSMPABC112	134239,4874	25899,15	0,433947	0,19217	0,0028	0,49055	0,00439	12,98532	0,16029	2760,82	23,76	2573	18,99	2678,6	11,64	1805,9	96,5	95,89584	12,98532	0,16029	0,49055	0,00439	0,724982	-3,94236		

FILE NAME	CORRECTED		0																										
	Pb206*		Pb207*	Th/U	207/206	1s	206/238	1s	207/235	1s	206/207		206/238		207/235		208/232		Conc	207/235		206/238		RHO	Disc.				
4.sSMPABC059	128000,3966	24919,23	0,337152	0,19503	0,00217	0,49424	0,00392	13,28466	0,11552	2785,05	18,13	2589	16,9	2700,1	8,21	2004,5	43,07	95,70877	13,28466	0,11552	0,49424	0,00392	0,912098	-4,11466					
4.sSMPABC072	26918	5522	0,463737	0,20597	0,00251	0,50997	0,00453	14,47604	0,14345	2874,1	19,66	2656,5	19,35	2781,4	9,41	2109,8	42,96	95,29832	14,47604	0,14345	0,50997	0,00453	0,896402	-4,49054					
4.sSMPABC057	55499	10717	0,342992	0,19475	0,00284	0,48549	0,00456	13,03065	0,15719	2782,7	23,73	2551,1	19,78	2681,9	11,38	1973,8	85,44	94,8728	13,03065	0,15719	0,48549	0,00456	0,77862	-4,87714					
4.sSMPABC165	265146,8049	38290,81	0,694147	0,14561	0,00177	0,37862	0,00326	7,59735	0,07927	2295	20,74	2069,8	15,23	2184,6	9,36	576,9	21,64	94,45357	7,59735	0,07927	0,37862	0,00326	0,825215	-5,25497					
4.sSMPABC113	126190,1027	23836,96	0,678753	0,19076	0,00218	0,47243	0,00399	12,42075	0,11759	2748,73	18,68	2494,2	17,45	2636,7	8,9	1445,1	37,53	94,28675	12,42075	0,11759	0,47243	0,00399	0,892099	-5,40448					
4.sSMPABC071	43642	9922	0,516088	0,22827	0,00319	0,5258	0,00502	16,53748	0,19054	3039,96	22,21	2723,7	21,21	2908,4	11,03	1701,1	63,95	93,21878	16,53748	0,19054	0,5258	0,00502	0,828641	-6,35057					
4.sSMPABC139	146563	29759	0,762666	0,20178	0,00408	0,47377	0,00531	13,14238	0,24193	2840,65	32,57	2500,1	23,23	2689,9	17,37	387	34,95	92,4083	13,14238	0,24193	0,47377	0,00531	0,608851	-7,05602					
4.sSMPABC031	110926	14600	0,196486	0,13327	0,0018	0,33235	0,00272	6,10196	0,06557	2141,5	23,4	1849,8	13,16	1990,5	9,37	1213,1	46,66	92,39377	6,10196	0,06557	0,33235	0,00272	0,761618	-7,06858					
4.sSMPABC044	16159,06937	3209,494	0,05376	0,19853	0,00403	0,46554	0,00548	12,72593	0,22922	2814,15	32,77	2464	24,12	2659,6	16,96	2428,3	243,63	92,06169	12,72593	0,22922	0,46554	0,00548	0,653523	-7,35449					
4.sSMPABC033	61406,56774	11918,07	0,327549	0,19661	0,00267	0,46198	0,0041	12,50933	0,1363	2798,26	22,05	2448,3	18,07	2643,4	10,24	2000,4	70,05	92,03121	12,50933	0,1363	0,46198	0,0041	0,814515	-7,38065					
4.sSMPABC089	110708,6599	14810,88	1,013032	0,13636	0,00202	0,32802	0,00289	6,16098	0,07635	2181,47	25,56	1828,8	14,02	1998,9	10,83	582,8	29,05	90,69882	6,16098	0,07635	0,32802	0,00289	0,710949	-8,50968					
4.sSMPABC025	157210	21351	0,511398	0,13676	0,00152	0,32388	0,00235	6,10338	0,0499	2186,57	19,25	1808,6	11,43	1990,7	7,13	351,2	7,53	89,93144	6,10338	0,0499	0,32388	0,00235	0,88747	-9,14754					
4.sSMPABC116	144304	28371	0,432075	0,19788	0,00411	0,43612	0,00487	11,86772	0,21896	2808,79	33,55	2333,3	21,85	2594	17,28	653,2	64,6	88,82698	11,86772	0,21896	0,43612	0,00487	0,605237	-10,0501					
4.sSMPABC085	78918,83354	10663,99	0,565277	0,13394	0,00201	0,30941	0,00289	5,71041	0,07264	2150,26	25,97	1737,8	14,24	1932,9	10,99	683,4	28,48	88,77316	5,71041	0,07264	0,30941	0,00289	0,734269	-10,0936					
4.sSMPABC114	282522	53588	0,210961	0,19112	0,00214	0,42076	0,00348	11,08343	0,10221	2751,82	18,25	2263,9	15,78	2530,2	8,59	1136,8	30,13	88,23711	11,08343	0,10221	0,42076	0,00348	0,896862	-10,5249					
4.sSMPABC134	22986	3117	0,528369	0,13584	0,00252	0,30535	0,0035	5,71624	0,09335	2174,82	31,99	1717,8	17,31	1933,8	14,11	1064,4	49,14	87,42578	5,71624	0,09335	0,30535	0,0035	0,701885	-11,1697					
4.sSMPABC128	87285,50992	11960,73	0,886583	0,13615	0,00201	0,30548	0,00267	5,72947	0,0712	2178,79	25,49	1718,4	13,17	1935,8	10,74	488,2	25,87	87,3487	5,72947	0,0712	0,30548	0,00267	0,703336	-11,2305					
4.sSMPABC014	208277,9347	42214,02	0,778037	0,20382	0,00212	0,43131	0,00324	12,11708	0,09438	2857,03	16,81	2311,6	14,59	2613,5	7,31	1519	18,67	86,93978	12,11708	0,09438	0,43131	0,00324	0,964436	-11,5516					
4.sSMPABC121	152140	29811	0,474833	0,19524	0,00234	0,41736	0,00326	11,22934	0,10618	2786,81	19,48	2248,5	14,81	2542,4	8,82	1844,9	63,27	86,92906	11,22934	0,10618	0,41736	0,00326	0,826073	-11,5599					
4.sSMPABC015	244811	49337	0,665252	0,20282	0,00211	0,42881	0,00318	11,98689	0,09247	2849,02	16,85	2300,3	14,34	2603,4	7,23	1676,5	21,72	86,82346	11,98689	0,09247	0,42881	0,00318	0,96132	-11,6425					
4.sSMPABC167	207729,5512	27549,57	0,550551	0,13352	0,00148	0,29464	0,00234	5,42138	0,04859	2144,77	19,28	1664,7	11,67	1888,2	7,68	1023,9	27,98	86,57416	5,42138	0,04859	0,29464	0,00234	0,886109	-11,8367					
4.sSMPABC090	115485,251	15354,42	1,72248	0,1349	0,00194	0,29684	0,00258	5,51719	0,06574	2162,72	24,81	1675,6	12,84	1903,3	10,24	258,4	11,55	86,41084	5,51719	0,06574	0,29684	0,00258	0,729433	-11,9634					
4.sSMPABC140	145458	27085	0,672829	0,18448	0,00298	0,39356	0,00372	10,00077	0,14146	2693,56	26,42	2139,3	17,19	2434,9	13,06	511,9	35,5	86,1824	10,00077	0,14146	0,39356	0,00372	0,668239	-12,1401					
4.sSMPABC012	103554	13918	0,727615	0,13515	0,00224	0,29457	0,00312	5,48324	0,0791	2165,95	28,63	1664,3	15,51	1898	12,39	852,6	35,49	85,95806	5,48324	0,0791	0,29457	0,00312	0,734221	-12,313					
4.sSMPABC013	72302	10465	1,360086	0,1459	0,00228	0,31667	0,00334	6,36514	0,08679	2298,42	26,67	1773,5	16,35	2027,5	11,97	397,1	13,36	85,67804	6,36514	0,08679	0,31667	0,00334	0,773531	-12,5277					
4.sSMPABC109	314319	59148	0,288225	0,18729	0,00227	0,39361	0,00352	10,16033	0,10727	2718,51	19,85	2139,5	16,28	2449,5	9,76	1775,2	56,65	85,51063	10,16033	0,10727	0,39361	0,00352	0,847044	-12,6556					
4.sSMPABC146	211187	43582	0,982623	0,20506	0,00256	0,42168	0,00339	11,91332	0,12148	2866,9	20,16	2268,1	15,39	2597,6	9,55	405,8	17,09	85,47242	11,91332	0,12148	0,42168	0,00339	0,788397	-12,6848					
4.sSMPABC055	16594,85716	2262,358	1,27612	0,13778	0,00205	0,29703	0,00282	5,64066	0,06963	2199,49	25,59	1676,6	14,02	1922,3	10,65	376,2	9,67	85,34534	5,64066	0,06963	0,29703	0,00282	0,769099	-12,7816					
4.sSMPABC145	57049	11120	1,180763	0,19798	0,00384	0,40682	0,00484	11,10317	0,19073	2809,62	31,39	2200,4	22,19	2531,8	16	988,6	62,2	84,9391	11,10317	0,19073	0,40682	0,00484	0,692582	-13,0895					
4.sSMPABC129	257752,8656	35370,56	0,809455	0,13857	0,00159	0,28852	0,00238	5,50977	0,05228	2209,41	19,76	1634,1	11,91	1902,1	8,15	245,1	7,45	83,59953	5,50977	0,05228	0,28852	0,00238	0,869359	-14,0897					
4.sSMPABC030	129260,9139	16817,45	0,414532	0,13235	0,00158	0,27451	0,00214	5,00596	0,04638	2129,38	20,76	1563,7	10,83	1820,3	7,84	666,8	16,44	83,5902	5,00596	0,04638	0,27451	0,00214	0,841419	-14,0966					
4.sSMPABC094	151953	28088	1,316975	0,18455	0,00232	0,37322	0,00311	9,49149	0,0971	2694,19	20,65	2044,5	14,58	2386,7	9,4	375	13,65	83,26241	9,49149	0,0971	0,37322	0,00311	0,814537	-14,3378					
4.sSMPABC074	193247	40953	0,035011	0,21187	0,00253	0,41413	0,0033	12,09037	0,11366	2919,9	19,17	2233,8	15,04	2611,4	8,82	831,8	35,84	83,09607	12,09037	0,11366	0,41413	0,0033	0,847636	-14,4597					
4.sSMPABC155	179050,153	32786,16	0,175461	0,18409	0,0024	0,37081	0,00306	9,40648	0,10115	2690,07	21,35	2033,2	14,38	2378,5	9,87	1759,5	76,09	83,01692	9,40648	0,10115	0,37081	0,00306	0,767417	-14,5176					
4.sSMPABC075	236773,054	47053	0,437346	0,19901	0,00272	0,39401	0,00351	10,80286	0,12408	2818,09	22,16	2141,4	16,22	2506,3	10,67	1941,5	91,75	82,95975	10,80286	0,12408	0,39401	0,00351	0,775598	-14,5593					
4.sSMPABC148	204293,7994	26701,66	1,029242	0,13556	0,00178	0,27818	0,00248	5,19691	0,05924	2171,23	22,64	1582,2	12,51	1852,1	9,71	304,9	13,19	82,94147	5,19691	0,05924	0,27818	0,00248	0,782089	-14,5726					
4.sSMPABC163	79282	15654	1,252808	0,19603	0,0025	0,38852	0,00323	10,4954	0,11	2793,43	20,76	2116	14,99	2479,5	9,72	870,6	35,22	82,82136	10,4954	0,11	0,38852	0,00323	0,793223	-14,6602					
4.sSMPABC043	199974,5064	41169,5	0,345357	0,20725	0,00234	0,40303	0,00298	11,50847	0,09679	2884,16	18,23	2183	13,71	2565,3	7,86	1522,6	36,7	82,4874	11,50847	0,09679	0,40303	0,00298	0,879156	-14,9027					
4.sSMPABC162	195753	36577	7,33044	0,18607	0,0028	0,35939	0,00311	9,21214	0,11928	2707,73	24,62	1979,3	14,76	2359,3	11,86	93,1	5,89	80,80129	9,21214	0,11928	0,35939	0,00311	0,668324	-16,1065					
4.sSMPABC087	71527	17796	0,899007	0,21149	0,00561	0,3904	0,00704	11,36236	0,27404	2917	42,33	2124,7	32,65	2553,3	22,51	126,3	8,65	79,82774	11,36236	0,27404	0,3904	0,00704	0,747683	-16,7861					
4.sSMPABC077	354806,4394	70129,44	0,247125	0,19859	0,00213	0,37218	0,00288	10,18626	0,08482	2814,64	17,41	2039,7	13,52	2451,8	7,7	1286,6	26,48	79,79605	10,18626	0,08482	0,37218	0,00288	0,9293	-16,8081					
4.sSMPABC110	233545,7943	44611,02	0,300891	0,19183	0,00204	0,36195	0,00281	9,56985	0,07922	2757,91	17,32	1991,4	13,3	2394,3	7,61	1941,5	37,09	79,768	9,56985	0,07922	0,36195	0,00281	0,937838	-16,8275					
4.sSMPABC039	168957	31981	0,290823	0,19731	0,00371	0,36962	0,00408	10,04475	0,16372	2804,07	30,43	2027,6	19,18	2438,9	15,05	1465,5	105,41	79,71493	10,04475	0,16372	0,36962	0,00408	0,677239	-16,8642					
4.sSMPABC156	197207,9431	27474,52	0,203108	0,13943	0,00161	0,26879	0,00206	5,16502	0,04705	2220,14	19,91	1534,7	10,45	1846,9	7,75	565,2	19	79,65726	5,16502	0,04705	0,26879	0,00206	0,84133	-16,904					
4.sSMPABC133	155380,0441	19605,67	0,271087	0,12719	0,00145	0,23743	0,00181	4,1621	0,0371	2059,49	20,04	1373,3	9,43	1666,6	7,3	1060,8	30,79	78,64269	4,1621	0,0371	0,23743	0,00181	0,855227	-17,5987					
4.sSMPABC135	32020,96618	4229,358	0,673109	0,13576	0,0024	0,25277	0,00265	4,72652	0,07262	2173,8	30,47	1452,7	13,66	1772	12,88	713,1	37,54	78,02024	4,72652	0,07262	0,25277	0,00265	0,682347	-18,0192					
4.sSMPABC078	39259,29393	4896,185	0,866694	0,13321	0,00221	0,24242	0,00257	4,44955	0,06423	2140,71	28,69	1399,2	13,33	1721,6	11,97	1137,5	40	76,95826	4,44955	0,06423	0,24242	0,00257	0,734417	-18,7268					
4.sSMPABC097	100777	13518	1,324714	0,13409	0,00196	0,23429	0,00202	4,32776	0,05236	2152,21	25,24	1357	10,57	1698,7	9,98	355,6	17,06	74,81945	4,32776	0,05236	0,23429	0,00202	0,712625	-20,1154					
4.sSMPABC061	286614,5936	57473,99	0,203797	0,20166	0,00229	0,34293	0,00279	9,53063	0,08711	2839,68	18,41	1900,8	13,38	2390,5	8,4	1755,2	46,38	74,23716	9,53063	0,08711	0,34293	0,00279	0,890128	-20,4853					
4.sSMPABC104	649473,1356	90504,2	0,17505	0,14139	0,00171	0,24317	0,00191	4,73764	0,04612	2244,3	20,75	1403,1	9,88	1773,9	8,16	2071,4	74,33	73,5728	4,73764	0,04612	0,24317	0,00191	0,806856	-20,9031					
4.sSMPABC060	263422	53018	0,200225	0,20213	0,00211	0,33778	0,00254	9,41021	0,07415	2843,47	16,92	1876	12,24	2378,8	7,23	1457,8	22,59	73,19829	9,41021	0,07415	0,33778	0,00254	0,954307	-21,1367					
4.sSMPABC041	172059	32139	0,327875	0,18868	0,0022	0,30836	0,00227	8,01586	0,0694	2730,69	19,08	1732,6	11,18	2232,8	7,82	1119,6	31,2	71,13009	8,01586	0,0694	0,30836	0,00227	0,850273	-22,4024					
4.sSMPABC130	192798,5189	25574,08	0,191514	0,13372	0,0017	0,20824	0,00172	3,83736	0,04038	2147,39	22,1	1219,4	9,19	1600,6	8,48	1030,1	41,15	68,73872	3,83736	0,04038	0,20824	0,00172	0,784929	-23,8161					
4.sSMPABC073	369539	79977	0,121236	0,21774	0,0026	0,33199	0,00288	9,96281	0,10057	2964,05	19,11	1848	13,92	2431,3	9,31	1299,6	42,16	68,43615	9,96281	0,10057	0,33199	0,00288	0,859371	-23,9913					
4.sSMPABC143	171244,8354	24800,97	2,089544	0,14605	0,00216	0,22596	0,00202	4,54642	0,05734	2300,18	25,16	1313,3	10,6	1739,5	10,5	226,5	12,36	67,5474	4,54642	0,05734	0,22596	0,00202	0,708813	-24,5013					
4.sSMPABC161	395992,7828	83710,84	0,359408	0,21113	0,00244	0,31696	0,00243	9,22227	0,08435	2914,24	18,58	1774,9	11,89	2360,3	8,38	2418,4	80,93	67,01786	9,22227	0,08435	0,31696	0,00243	0,838213	-24,8019					
4.sSMPABC048	187573	37118	0,35618	0,19939	0,00258	0,29829	0,00262	8,19785	0,08748	2821,21	20,95	1682,8	13,03	2253,1	9,66	2094,9	71,97	66,11005	8,19785	0,08748	0,29829	0,00262	0,823102	-25,3118					
4.sSMPABC076	143978	28451	0,772587	0,19585	0,00504	0,28867	0,0041	7,77072	0,17962	2791,92	41,54	1634,9	20,51	2204,8	20,79	1053,2	115,02	65,1416	7,77072	0,17962	0,28867	0,0041	0,614453	-25,8481					
4.sSMPABC150	174707,5707	32056,46	0,897977	0,18318	0,00254	0,27221	0,00229	6,87027	0,07974	2681,87	22,72	1552	11,61	2094,8	10,29	454,6	24,77	65,02577	6,87027	0,07974	0,27221	0,00229	0,724818	-25,9118					
4.sSMPABC122	169296,1474	31165,86	0,230716	0,18503	0,00268	0,2725	0,00267	6,95013	0,08979	2698,48	23,7	1553,5	13,53	2105,1	11,47	1401,2	68,33	64,49308	6,95013	0,08979	0,2725	0,00267	0,75842	-26,203					
4.sSMPABC084	111912	16268	1,053271	0,14544	0,002	0,21282	0,00189	4,26486	0,04895	2292,99	23,49	1243,8	10,04	1686,6	9,44	591,7	23,7	64,39942	4,26486	0,04895	0,21282	0,00189	0,773751	-26,254					
4.sSMPABC138	220208	46007	1,016473	0,20942	0,00227	0,28935	0,00228	8,35096	0,07183	2901,06	17,48	1638,3	11,39	2269,9	7,8	242,2	5,89	61,44784	8,35096	0,07183	0,28935	0,00228	0,916098	-27,825					
4.sSMPABC125	674186,4851	103641,4	0,193119	0,15408	0,00169	0,20921	0,00173	4,44295	0,04058	2391,71	18,6	1224,6	9,2	1720,4	7,57	895,1	22,73	59,51331	4,44295	0,04058	0,20921	0,00173	0,905364	-28,8189					
4.sSMPABC126	390423,583	62642,69	0,286578	0,1595	0,00344	0,21002	0,00229	4,60811	0,09083	2450,37	36,03	1228,9	12,18	1750,7	16,45	1011,3	110,17	57,53926	4,60811	0,09083	0,21002	0,00229	0,553182	-29,8052					
4.sSMPABC111	894024,3202	128219,3	0,276388	0,14432	0,00173	0,18673	0,00161	3,7145	0,03841	2279,69	20,5	1103,6	8,75	1574,5	8,27	701,4	25,28	57,33055	3,7145	0,03841	0,18673	0,00161	0,833811	-29,9079					
4.sSMPABC107	331155,7844	71546,19	0,118186	0,21473	0,00288	0,27716	0,00233	8,19714	0,09162	2941,59	21,52	1577	11,75	2253	10,11	5916,6	247,74	57,1338	8,19714	0,09162	0,27716	0,00233	0,752138	-30,0044					
4.sSMPABC132	176325,2929	28196,16	0,6733	0,16156	0,00174	0,20318	0,00159	4,52401	0,03837	2472,05	18,02	1192,4	8,54	1735,4	7,05	907,5	19,44	54,46159	4,52401	0,03837	0,20318	0,00159	0,922673	-31,2896					
4.sSMPABC103	870088,04	131627,9	0,300497	0,15299	0,0017	0,18525	0,00139	3,90571	0,03351	2379,62	18,85	1095,6	7,55	1614,9	6,93	1048,6	29,54	52,60131	3,90571	0,03351	0,18525	0,00139	0,874545	-32,1568					
4.sSMPABC108	231332,6172	33239,12	0,131487	0,14384	0,00172	0,17139	0,00132	3,39709	0,03192	2273,95	20,43	1019,8	7,25	1503,7	7,37	556,8	19,28	52,54952	3,39709	0,03192	0,17139	0,00132	0,819658	-32,1806					
4.sSMPABC027	444672	99085	0,387094	0,22183	0,0027	0,26503	0,00235	8,09589	0,08361	2994,02	19,42	1515,5	11,98	2241,8	9,33	1485,5	45,79	52,07522	8,09589	0,08361	0,26503	0,00235	0,858577	-32,3981					
4.sSMPABC045	189147	30838	0,426604	0,16298	0,00186	0,19511	0,00148	4,38177	0,03807	2486,81	19,15	1149	7,97	1708,9	7,18	688,5	16,71	51,27067	4,38177	0,03807	0,19511	0,00148	0,87307	-32,7638					
4.sSMPABC151	212475	31278	0,069207	0,14826	0,00172	0,16157	0,00133	3,30126	0,03171	2325,95	19,75	965,5	7,41	1481,4	7,49	2625,7	78,42	46,56655	3,30126	0,03171	0,16157	0,00133	0,856987	-34,8252					
4.sSMPABC063	519230,3288	103325,8	0,336152	0,20176	0,00226	0,21824	0,00173	6,06796	0,05406	2840,49	18,16	1272,6	9,14	1985,7	7,77	1648,4	42,86	43,96511	6,06796	0,05406	0,21824	0,00173	0,889771	-35,9118					
4.sSMPABC106	432134,4218	99175,29	0,036767	0,22855	0,00266	0,24011	0,00189	7,56293	0,07024	3041,92	18,53	1387,3	9,81	2180,5	8,33	1802,4	60,4	42,82419	7,56293	0,07024	0,24011	0,00189	0,847534	-36,377					
4.sSMPABC028	169608,8198	29881	0,203988	0,17788	0,00226	0,18126	0,00155	4,44416	0,04582	2633,2	20,97	1073,9	8,47	1720,6	8,55	1419,5	44,71	39,78024	4,44416	0,04582	0,18126	0,00155	0,829401	-37,5857					
4.sSMPABC062	266385,0096	38980,5	0,42848	0,14588	0,00165	0,14114	0,00108	2,83749	0,02482	2298,18	19,28	851,1	6,12	1365,5	6,57	573,6	14,88	39,56057	2,83749	0,02482	0,14114	0,00108	0,874795	-37,6712					
4.sSMPABC026	388380,9525	87950,68	0,099062	0,22734	0,00237	0,226	0,0017	7,08109	0,05572	3033,42	16,61	1313,5	8,96	2121,7	7	3414,6	46,92	38,46974	7,08109	0,05572	0,226	0,0017	0,955937	-38,0921					

FILE NAME	CORRECTED																							
	Pb206*	Pb207*	Th/U	207/206	1s	206/238	1s	207/235	1s	206/207		206/238		207/235		208/232		Conc	207/235		206/238		RHO	Disc.
4.sSMPABC029	186032,8581	27077,94	0,315772	0,14726	0,00156	0,13212	0,00099	2,68145	0,0214	2314,35	18,1	799,9	5,64	1323,4	5,9	702,5	10,61	34,55432	2,68145	0,0214	0,13212	0,00099	0,938907	-39,5572
4.sSMPABC166	158255	30727	1,849568	0,19241	0,00288	0,18167	0,00157	4,81517	0,06178	2762,87	24,39	1076,1	8,59	1787,6	10,79	255,8	15,74	33,88161	4,81517	0,06178	0,18167	0,00157	0,673566	-39,802
4.sSMPABC105	383678,1716	54569,97	0,390826	0,1428	0,00207	0,12312	0,00102	2,42113	0,02937	2261,44	24,82	748,5	5,83	1248,9	8,72	539,7	32,26	33,14629	2,42113	0,02937	0,12312	0,00102	0,682945	-40,0673
4.sSMPABC144	101116	15788	3,101118	0,15565	0,00214	0,13782	0,00115	2,95543	0,03357	2408,94	23,21	832,3	6,51	1396,2	8,62	125,2	6,05	32,24799	2,95543	0,03357	0,13782	0,00115	0,734607	-40,3882
4.sSMPABC049	123887	23812	0,360715	0,19405	0,00233	0,17346	0,00144	4,6382	0,0445	2776,79	19,59	1031,1	7,92	1756,2	8,01	1072,8	28,74	29,67704	4,6382	0,0445	0,17346	0,00144	0,865272	-41,288
4.sSMPABC152	188224,9948	30181,68	1,012239	0,16339	0,00179	0,14044	0,00113	3,16236	0,02817	2491,05	18,37	847,1	6,4	1448	6,87	381,6	9,54	29,06386	3,16236	0,02817	0,14044	0,00113	0,903259	-41,4986
4.sSMPABC142	210592,4381	38374,58	2,659405	0,18368	0,00198	0,15596	0,00123	3,94785	0,03378	2686,38	17,69	934,3	6,86	1623,5	6,93	157,4	3,65	26,23354	3,94785	0,03378	0,15596	0,00123	0,921707	-42,4515
4.sSMPABC095	151679	29169	2,450296	0,19292	0,00205	0,15651	0,00121	4,16159	0,03426	2767,22	17,35	937,4	6,75	1666,5	6,74	115,2	2,14	22,22104	4,16159	0,03426	0,15651	0,00121	0,939107	-43,7504
4.sSMPABC157	184849,9184	27727,98	0,791526	0,15433	0,00171	0,10756	0,00085	2,28762	0,0203	2394,47	18,72	658,6	4,96	1208,5	6,27	378	10,17	16,50471	2,28762	0,0203	0,10756	0,00085	0,890545	-45,5027
4.sSMPABC096	86431	16105	2,066427	0,18677	0,00278	0,13375	0,00117	3,44125	0,042	2713,93	24,38	809,2	6,67	1513,9	9,6	127,1	6,45	12,91399	3,44125	0,042	0,13375	0,00117	0,716736	-46,5486
4.sSMPABC149	108240,5745	19677,02	2,481072	0,1835	0,00202	0,12991	0,00104	3,28514	0,02894	2684,76	18,04	787,3	5,94	1477,5	6,86	167,7	4,08	12,33329	3,28514	0,02894	0,12991	0,00104	0,908754	-46,714
4.sSMPABC159	229500,3032	36745,62	0,731927	0,16504	0,00187	0,10279	0,00083	2,33793	0,02164	2507,96	18,98	630,7	4,84	1223,9	6,58	497	14,98	5,945775	2,33793	0,02164	0,10279	0,00083	0,872372	-48,468
4.sSMPABC160	218320,5178	38720,32	1,212967	0,18036	0,00205	0,11001	0,0009	2,73456	0,02556	2656,18	18,69	672,8	5,23	1337,9	6,95	311,8	9,18	1,144471	2,73456	0,02556	0,11001	0,0009	0,87526	-49,7122
4.sSMPABC158	204386,0705	40516,02	0,640491	0,20134	0,00248	0,12426	0,00102	3,44762	0,03509	2837,09	19,95	755,1	5,86	1515,3	8,01	862,5	33,87	-0,67541	3,44762	0,03509	0,12426	0,00102	0,806501	-50,1683
4.sSMPABC147	71822,19616	12473,26	1,852005	0,17624	0,00243	0,0669	0,00056	1,62431	0,01835	2617,8	22,74	417,5	3,4	979,7	7,1	145,8	6,98	-34,6587	1,62431	0,01835	0,0669	0,00056	0,74096	-57,3849

FILE NAME	CORRECT	0																							
	Pb206*	Pb207*	Th/U	207/206	1s	206/238	1s	207/235	1s	206/207		206/238		207/235		208/232		Conc	207/235		206/238		RHO	Disc.
Padrões Primários																								
4.sSMPABC001	65934,12	3218,652	0,009948	0,05972	0,00067	0,0986	0,00078	0,81145	0,00737	593,4447	24,04	606,2	4,56	603,3	4,13	638	25,2	100,4784	0,81145	0,00737	0,0986	0,00078	0,870988	0,48069
4.sSMPABC002	76428,11	4714,398	0,010217	0,06037	0,00068	0,09869	0,00078	0,82105	0,00743	616,8622	24,09	606,7	4,56	608,6	4,14	608,6	24,07	99,68683	0,82105	0,00743	0,09869	0,00078	0,873378	-0,31219
4.sSMPABC003	76583,09	4682,446	0,009897	0,06059	0,00068	0,0967	0,00076	0,80749	0,00727	624,7105	23,99	595	4,47	601	4,08	601,3	23,57	98,9916	0,80749	0,00727	0,0967	0,00076	0,872951	-0,99834
4.sSMPABC007	71167,06	3884,586	0,009776	0,05967	0,00067	0,09792	0,00077	0,80522	0,0073	591,629	24,23	602,2	4,53	599,8	4,11	649,1	26,8	100,3985	0,80522	0,0073	0,09792	0,00077	0,867383	0,400133
4.sSMPABC008	66479,85	3239,175	0,009965	0,05991	0,00068	0,09734	0,00077	0,80369	0,00732	600,3256	24,29	598,8	4,5	598,9	4,12	580,5	26,29	99,9833	0,80369	0,00732	0,09734	0,00077	0,868514	-0,0167
4.sSMPABC009	72085,46	4310,344	0,009959	0,05973	0,00068	0,09785	0,00077	0,8055	0,00734	593,8076	24,32	601,8	4,52	599,9	4,13	621,8	25,46	100,3157	0,8055	0,00734	0,09785	0,00077	0,863574	0,316719
4.sSMPABC030	61347,98	3697,415	0,010148	0,06042	0,0007	0,09747	0,00077	0,81171	0,00765	618,6493	24,82	599,6	4,55	603,4	4,29	535,2	30,14	99,36624	0,81171	0,00765	0,09747	0,00077	0,838222	-0,62976
4.sSMPABC031	60014,39	3447,471	0,010105	0,06093	0,0007	0,09684	0,00077	0,81324	0,00763	636,7638	24,63	595,9	4,52	604,3	4,27	505,9	27,88	98,59037	0,81324	0,00763	0,09684	0,00077	0,847481	-1,39004
4.sSMPABC057	53659	3239	0,010044	0,05978	0,00071	0,09771	0,00079	0,80496	0,00791	595,6208	26,1	601	4,63	599,6	4,45	609,6	30,85	100,2329	0,80496	0,00791	0,09771	0,00079	0,822784	0,233489
4.sSMPABC058	52256,57	3094,374	0,010352	0,06042	0,00072	0,09753	0,00079	0,81211	0,00794	618,6493	25,42	599,9	4,62	603,6	4,45	712,8	30,46	99,38323	0,81211	0,00794	0,09753	0,00079	0,828482	-0,61299
4.sSMPABC081	52272,3	3005,422	0,009915	0,06194	0,00074	0,09647	0,00078	0,82347	0,00811	672,0377	25,28	593,7	4,61	610	4,52	644,6	30,29	97,25451	0,82347	0,00811	0,09647	0,00078	0,820974	-2,67213
4.sSMPABC082	53347,7	2852,521	0,009908	0,05966	0,00071	0,09696	0,00079	0,79717	0,00789	591,2656	25,74	596,5	4,61	595,2	4,46	637,3	31,77	100,2179	0,79717	0,00789	0,09696	0,00079	0,823206	0,218414
4.sSMPABC120	58941,8	4105,217	0,01025	0,0599	0,00075	0,0978	0,00081	0,80736	0,00845	599,9642	26,76	601,5	4,73	601	4,75	559,5	34,33	100,0831	0,80736	0,00845	0,0978	0,00081	0,791328	0,083195
4.sSMPABC121	55095	3313	0,010223	0,05946	0,00074	0,09896	0,00082	0,81096	0,00843	583,9802	26,63	608,3	4,78	603	4,72	603,2	34,49	100,8713	0,81096	0,00843	0,09896	0,00082	0,797124	0,878939
Padrões Secundários																								
4.sSMPABC004	91228,94	4762,805	0,072191	0,05728	0,00066	0,09002	0,0007	0,7106	0,00656	502,3298	25,37	555,7	4,13	545,1	3,9	520,7	11,19	101,9075	0,7106	0,00656	0,09002	0,0007	0,842326	1,944597
4.sSMPABC005	93182,21	5959,092	0,074259	0,05811	0,00067	0,08978	0,00069	0,71904	0,00656	533,9117	25,45	554,3	4,08	550,1	3,88	506	10,69	100,7577	0,71904	0,00656	0,08978	0,00069	0,842401	0,763498
4.sSMPABC006	93047,65	4794,284	0,072969	0,05841	0,00072	0,09009	0,00072	0,72515	0,0074	545,1748	26,85	556,1	4,26	553,7	4,35	521,9	13,51	100,4316	0,72515	0,0074	0,09009	0,00072	0,783163	0,433448
4.sSMPABC032	65510,63	3371,702	0,075455	0,05849	0,0007	0,08965	0,0007	0,72265	0,007	548,1649	25,92	553,4	4,15	552,2	4,12	514,1	12,56	100,2168	0,72265	0,007	0,08965	0,0007	0,806079	0,217313
4.sSMPABC033	72024,8	4205,052	0,0735	0,05957	0,00069	0,08954	0,0007	0,73508	0,00685	587,9913	24,94	552,8	4,14	559,5	4,01	513	11,78	98,78799	0,73508	0,00685	0,08954	0,0007	0,838929	-1,1975
4.sSMPABC059	74776	4453	0,072243	0,05901	0,00069	0,08997	0,00072	0,73169	0,00706	567,465	25,78	555,4	4,28	557,5	4,14	518,3	13,37	99,62189	0,73169	0,00706	0,08997	0,00072	0,829387	-0,37668
4.sSMPABC060	66072	3920	0,073958	0,05864	0,00071	0,08922	0,00071	0,72099	0,00716	553,7563	26,25	550,9	4,2	551,2	4,22	536,9	15,36	99,94554	0,72099	0,00716	0,08922	0,00071	0,801332	-0,05443
4.sSMPABC083	112971,9	7077,1	0,070893	0,05847	0,00066	0,08968	0,00071	0,72264	0,00664	547,4179	24,53	553,7	4,22	552,2	3,91	514	14,61	100,2709	0,72264	0,00664	0,08968	0,00071	0,861622	0,271641
4.sSMPABC084	107259,1	6624,737	0,072449	0,05902	0,00067	0,0896	0,00071	0,7288	0,00671	567,8339	25,08	553,2	4,22	555,8	3,94	460,6	13,3	99,53001	0,7288	0,00671	0,0896	0,00071	0,860669	-0,46779
Amostras																								
4.sSMPABC103	275173,8	158311,2	0,782138	0,49395	0,00654	1,25905	0,01091	85,67245	0,96738	4223,255	19,41	5253,5	31,14	4530,8	11,33	******	489,7	113,7565	85,67245	0,96738	1,25905	0,01091	0,767407	15,95083
4.sSMPABC137	101799	24712	0,136406	0,24017	0,00289	0,64418	0,00551	21,32525	0,21537	3121,097	19	3205,4	21,6	3153,5	9,8	2338,1	94,21	101,6191	21,32525	0,21537	0,64418	0,00551	0,846941	1,64579
4.sSMPABC102	179337	33899	0,296326	0,18529	0,00239	0,53794	0,00441	13,73402	0,1465	2700,799	21,11	2774,8	18,47	2731,5	10,1	2447	139,28	101,5605	13,73402	0,1465	0,53794	0,00441	0,768537	1,58521
4.sSMPABC047	134042	25131	0,215631	0,18556	0,00203	0,53824	0,00425	13,7653	0,11794	2703,203	17,93	2776,1	17,8	2733,7	8,11	2333,1	58,46	101,5273	13,7653	0,11794	0,53824	0,00425	0,921589	1,551011
4.sSMPABC026	267755	49031	0,348015	0,17989	0,00281	0,52417	0,00572	12,96981	0,18362	2651,857	25,67	2716,8	24,21	2677,5	13,35	1539,9	72,57	101,4466	12,96981	0,18362	0,52417	0,00572	0,770793	1,467787
4.sSMPABC063	154465,7	28364,34	0,261623	0,18185	0,00208	0,52871	0,00416	13,25017	0,11943	2669,815	18,81	2736	17,55	2697,6	8,51	2204,1	73,06	101,4035	13,25017	0,11943	0,52871	0,00416	0,872939	1,423488
4.sSMPABC045	139524,1	26107,02	0,298426	0,18583	0,00202	0,53603	0,00423	13,72837	0,11678	2705,602	17,78	2766,8	17,77	2731,2	8,05	2335,5	54,73	101,2867	13,72837	0,11678	0,53603	0,00423	0,927688	1,303456
4.sSMPABC131	66843	14089	0,248095	0,20838	0,00243	0,58178	0,00499	16,70958	0,16295	2892,988	18,77	2956	20,33	2918,3	9,34	2321,3	77,16	101,2754	16,70958	0,16295	0,58178	0,00499	0,879535	1,291848
4.sSMPABC135	18275	4627	0,489267	0,24877	0,00422	0,65179	0,00767	22,34317	0,33927	3176,955	26,59	3235,2	29,95	3198,8	14,76	2839,3	203,62	101,1251	22,34317	0,33927	0,65179	0,00767	0,774974	1,137927
4.sSMPABC113	242845,6	45719,25	0,287304	0,18594	0,0021	0,53425	0,00428	13,69152	0,12547	2706,579	18,52	2759,3	18	2728,6	8,67	2267,1	83,89	101,1126	13,69152	0,12547	0,53425	0,00428	0,8742	1,125119
4.sSMPABC072	176128	36409	0,336662	0,20423	0,00229	0,57142	0,00449	16,08319	0,14273	2860,303	18,17	2913,6	18,43	2881,8	8,48	2452,5	79,57	101,0914	16,08319	0,14273	0,57142	0,00449	0,885417	1,103477
4.sSMPABC106	68506	13468	0,320542	0,19423	0,00234	0,55038	0,00458	14,73305	0,14533	2778,315	19,64	2826,8	19,06	2798,2	9,38	2357	96,71	101,0117	14,73305	0,14533	0,55038	0,00458	0,843607	1,022086
4.sSMPABC011	315538	72653	0,278486	0,22789	0,0024	0,61445	0,00472	19,29759	0,15608	3037,288	16,78	3087,8	18,86	3056,8	7,81	2660,1	54,52	101,004	19,29759	0,15608	0,61445	0,00472	0,949754	1,014132
4.sSMPABC019	57217,47	10500,57	0,218893	0,18324	0,00209	0,52689	0,00427	13,30572	0,1188	2682,416	18,76	2728,3	18,02	2701,6	8,43	2410,1	58,41	100,9786	13,30572	0,1188	0,52689	0,00427	0,907674	0,988303
4.sSMPABC024	27350	4984	0,417214	0,18047	0,00228	0,52047	0,00471	12,94537	0,13489	2657,194	20,76	2701,2	19,97	2675,7	9,82	2413,7	55,82	100,944	12,94537	0,13489	0,52047	0,00471	0,86848	0,953022
4.sSMPABC018	89951	16704	0,266973	0,18377	0,00194	0,52653	0,00424	13,33594	0,11171	2687,191	17,35	2726,8	17,91	2703,7	7,91	2335,4	39,01	100,8471	13,33594	0,11171	0,52653	0,00424	0,961334	0,854385
4.sSMPABC109	137948,4	27480,24	0,45559	0,19669	0,00228	0,55293	0,00454	14,98983	0,14226	2798,926	18,83	2837,3	18,86	2814,6	9,03	2283,4	85	100,8001	14,98983	0,14226	0,55293	0,00454	0,865166	0,806509
4.sSMPABC099	99182	17314	0,334665	0,17274	0,00256	0,50117	0,00455	11,92675	0,15139	2584,37	24,57	2618,8	19,54	2598,7	11,89	2564,4	183,17	100,7675	11,92675	0,15139	0,50117	0,00455	0,715239	0,773464
4.sSMPABC070	173912	45804	0,336452	0,25999	0,00279	0,66068	0,00525	23,6742	0,20122	3246,645	16,81	3269,8	20,36	3255,1	8,28	2870,3	74,48	100,4496	23,6742	0,20122	0,66068	0,00525	0,934915	0,451599
4.sSMPABC115	212684	42697	0,345804	0,19843	0,00217	0,54877	0,00444	15,00762	0,13325	2813,326	17,73	2820,1	18,48	2815,7	8,45	2161,3	64,55	100,156	15,00762	0,13325	0,54877	0,00444	0,911249	0,156267
4.sSMPABC050	54720	13555	0,456841	0,24313	0,003	0,62929	0,00551	21,083	0,21105	3140,574	19,46	3146,8	21,81	3142,4	9,7	2582,6	93,99	100,1398	21,083	0,21105	0,62929	0,00551	0,874677	0,14002
4.sSMPABC062	242875	46491	0,242692	0,18915	0,00201	0,52801	0,00418	13,7649	0,11586	2734,785	17,38	2733,1	17,62	2733,7	7,97	2555,3	60,86	99,97805	13,7649	0,11586	0,52801	0,00418	0,940532	-0,02195
4.sSMPABC012	304792,5	70681,66	0,280635	0,23117	0,00251	0,60344	0,00476	19,22432	0,16376	3060,165	17,29	3043,7	19,13	3053,1	8,22	2553,5	59,78	99,69117	19,22432	0,16376	0,60344	0,00476	0,926011	-0,30788
4.sSMPABC043	61433	11672	0,315599	0,1864	0,00233	0,51821	0,00446	13,31141	0,13479	2710,655	20,49	2691,6	18,93	2702	9,56	2357,9	87,76	99,61361	13,31141	0,13479	0,51821	0,00446	0,849954	-0,3849
4.sSMPABC130	124423	26268	0,565776	0,20714	0,00313	0,55787	0,00536	15,91612	0,21055	2883,3	24,29	2857,8	22,17	2871,8	12,64	2448,8	163,13	99,51011	15,91612	0,21055	0,55787	0,00536	0,726296	-0,4875
4.sSMPABC049	137020	24888	0,200673	0,17769	0,00298	0,49827	0,00503	12,20503	0,17796	2631,427	27,58	2606,3	21,63	2620,3	13,68	2331,5	185,87	99,46284	12,20503	0,17796	0,49827	0,00503	0,69234	-0,53429
4.sSMPABC051	85616	20780	0,444713	0,23807	0,00422	0,61097	0,00712	20,00546	0,31523	3107,113	27,96	3073,9	28,48	3091,6	15,24	2402,5	187,9	99,42418	20,00546	0,31523	0,61097	0,00712	0,739573	-0,57252
4.sSMPABC010	495375	115877	0,364177	0,23176	0,00237	0,60073	0,00452	19,18644	0,14849	3064,241	16,29	3032,8	18,22	3051,2	7,47	2432,9	40,88	99,3933	19,18644	0,14849	0,60073	0,00452	0,972202	-0,60304
4.sSMPABC055	87182	16239	0,726526	0,18345	0,00245	0,50933	0,00455	12,8756	0,14317	2684,31	21,93	2653,8	19,43	2670,6	10,48	2284	105,25	99,36695	12,8756	0,14317	0,50933	0,00455	0,803392	-0,62907
4.sSMPABC076	177379	42758	0,469275	0,23851	0,00276	0,61118	0,00483	20,0899	0,18447	3110,055	18,32	3074,7	19,31	3095,7	8,88	2425,6	89,15	99,31701	20,0899	0,18447	0,61118	0,00483	0,860657	-0,67836
4.sSMPABC046	206849	39517	0,334027	0,1879	0,00225	0,51587	0,00414	13,35787	0,12789	2723,867	19,61	2681,6	17,6	2705,3	9,04	2377,6	94,01	99,1162	13,35787	0,12789	0,51587	0,00414	0,838225	-0,87606
4.sSMPABC021	84858	16684	0,306125	0,19446	0,00219	0,52809	0,00427	14,1531	0,12475	2780,254	18,3	2733,4	18	2760	8,36	2682,4	63,11	99,02685	14,1531	0,12475	0,52809	0,00427	0,917341	-0,96377
4.sSMPABC016	68873,89	12876,38	0,216391	0,18379	0,00227	0,50595	0,00436	12,81448	0,12766	2687,371	20,3	2639,3	18,67	2666,1	9,38	2326	74,51	98,98458	12,81448	0,12766	0,50595	0,00436	0,865018	-1,00521
4.sSMPABC127	110676	20914	0,189517	0,18388	0,00441	0,50417	0,0065	12,72977	0,28708	2688,18	39,08	2631,7	27,87	2659,9	21,23	2433,4	377,15	98,92845	12,72977	0,28708	0,50417	0,0065	0,571681	-1,06019
4.sSMPABC073	243054	50253	0,295301	0,20469	0,00298	0,53326	0,00483	15,04385	0,18787	2863,963	23,46	2755,2	20,31	2818	11,89	2031,5	118,02	97,72067	15,04385	0,18787	0,53326	0,00483	0,725287	-2,22853
4.sSMPABC034	96414,17	18332,69	0,409846	0,19059	0,00239	0,49407	0,00437	12,97587	0,13417	2747,26	20,45	2588,3	18,84	2677,9	9,75	2353,3	77,67	96,53827	12,97587	0,13417	0,49407	0,00437	0,855409	-3,34591
4.sSMPABC020	131264	25936	0,461617	0,19517	0,00203	0,50132	0,00404	13,48542	0,11174	2786,226	16,91	2619,5	17,36	2714,3	7,83	2005,8	30,93	96,38099	13,48542	0,11174	0,50132	0,00404	0,972573	-3,49261
4.sSMPABC124	228611	45470	0,40371	0,19684	0,00241	0,50287	0,00444	13,64153	0,1439	2800,173	19,86	2626,1	19,04	2725,1	9,98	1548,9	57,93	96,23015	13,64153	0,1439	0,50287	0,00444	0,837008	-3,63289
4.sSMPABC035	137957,6	26598,47	0,446871	0,19155	0,0021	0,49089	0,0038	12,95853	0,10913	2755,516	17,86	2574,5	16,43	2676,6	7,94	2184,4	53,89	96,03418	12,95853	0,10913	0,49089	0,0038	0,919202	-3,81454
4.sSMPABC085	169570	33041	0,302926	0,19453	0,00244	0,49459	0,00452	13,26022	0,14467	2780,844	20,44	2590,5	19,51	2698,4	10,3	1931,9	69,72	95,83478	13,26022	0,14467	0,49459	0,00452	0,837655	-3,99867

FILE NAME	CORRECT	0																										
	Pb206*	Pb207*	Th/U	207/206	1s	206/238	1s	207/235	1s	206/207		206/238		207/235		208/232		Conc	207/235		206/238		RHO	Disc.				
4.sSMPABC029	132778	27248	0,213049	0,20343	0,0025	0,50795	0,00433	14,2379	0,14189	2853,915	19,87	2647,9	18,52	2765,7	9,45	2281,5	81,21	95,55119	14,2379	0,14189	0,50795	0,00433	0,855384	-4,25932				
4.sSMPABC014	146124	32731,94	0,296319	0,21159	0,00264	0,52188	0,0052	15,20842	0,16747	2917,763	20,03	2707,2	22,04	2828,4	10,49	1416,7	38,33	95,52305	15,20842	0,16747	0,52188	0,0052	0,904857	-4,28511				
4.sSMPABC067	169190	43108	0,435263	0,25247	0,00266	0,58597	0,0047	20,38938	0,17139	3200,321	16,55	2973,1	19,1	3110	8,14	2543,4	54,79	95,39538	20,38938	0,17139	0,58597	0,0047	0,954204	-4,40193				
4.sSMPABC028	279681	55919	0,387863	0,19678	0,00245	0,49337	0,00452	13,37701	0,1431	2799,674	20,22	2585,2	19,5	2706,6	10,11	2159	84,84	95,30404	13,37701	0,1431	0,49337	0,00452	0,856417	-4,48533				
4.sSMPABC069	235676	47613	0,462096	0,19869	0,00258	0,4949	0,00454	13,54382	0,15218	2815,466	21,09	2591,8	19,59	2718,3	10,62	2140,5	99,6	95,11922	13,54382	0,15218	0,4949	0,00454	0,816436	-4,65364				
4.sSMPABC101	315171,5	64297,9	0,18703	0,1997	0,00256	0,49554	0,00435	13,6315	0,14965	2823,746	20,73	2594,6	18,77	2724,5	10,39	2366,7	118,74	94,99345	13,6315	0,14965	0,49554	0,00435	0,799609	-4,76785				
4.sSMPABC079	41579	7972	0,339523	0,18964	0,00402	0,47633	0,00637	12,44945	0,23868	2739,042	34,47	2511,3	27,81	2638,9	18,02	2289,9	198,32	94,91897	12,44945	0,23868	0,47633	0,00637	0,697534	-4,83535				
4.sSMPABC074	7905	1571	0,002219	0,19756	0,00629	0,48839	0,00895	13,29953	0,42852	2806,144	51,11	2563,7	38,75	2701,1	30,43	******	4185,94	94,64056	13,29953	0,42852	0,48839	0,00895	0,56875	-5,08682				
4.sSMPABC125	403234	71727	0,257961	0,18396	0,00458	0,45923	0,00546	11,63799	0,26579	2688,899	40,57	2436,2	24,12	2575,7	21,35	1588,5	191,61	94,27387	11,63799	0,26579	0,45923	0,00546	0,520597	-5,416				
4.sSMPABC136	25402	6454	0,422573	0,25035	0,00479	0,56758	0,00708	19,56377	0,33526	3186,981	29,97	2897,9	29,11	3070	16,55	3034,6	307,15	94,06122	19,56377	0,33526	0,56758	0,00708	0,727909	-5,60586				
4.sSMPABC078	40728	7557	0,26925	0,18261	0,00421	0,42597	0,00608	10,70516	0,22341	2676,718	37,64	2287,5	27,47	2497,9	19,38	2480,2	254,65	90,80219	10,70516	0,22341	0,42597	0,00608	0,683935	-8,42308				
4.sSMPABC138	308140,4	72727,13	0,532921	0,23475	0,00325	0,50352	0,00464	16,28639	0,19871	3084,719	21,95	2628,9	19,9	2893,8	11,67	1885,4	96,83	89,92354	16,28639	0,19871	0,50352	0,00464	0,755277	-9,15405				
4.sSMPABC017	129135,1	23829,42	0,227715	0,18609	0,00275	0,42154	0,00392	10,80198	0,13307	2707,909	24,17	2267,4	17,77	2506,2	11,45	2310,4	122,65	89,46811	10,80198	0,13307	0,42154	0,00392	0,754867	-9,52837				
4.sSMPABC116	201759	38602,9	0,720731	0,19147	0,00253	0,40653	0,00372	10,72808	0,12362	2754,83	21,52	2199	17,04	2499,9	10,7	1200	51,04	86,31651	10,72808	0,12362	0,40653	0,00372	0,794115	-12,0365				
4.sSMPABC066	275561,7	53395,77	0,384178	0,19192	0,002	0,359	0,00283	9,49606	0,0783	2758,685	17,03	1977,4	13,42	2387,2	7,57	1456,9	31,96	79,27582	9,49606	0,0783	0,359	0,00283	0,956035	-17,1666				
4.sSMPABC087	821742,5	147050,1	0,261059	0,17898	0,00211	0,32833	0,00278	8,09569	0,0807	2643,442	19,44	1830,3	13,5	2241,8	9,01	1742,8	66,18	77,51735	8,09569	0,0807	0,32833	0,00278	0,849405	-18,3558				
4.sSMPABC097	242460	60266,46	0,283839	0,24532	0,0028	0,39889	0,00312	13,48605	0,12267	3154,813	18,02	2163,9	14,4	2714,3	8,6	1875,2	73,84	74,56444	13,48605	0,12267	0,39889	0,00312	0,8599	-20,2778				
4.sSMPABC105	118544	21862	0,271316	0,18313	0,00249	0,31394	0,00272	7,92321	0,09055	2681,422	22,28	1760,1	13,36	2222,3	10,3	1312,3	65,86	73,74013	7,92321	0,09055	0,31394	0,00272	0,758115	-20,7983				
4.sSMPABC068	181004	40864	0,137932	0,22373	0,0026	0,36435	0,00287	11,23512	0,10305	3007,73	18,54	2002,7	13,55	2542,8	8,55	2040,9	75,06	73,03141	11,23512	0,10305	0,36435	0,00287	0,858802	-21,2404				
4.sSMPABC132	196129	36253	0,649532	0,18602	0,00336	0,31097	0,0031	7,95507	0,12841	2707,289	29,53	1745,5	15,23	2225,9	14,56	1024	73,25	72,4778	7,95507	0,12841	0,31097	0,0031	0,617573	-21,5823				
4.sSMPABC065	341542	63201	0,476041	0,18373	0,00207	0,30415	0,00241	7,7015	0,06928	2686,831	18,52	1711,9	11,9	2196,8	8,08	1235,2	39,28	71,67475	7,7015	0,06928	0,30415	0,00241	0,880839	-22,073				
4.sSMPABC071	256609,4	55281,95	0,041358	0,21362	0,00229	0,34018	0,00274	10,01573	0,08653	2933,21	17,23	1887,6	13,2	2436,2	7,98	1188,5	32,56	70,93664	10,01573	0,08653	0,34018	0,00274	0,932304	-22,5187				
4.sSMPABC090	270755,1	57161,32	0,362845	0,20998	0,00259	0,32708	0,00263	9,46638	0,09488	2905,391	19,81	1824,2	12,79	2384,3	9,2	2151,7	95,71	69,29613	9,46638	0,09488	0,32708	0,00263	0,802252	-23,4912				
4.sSMPABC123	181756	38650	0,284548	0,21393	0,0037	0,33095	0,00324	9,73816	0,14925	2935,554	27,69	1843	15,71	2410,3	14,11	1936,6	131,07	69,21867	9,73816	0,14925	0,33095	0,00324	0,638771	-23,5365				
4.sSMPABC118	1053353	140921,7	0,046667	0,13299	0,00158	0,20836	0,00179	3,81854	0,03881	2137,818	20,59	1220,1	9,54	1596,7	8,18	1156,1	43,04	69,13368	3,81854	0,03881	0,20836	0,00179	0,845264	-23,5861				
4.sSMPABC044	252199,2	45403,7	0,259991	0,1781	0,00195	0,27391	0,00231	6,72269	0,06132	2635,257	18,11	1560,6	11,7	2075,6	8,06	1614,8	40,93	66,99987	6,72269	0,06132	0,27391	0,00231	0,924581	-24,8121				
4.sSMPABC094	203229	41460	0,544926	0,20174	0,00228	0,30121	0,00246	8,37538	0,07729	2840,325	18,3	1697,3	12,2	2272,5	8,37	1530,6	49,73	66,11088	8,37538	0,07729	0,30121	0,00246	0,885007	-25,3113				
4.sSMPABC080	392312,6	81712,54	0,043401	0,20629	0,00237	0,30604	0,00263	8,69971	0,08478	2876,621	18,55	1721,2	12,96	2307	8,87	1485	52,75	65,96561	8,69971	0,08478	0,30604	0,00263	0,881838	-25,3923				
4.sSMPABC025	105775,9	19149,06	0,482273	0,18207	0,00229	0,26816	0,00229	6,72682	0,0681	2671,817	20,64	1531,5	11,63	2076,2	8,95	1833,2	58,28	64,43356	6,72682	0,0681	0,26816	0,00229	0,843537	-26,2354				
4.sSMPABC111	777163,9	133150,7	0,167866	0,17048	0,00237	0,25058	0,00222	5,88175	0,07114	2562,361	23,08	1441,4	11,44	1958,5	10,5	2823,6	174,26	64,12516	5,88175	0,07114	0,25058	0,00222	0,732486	-26,4029				
4.sSMPABC096	527753	107820,1	0,678466	0,20296	0,00221	0,28634	0,00228	8,01004	0,07015	2850,149	17,64	1623,2	11,4	2232,2	7,91	1450,8	44,88	62,48152	8,01004	0,07015	0,28634	0,00228	0,909201	-27,2825				
4.sSMPABC088	254091,5	46980,99	0,259648	0,18452	0,00216	0,25988	0,0022	6,60727	0,06482	2693,922	19,25	1489,2	11,24	2060,3	8,65	1985,9	71,68	61,65055	6,60727	0,06482	0,25988	0,0022	0,862905	-27,7193				
4.sSMPABC027	615439,1	96939,18	0,143456	0,15708	0,00163	0,22084	0,0017	4,78079	0,03847	2424,469	17,51	1286,3	8,98	1781,5	6,76	1662,8	33,11	61,50198	4,78079	0,03847	0,22084	0,0017	0,95664	-27,7968				
4.sSMPABC117	391797,7	85886,31	0,432886	0,21668	0,00235	0,29402	0,00236	8,78066	0,07722	2956,182	17,42	1661,6	11,74	2315,5	8,02	1020,7	32,11	60,64636	8,78066	0,07722	0,29402	0,00236	0,912709	-28,2401				
4.sSMPABC122	162220,4	40147,37	0,396117	0,24282	0,00607	0,31121	0,00424	10,41228	0,24096	3138,547	39,16	1746,7	20,84	2472,1	21,44	854,5	103,11	58,47026	10,41228	0,24096	0,31121	0,00424	0,588726	-29,3435				
4.sSMPABC048	283023	50080	0,158923	0,17535	0,00192	0,23475	0,00198	5,67244	0,05172	2609,374	18,1	1359,3	10,34	1927,2	7,87	1598,1	40,58	58,22114	5,67244	0,05172	0,23475	0,00198	0,925062	-29,4676				
4.sSMPABC086	453987	76231,29	0,439706	0,16678	0,00199	0,2202	0,00188	5,05948	0,05092	2525,586	19,85	1282,9	9,91	1829,3	8,53	868,9	34,79	57,409	5,05948	0,05092	0,2202	0,00188	0,848317	-29,8693				
4.sSMPABC107	1285706	238677	0,499873	0,18421	0,00218	0,24139	0,00206	6,12607	0,06181	2691,143	19,43	1393,9	10,68	1994	8,81	1871,3	73,98	56,94813	6,12607	0,06181	0,24139	0,00206	0,845807	-30,0953				
4.sSMPABC108	713808,8	117784,3	0,316727	0,16462	0,00194	0,21494	0,00179	4,87491	0,04797	2503,675	19,65	1255,1	9,47	1797,9	8,29	2298,8	93,85	56,75245	4,87491	0,04797	0,21494	0,00179	0,846316	-30,1908				
4.sSMPABC134	524186,1	90316,46	0,639754	0,17066	0,00264	0,21934	0,00199	5,15902	0,06987	2564,126	25,68	1278,4	10,52	1845,9	11,52	997	78,3	55,60857	5,15902	0,06987	0,21934	0,00199	0,669903	-30,7438				
4.sSMPABC112	526456,5	91881,37	0,217256	0,1743	0,00204	0,22187	0,0018	5,32954	0,05138	2599,367	19,41	1291,7	9,47	1873,6	8,24	2021,8	79	54,95084	5,32954	0,05138	0,22187	0,0018	0,84153	-31,0579				
4.sSMPABC077	99202,72	23645,94	0,23935	0,23425	0,00264	0,28766	0,00238	9,28776	0,08467	3081,315	17,87	1629,8	11,9	2366,8	8,36	1489,4	44,73	54,77973	9,28776	0,08467	0,28766	0,00238	0,907567	-31,1391				
4.sSMPABC100	92300,97	17419,6	0,349899	0,18737	0,00238	0,23388	0,00196	6,0399	0,06311	2719,213	20,82	1354,8	10,26	1981,6	9,1	1493,7	67,13	53,73487	6,0399	0,06311	0,23388	0,00196	0,802037	-31,631				
4.sSMPABC139	269239,8	48814,1	0,130167	0,17894	0,0026	0,22266	0,00207	5,48808	0,07041	2643,071	23,88	1295,9	10,94	1898,7	11,02	1951,8	122,22	53,48407	5,48808	0,07041	0,22266	0,00207	0,724627	-31,748				
4.sSMPABC037	179209,3	38270,42	0,199494	0,20997	0,00244	0,25485	0,00197	7,37282	0,06602	2905,314	18,69	1463,5	10,1	2157,7	8,01	2211,8	80,16	52,56577	7,37282	0,06602	0,25485	0,00197	0,863256	-32,1731				
4.sSMPABC013	194582	33046	0,179055	0,16834	0,00233	0,20391	0,00188	4,72955	0,05513	2541,206	23,06	1196,3	10,07	1772,5	9,77	1154,2	49,47	51,83482	4,72955	0,05513	0,20391	0,00188	0,790954	-32,5078				
4.sSMPABC133	322798,5	53107,26	0,755622	0,16379	0,00215	0,19632	0,00162	4,43192	0,04888	2495,166	21,96	1155,5	8,74	1718,3	9,14	929,5	51,73	51,29381	4,43192	0,04888	0,19632	0,00162	0,748189	-32,7533				
4.sSMPABC110	882673,4	170863,2	0,308118	0,19223	0,00232	0,22998	0,00194	6,08971	0,06222	2761,335	19,68	1334,4	10,17	1988,8	8,91	2047,3	90,96	50,95923	6,08971	0,06222	0,22998	0,00194	0,825616	-32,9043				
4.sSMPABC061	450331,9	85935,47	0,42463	0,18975	0,002	0,22605	0,00186	5,91153	0,05116	2739,996	17,21	1313,8	9,78	1962,9	7,52	1942,2	41,44	50,5937	5,91153	0,05116	0,22605	0,00186	0,950775	-33,0684				
4.sSMPABC128	812654,9	131595,5	0,432483	0,16197	0,002	0,18936	0,00154	4,22737	0,04345	2476,33	20,7	1117,9	8,35	1679,4	8,44	963,4	46,13	49,77189	4,22737	0,04345	0,18936	0,00154	0,791249	-33,4346				
4.sSMPABC023	677696,9	144797,9	0,262647	0,21164	0,00221	0,24452	0,00201	7,13231	0,06096	2918,145	16,78	1410,2	10,41	2128,1	7,61	1400,8	27,99	49,09233	7,13231	0,06096	0,24452	0,00201	0,96176	-33,7343				
4.sSMPABC022	691913,7	141474,2	0,565836	0,20322	0,0021	0,23308	0,00186	6,5281	0,05389	2852,233	16,71	1350,6	9,74	2049,7	7,27	1114,1	20,04	48,23782	6,5281	0,05389	0,23308	0,00186	0,966688	-34,1074				
4.sSMPABC095	426259	92754,73	0,517687	0,21576	0,00253	0,24403	0,00192	7,25689	0,0685	2949,314	18,81	1407,6	9,95	2143,5	8,42	1772	72,74	47,71952	7,25689	0,0685	0,24403	0,00192	0,833524	-34,3317				
4.sSMPABC119	418793,6	42949,48	0,302323	0,09988	0,00109	0,06907	0,00055	0,95077	0,00846	1621,849	20,26	430,5	3,34	678,5	4,41	286,2	9,31	42,39257	0,95077	0,00846	0,06907	0,00055	0,894908	-36,5512				
4.sSMPABC041	213440,4	44909,99	0,282308	0,2086	0,00223	0,2047	0,00162	5,88543	0,04968	2894,699	17,25	1200,5	8,69	1959,1	7,33	1790,6	40	36,80966	5,88543	0,04968	0,2047	0,00162	0,937549	-38,7219				
4.sSMPABC039	112953	22958	0,084825	0,20371	0,00329	0,19865	0,00198	5,57637	0,07584	2856,154	26,06	1168	10,67	1912,5	11,71	2228,1	135,72	36,25856	5,57637	0,07584	0,19865	0,00198	0,732875	-38,9281				
4.sSMPABC129	1536412	303519,4	0,540542	0,20651	0,00358	0,19696	0,0019	5,60381	0,08632	2878,353	27,9	1159	10,21	1916,7	13,27	980,7	70,47	34,62468	5,60381	0,08632	0,19696	0,0019	0,62625	-39,5315				
4.sSMPABC015	56172	12278	0,240344	0,21731	0,00337	0,18761	0,00199	5,61338	0,07245	2960,865	24,78	1108,4	10,79	1918,2	11,12	1159,3	47,21	26,93973	5,61338	0,07245	0,18761	0,00199	0,821832	-42,2167				
4.sSMPABC053	192459,7	35294,77	0,221149	0,18173	0,00197	0,12763	0,00099	3,19669	0,02691	2668,722	17,84	774,3	5,66	1456,4	6,51	904,1	23,46	11,90753	3,19669	0,02691	0,12763	0,00099	0,921445	-46,8347				
4.sSMPABC056	54329,89	9939,009	0,203261	0,1834	0,00213	0,12372	0,00106	3,12696	0,02975	2683,859	19,08	751,9	6,1	1439,3	7,32	895,4	22,8	8,578268	3,12696	0,02975	0,12372	0,00106	0,900536	-47,7593				
4.sSMPABC098	168630	44197,49	0,410634	0,25617	0,00364	0,1515	0,0013	5,34886	0,06399	3223,305	22,27	909,4	7,3	1876,7	10,23	1835,9	119,03	-6,36684	5,34886	0,06399	0,1515	0,0013	0,717265	-51,5426				
4.sSMPABC040	127018	31292	0,292018	0,24313	0,0031	0,14366	0,00118	4,81161	0,04836	3140,574	20,11	865,3	6,65	1786,9	8,45	2349,5	102,19	-6,50641	4,81161	0,04836	0,14366	0,00118	0,817241	-51,5754				
4.sSMPABC140	192595,5	33615,96	0,102842	0,17207	0,00262	0,08633	0,00082	2,04487	0,02759	2577,88	25,19	533,8	4,89	1130,6	9,2	1391,1	93,68	-11,8022	2,04487	0,02759	0,08633	0,00082	0,703989	-52,7861				
4.sSMPABC064	267086	75912	0,523192	0,28116	0,00567	0,13903	0,00161	5,37115	0,09569	3369,385	31,12	839,2	9,12	1880,3	15,25	1386,9	131,12	-24,0586	5,37115	0,09569	0,13903	0,00161	0,650007	-55,3688				
4.sSMPABC038	105577	23273	0,207529	0,21671	0,00286	0,10403	0,00088	3,1061	0,03268	2956,405	21,13	638	5,17	1434,2	8,08	2422,8	109,62	-24,7962	3,1061	0,03268	0,10403	0,00088	0,804003	-55,5153				
4.sSMPABC126	153295,4	36993,17	0,06858	0,23439	0,00358	0,11247	0,00108	3,63209	0,04877	3082,269	24,15	687,1	6,28	1556,6	10,69	4041,6	264,02	-26,5464	3,63209	0,04877	0,11247	0,00108	0,71514	-55,8589				

FILE NAME	CORRECT		0																					
	Pb206*	Pb207*	Th/U	207/206	1s	206/238	1s	207/235	1s	206/207	206/238		207/235		208/232		Conc	207/235		206/238		RHO	Disc.	
4.sSMPABC093	306927,3	92284,11	0,526492	0,29223	0,00478	0,14125	0,00131	5,68786	0,08138	3429,515	25,21	851,7	7,41	1929,5	12,36	1108,7	80,06	-26,5469	5,68786	0,08138	0,14125	0,00131	0,648208	-55,859
4.sSMPABC104	144200,3	28236,02	0,369657	0,19408	0,00259	0,08108	0,00073	2,16803	0,02477	2777,048	21,68	502,6	4,37	1170,8	7,94	434,1	21,84	-32,9487	2,16803	0,02477	0,08108	0,00073	0,78804	-57,0721
4.sSMPABC114	132394,5	28813	0,178657	0,21298	0,0029	0,09217	0,00083	2,70352	0,03144	2928,358	21,82	568,4	4,93	1329,4	8,62	1487,6	80,37	-33,8846	2,70352	0,03144	0,09217	0,00083	0,774347	-57,2439
4.sSMPABC052	129496	25547	0,265455	0,19827	0,0029	0,07397	0,00066	2,0195	0,02432	2812,008	23,67	460	3,99	1122,1	8,18	615,1	32,72	-43,9348	2,0195	0,02432	0,07397	0,00066	0,740915	-59,0054
4.sSMPABC042	135508,9	35224,09	0,234373	0,25351	0,00267	0,09157	0,00071	3,19918	0,02589	3206,82	16,53	564,8	4,19	1457	6,26	1870,2	38,65	-57,9674	3,19918	0,02589	0,09157	0,00071	0,958102	-61,2354
4.sSMPABC089	171186,5	35846,34	0,138991	0,20752	0,00263	0,06202	0,00053	1,77337	0,01866	2886,276	20,43	387,9	3,19	1035,8	6,83	1479,4	67,29	-67,0276	1,77337	0,01866	0,06202	0,00053	0,812142	-62,5507
4.sSMPABC092	117009	25049	0,21233	0,21458	0,00323	0,05932	0,00054	1,75203	0,02228	2940,457	24,15	371,5	3,29	1027,9	8,22	1188,6	66,45	-76,6891	1,75203	0,02228	0,05932	0,00054	0,715845	-63,8584
4.sSMPABC091	121187,8	28931,1	0,210522	0,23595	0,00325	0,06648	0,00058	2,16063	0,02481	3092,854	21,81	414,9	3,49	1168,5	7,97	1442,6	72	-81,6341	2,16063	0,02481	0,06648	0,00058	0,759785	-64,4929
4.sSMPABC054	166459,6	46850,62	0,166756	0,27171	0,00366	0,07219	0,00066	2,70058	0,03061	3315,921	20,96	449,3	3,97	1328,6	8,4	2156,4	101	-95,7044	2,70058	0,03061	0,07219	0,00066	0,806604	-66,1824
4.sSMPABC036	6772,146	2674,771	0,332056	0,30802	0,00827	0,06476	0,0012	2,74751	0,05856	3511,029	40,86	404,5	7,24	1341,4	15,87	1139,9	61,78	-131,619	2,74751	0,05856	0,06476	0,0012	0,869386	-69,8449

FILE NAME	CORRECTED	0																									
	Pb206*	Pb207*	Th/U	207/206	1s	206/238	1s	207/235	1s	206/207		206/238		207/235		208/232		Conc		207/235		206/238		RHO		Disc.	
Padrão Primário																											
4.sSMPABC001	50838,07287	3059,997	0,010494	0,05941	0,00072	0,09752	0,0008	0,79867	0,00809	582,1536		26,01	599,9	4,7	596,1	4,57	888,4	42,13	100,6334	0,79867	0,00809	0,09752	0,0008	0,80987	0,637477		
4.sSMPABC002	51536	3123	0,010687	0,05989	0,00072	0,09691	0,0008	0,79994	0,00807	599,6027		25,86	596,3	4,68	596,8	4,55	502,4	34,55	99,91615	0,79994	0,00807	0,09691	0,0008	0,818286	-0,08378		
4.sSMPABC003	48909,68634	3067,522	0,010501	0,06091	0,00074	0,09682	0,0008	0,81289	0,00829	636,0573		25,92	595,7	4,68	604,1	4,64	663,8	40,51	98,58989	0,81289	0,00829	0,09682	0,0008	0,810219	-1,3905		
4.sSMPABC006	44715	2691	0,010295	0,05923	0,00073	0,09894	0,00083	0,80776	0,0085	575,5605		26,61	608,2	4,85	601,2	4,77	626,2	40,79	101,1509	0,80776	0,0085	0,09894	0,00083	0,797204	1,164338		
4.sSMPABC007	45917,26199	2718,855	0,010625	0,0593	0,00072	0,09865	0,00082	0,80637	0,00836	578,1277		26,32	606,5	4,83	600,4	4,7	235,2	38,61	101,0058	0,80637	0,00836	0,09865	0,00082	0,801761	1,015989		
4.sSMPABC008	45982	2742	0,010708	0,05909	0,00088	0,09595	0,00084	0,78132	0,01012	570,4136		32,03	590,6	4,94	586,2	5,77	126	48,66	100,745	0,78132	0,01012	0,09595	0,00084	0,6759	0,750597		
4.sSMPABC051	43509,67392	2559,561	0,010738	0,0612	0,00084	0,09867	0,00083	0,83242	0,00973	646,2707		29,12	606,6	4,86	615	5,39	524,2	59,96	98,61523	0,83242	0,00973	0,09867	0,00083	0,719652	-1,36585		
4.sSMPABC052	48991	3047	0,010321	0,06177	0,00077	0,09802	0,00082	0,83471	0,00882	666,1553		26,42	602,8	4,82	616,2	4,88	688	53,17	97,77704	0,83471	0,00882	0,09802	0,00082	0,79171	-2,17462		
4.sSMPABC101	46944,61724	2981,124	0,010593	0,06041	0,00081	0,09786	0,00084	0,81478	0,00943	618,292		28,78	601,8	4,91	605,1	5,28	645,6	60,44	99,45165	0,81478	0,00943	0,09786	0,00084	0,741656	-0,54536		
4.sSMPABC102	39887,53357	1632,29	0,0102	0,05983	0,00098	0,09605	0,00086	0,79202	0,01137	597,432		35,02	591,2	5,06	592,3	6,44	541	77,5	99,81394	0,79202	0,01137	0,09605	0,00086	0,623701	-0,18572		
Padrão Secundário																											
4.sSMPABC004	41717,53315	2074,418	0,075446	0,05946	0,00079	0,09087	0,00077	0,74457	0,00843	583,9802		28,45	560,7	4,55	565,1	4,91	456,5	16,84	99,21527	0,74457	0,00843	0,09087	0,00077	0,748425	-0,77862		
4.sSMPABC005	43280,6295	2080,226	0,077544	0,0557	0,00086	0,09203	0,00081	0,7062	0,00959	440,4299		33,68	567,5	4,76	542,5	5,7	496,7	22,48	104,4053	0,7062	0,00959	0,09203	0,00081	0,648134	4,608295		
4.sSMPABC053	57789,99982	2979,639	0,07353	0,06256	0,0012	0,09059	0,00091	0,78128	0,01345	693,3078		40,21	559	5,38	586,2	7,67	499,8	40,07	95,13417	0,78128	0,01345	0,09059	0,00091	0,583506	-4,64005		
4.sSMPABC054	55750,46194	3149,427	0,07763	0,05759	0,00076	0,0927	0,00077	0,73591	0,00827	514,1986		28,91	571,5	4,57	560	4,84	425,4	20,67	102,0122	0,73591	0,00827	0,0927	0,00077	0,739146	2,053571		
4.sSMPABC103	50943	3033	0,078022	0,06053	0,00129	0,09405	0,00096	0,78496	0,01504	622,5739		45,23	579,5	5,67	588,3	8,56	619	93	98,48145	0,78496	0,01504	0,09405	0,00096	0,532736	-1,49584		
4.sSMPABC104	48428	2852	0,080083	0,05937	0,00107	0,09451	0,00087	0,77351	0,01231	580,6908		38,72	582,1	5,14	581,8	7,05	687,1	84,08	100,0515	0,77351	0,01231	0,09451	0,00087	0,578428	0,051564		
Amostras																											
4.sSMPABC105	35056	1834	0,082531	0,05261	0,00139	0,12384	0,00148	0,89834	0,02214	312,014		58,71	752,6	8,5	650,8	11,84	447,7	58,93	113,5264	0,89834	0,02214	0,12384	0,00148	0,484913	15,64229		
4.sSMPABC106	34069,94042	2133,115	0,079173	0,05814	0,00151	0,12693	0,00154	1,01662	0,0246	535,0416		56,53	770,3	8,79	712,2	12,39	712,3	89,77	107,5425	1,01662	0,0246	0,12693	0,00154	0,501395	8,157821		
4.sSMPABC031	175614	59953	0,576004	0,3397	0,00451	0,83681	0,00775	39,14433	0,44759	3661,421		20,16	3919,6	27,2	3749,3	11,32	4588,7	259,51	104,3448	39,14433	0,44759	0,83681	0,00775	0,80996	4,542181		
4.sSMPABC035	94148	18396	0,458177	0,1953	0,00234	0,56963	0,00513	15,33942	0,15722	2787,316		19,46	2906,3	21,06	2836,6	9,77	2505,9	100,09	102,3982	15,33942	0,15722	0,56963	0,00513	0,87867	2,457167		
4.sSMPABC038	500017,2221	109107,8	0,342918	0,21743	0,0024	0,61303	0,00509	18,37321	0,16832	2961,756		17,66	3082,1	20,35	3009,5	8,82	6654	223,27	102,3555	18,37321	0,16832	0,61303	0,00509	0,906328	2,412361		
4.sSMPABC020	81926	14716	0,313544	0,1807	0,00328	0,5352	0,00617	13,30492	0,21558	2659,305		29,82	2763,3	25,93	2701,5	15,3	2686	258,28	102,2365	13,30492	0,21558	0,5352	0,00617	0,711497	2,287618		
4.sSMPABC037	97503	22062	0,264179	0,22179	0,00247	0,61622	0,00541	18,83768	0,17847	2993,731		17,77	3094,9	21,56	3033,5	9,14	2145,4	65,11	101,9839	18,83768	0,17847	0,61622	0,00541	0,926667	2,024065		
4.sSMPABC021	80307	14461	0,26114	0,18068	0,00318	0,532	0,00587	13,23326	0,20589	2659,122		28,88	2749,9	24,71	2696,4	14,69	3559,4	417,47	101,9455	13,23326	0,20589	0,532	0,00587	0,709183	1,984127		
4.sSMPABC049	182766	37478	0,301634	0,20432	0,00257	0,57834	0,00504	16,28909	0,17371	2861,02		20,31	2942	20,6	2893,9	10,2	2641,8	150,12	101,6349	16,28909	0,17371	0,57834	0,00504	0,817183	1,662117		
4.sSMPABC018	126290	25474	0,304797	0,19935	0,00212	0,56375	0,00465	15,49159	0,1344	2820,882		17,23	2882,1	19,16	2846	8,28	2284,9	60,52	101,2526	15,49159	0,1344	0,56375	0,00465	0,950743	1,268447		
4.sSMPABC023	80162	14866	0,442544	0,18421	0,00212	0,52852	0,00446	13,41701	0,1265	2691,143		18,86	2735,2	18,81	2709,5	8,91	2121,1	73,32	100,9396	13,41701	0,1265	0,52852	0,00446	0,895032	0,948514		
4.sSMPABC097	68717	13457	0,274877	0,19954	0,00353	0,56009	0,00561	15,40235	0,23793	2822,438		28,56	2867	23,18	2840,5	14,73	4180,9	649,67	100,9243	15,40235	0,23793	0,56009	0,00561	0,6484	0,932934		
4.sSMPABC090	336174,8998	76291,83	0,083859	0,22143	0,00313	0,60031	0,00568	18,32752	0,23263	2991,118		22,58	3031,1	22,87	3007,1	12,22	1976,6	133,09	100,7918	18,32752	0,23263	0,60031	0,00568	0,745437	0,798111		
4.sSMPABC141	70713	15418	0,300439	0,21355	0,00849	0,58404	0,0107	17,1614	0,61994	2932,68		62,89	2965,2	43,54	2943,9	34,66	3896,3	1678,28	100,7183	17,1614	0,61994	0,58404	0,0107	0,507159	0,72353		
4.sSMPABC026	51385	10150	0,206348	0,19747	0,00712	0,55229	0,01226	15,00067	0,50585	2805,399		57,79	2834,7	50,9	2815,3	32,1	7744,9	2936,86	100,6844	15,00067	0,50585	0,55229	0,01226	0,658282	0,689092		
4.sSMPABC069	49228,78165	8997,787	0,349714	0,18414	0,00264	0,52218	0,00479	13,25325	0,16124	2690,515		23,47	2708,4	20,29	2697,9	11,49	2607,4	207,22	100,3877	13,25325	0,16124	0,52218	0,00479	0,753989	0,389192		
4.sSMPABC062	50415,43477	8983,341	0,323337	0,18039	0,00281	0,51346	0,00526	12,76314	0,17476	2656,459		25,57	2671,4	22,39	2662,3	12,89	2455,5	178,23	100,3406	12,76314	0,17476	0,51346	0,00526	0,74816	0,34181		
4.sSMPABC082	82044,79906	15497,59	0,29626	0,1891	0,00293	0,53199	0,00491	13,86714	0,1847	2734,35		25,28	2749,8	20,64	2740,7	12,61	3337,5	388,76	100,3309	13,86714	0,1847	0,53199	0,00491	0,692944	0,332032		
4.sSMPABC011	130036	26412	0,362228	0,20122	0,00248	0,55612	0,00473	15,41399	0,15633	2836,117		19,93	2850,6	19,59	2841,2	9,67	2287,6	110,72	100,3298	15,41399	0,15633	0,55612	0,00473	0,83862	0,330846		
4.sSMPABC057	82895	21847	0,544277	0,26392	0,00358	0,66464	0,00593	24,17515	0,27628	3270,259		21,18	3285,1	22,98	3275,5	11,14	3161	230,52	100,2922	24,17515	0,27628	0,66464	0,00593	0,780707	0,293085		
4.sSMPABC118	65547	13987	0,440752	0,21483	0,00643	0,57742	0,00838	17,03218	0,46553	2942,338		47,57	2938,2	34,23	2936,6	26,21	3372,4	831,32	100,0545	17,03218	0,46553	0,57742	0,00838	0,530976	0,054485		
4.sSMPABC100	89367	16052	0,687755	0,18016	0,00355	0,50952	0,00558	12,65468	0,22494	2654,344		32,3	2654,6	23,81	2654,3	16,73	2409,7	296,9	100,0113	12,65468	0,22494	0,50952	0,00558	0,616109	0,011302		
4.sSMPABC027	78038	16374	0,191094	0,21133	0,00943	0,56562	0,01525	16,32205	0,68027	2915,772		70,47	2889,8	62,79	2895,9	39,88	3684,9	1197,75	99,78891	16,32205	0,68027	0,56562	0,01525	0,646902	-0,21064		
4.sSMPABC024	202171	35469	0,429191	0,17366	0,00313	0,49097	0,00547	11,72027	0,18997	2593,233		29,77	2574,9	23,66	2582,3	15,16	2394,6	233,61	99,71261	11,72027	0,18997	0,49097	0,00547	0,687361	-0,28657		
4.sSMPABC126	40172	11664	0,245956	0,29325	0,00569	0,69977	0,00798	28,30552	0,49429	3434,928		29,79	3419,8	30,25	3429,7	17,13	3836,9	621,39	99,71051	28,30552	0,49429	0,69977	0,00798	0,653036	-0,28865		
4.sSMPABC032	163263	19674	0,037051	0,11944	0,00221	0,34855	0,00382	5,71902	0,0951	1947,862		32,65	1927,7	18,27	1934,2	14,37	1986,7	187,98	99,66281	5,71902	0,0951	0,34855	0,00382	0,659082	-0,33606		
4.sSMPABC122	106290	19785	0,231567	0,19003	0,00336	0,52615	0,00504	13,78141	0,21356	2742,421		28,82	2725,2	21,27	2734,8	14,67	3539,1	531,46	99,64773	13,78141	0,21356	0,52615	0,00504	0,618151	-0,35103		
4.sSMPABC063	170554,8066	45810,7	0,409849	0,25959	0,00631	0,64837	0,00858	23,17711	0,52538	3244,219		37,77	3221,9	33,53	3234,4	22,06	#NOME?	NaN		99,61203	23,17711	0,52538	0,64837	0,00858	0,583781	-0,38647	
4.sSMPABC061	56751	10154	0,416184	0,17931	0,00249	0,50201	0,00482	12,40674	0,14939	2646,499		22,83	2622,4	20,67	2635,7	11,31	2444,1	143,12	99,49283	12,40674	0,14939	0,50201	0,00482	0,79739	-0,50461		
4.sSMPABC047	198086	38301	0,604013	0,19018	0,00525	0,52404	0,00727	13,74322	0,34553	2743,719		44,65	2716,3	30,75	2732,2	23,8	1977,4	540,6	99,41464	13,74322	0,34553	0,52404	0,00727	0,551789	-0,58195		
4.sSMPABC129	49014	11920	0,423073	0,24771	0,00503	0,62715	0,00711	21,43309	0,39343	3170,189		31,85	3138,3	28,16	3158,4	17,81	4000,4	726,6	99,35953	21,43309	0,39343	0,62715	0,00711	0,617612	-0,6364		
4.sSMPABC071	60191,54098	10992,56	0,284328	0,18629	0,00285	0,51513	0,00485	13,22483	0,17367	2709,682		25,01	2678,5	20,64	2695,8	12,4	2812,6	270,38	99,35412	13,22483	0,17367	0,51513	0,00485	0,716952	-0,64174		
4.sSMPABC120	123867,5928	26703,46	0,391524	0,21819	0,00339	0,57624	0,00526	17,3311	0,23461	2967,382		24,8	2933,4	21,51	2953,3	13	3139,5	364,72	99,32161	17,3311	0,23461	0,57624	0,00526	0,674314	-0,67382		
4.sSMPABC036	254729	51163	0,163056	0,19296	0,00245	0,5255	0,00493	13,96797	0,15744	2767,556		20,66	2722,5	20,83	2747,5	10,68	1980,7	103,87	99,08173	13,96797	0,15744	0,5255	0,00493	0,832324	-0,90992		
4.sSMPABC131	88840,57772	19227,45	0,345216	0,21963	0,00418	0,57574	0,00604	17,42754	0,29915	2977,981		30,33	2931,3	24,7	2958,7	16,48	3434,2	532,44	99,06526	17,42754	0,29915	0,57574	0,00604	0,611164	-0,92608		
4.sSMPABC132	201870,7264	42403,59	0,086164	0,19294	0,00569	0,52047	0,00768	13,70794	0,38335	2767,386		47,56	2701,2	32,58	2729,7	26,47	1308,6	145,71	98,94491	13,70794	0,38335	0,52047	0,00768	0,527646	-1,04407		
4.sSMPABC088	831936,4789	109722,5	0,460893	0,13296	0,00219	0,38127	0,00365	6,98878	0,10288	2137,423		28,55	2082,2	17,02	2110	13,08	2799,3	299,67	98,66487	6,98878	0,10288	0,38127	0,00365	0,650325	-1,31754		
4.sSMPABC043	232526	45676	0,343197	0,19438	0,00343	0,52239	0,0054	13,98339	0,21991	2779,58		28,63	2709,3	22,85	2748,6	14,9	1555,9	126,35	98,54944	13,98339	0,21991	0,52239	0,0054	0,657304	-1,42982		
4.sSMPABC117	74195	16089	0,410279	0,2215	0,00389	0,57244	0,00585	17,47673	0,27423	2991,627		27,98	2917,8	23,98	2961,4	15,07	2923,4	347,5	98,50572	17,47673	0,27423	0,57244	0,00585	0,651285	-1,47228		
4.sSMPABC073	67776	12380	0,304752	0,18294	0,00281	0,49533	0,00473	12,48794	0,16618	2679,705		25,19	2593,7	20,38	2641,8	12,51	2580,1	229,34	98,14551	12,48794	0,16618	0,49533	0,00473	0,717594	-1,82073		
4.sSMPABC070	38252	7151	0,278473	0,18756	0,00295	0,4926	0,00493	12,73411	0,17305	2720,883		25,66	2581,9	21,28	2660,2	12,79	2785,2	246,07	96,96735	12,73411	0,17305	0,4926	0,00493	0,736461	-2,94339		
4.sSMPABC050	81268	15947	0,425727	0,19573	0,00281	0,50404	0,00456	13,59707	0,16459	2790,918		23,27	2631,1	19,54	2722,1	11,45	2666,3	236,77	96,54137	13,59707	0,16459	0,50404	0,00456	0,74738	-3,34301		
4.sSMPABC142	120212	25122	0,541346	0,19999	0,0138	0,50927	0,01574	13,93999	0,93793	2826,115		108,34	2653,5	67,21	2745,6	63,75	1906,2	1019,2	96,52911	13,93999	0,93793	0,50927	0,01574	0,459355	-3,35446		
4.sSMPABC121	237797,9925	41222,35	0,412658	0,1897	0,00765	0,46599	0,00799	12,0907	0,44799	2739,563		64,85	2466	35,11	2611,5	34,75	2263,9	620,75	94,09976	12,0907	0,44799	0,46599	0,00799	0,462757	-5,57151		
4.sSMPABC081	90164	16689	0,278619	0,1856	0,0026	0,45695	0,00396	11,69076	0,1378	2703,558		22,92	2426,1	17,5	2580	11,03	2530,4	217,23	93,65649	11,69076	0,1378	0,45695	0,00396	0,735225	-5,96512		
4.sSMPABC014	184255	37858	0,198008	0,20749	0,00306	0,48718	0,0048	13,9328	0,17962	2886,041		23,72	2558,4	20,81	2745,1	12,21	2667,4	192,32	92,70247	13,9328	0,17962	0,48718	0,0048	0,76425	-6,80121		
4.sSMPABC093	148112	33294	0,222884	0,2263	0,00393	0,512	0,00484	15,96698	0,24093	3026,064		27,62	2665,2	20,63	2874,8	14,42	3344,2	521,7	92,13567	15,96698	0,24093	0,512	0,00484	0,62648	-7,29094		
4.sSMPABC033	258418	58665	0,332967	0,22599	0,00315	0,50575	0,00474	15,75108	0,19109	3023,865		22,17	2638,5	20,28	2861,8	11,58	2573,2	191,41	91,53686	15,75108	0,19109	0,50575	0,00474	0,772529	-7,80278		
4.sSMPABC091	106528	24251	0,18506	0,22923	0,00476	0,50692	0,00578	16,02191	0,30119	3046,679		32,87	2643,4	24,74	2878,1	17,97	2054,3	249,44	91,12128	16,02191	0,30119	0,50692	0,00578	0,606544	-8,15469		
4.sSMPABC028	18703	3620	0,473246	0,19088	0,00467	0,44377	0,00723	11,67113	0,258	2749,759		39,62	2367,5	32,26	2578,4	20,67	3588,2	461,39	91,09187	11,67113	0,258	0,44377	0,00723	0,73701	-8,17949		
4.sSMPABC030	312958	62541	0,259436	0,19972	0,00234	0,449	0,00383	12,35877	0,12165	2823,91		18,97	2390,8	17,03	2632	9,25	2186,5	96,99	89,91133	12,35877	0,12165	0,449	0,00383	0,866594	-9,16413		
4.sSMPABC058	174047	45981	0,59071	0,24316	0,00541	0,50405	0,00647	17,00332	0,34815	3140,77		34,88	2631,2	27,72	2935	19,64	2584,6	374,6	88,45394	17,00332	0,34815	0,50405	0,00647	0,6269	-10,3509		
4.sSMPABC086	156572,0384	29882,15	0,296841	0,19117	0,00379	0,42207	0,00455	11,11301	0,1992	2752,253		32,24	2269,9	20,61	2532,6	16,7	1918,7	231,08	88,4268	11,11301	0,1992	0,42207	0,00455	0,601408	-10,3727		
4.sSMPABC111	129270,0986	24545,87	0,225123	0,19134	0,00377	0,42042	0,00421	11,08627	0,19098	2753,714		32,02	2262,4	19,09	2530,4	16,04	4358,2	865,78	88,15417	11,08627	0,19098	0,42042	0,00421	0,581295	-10,5912		

FILE NAME	CORRECTED	0																										
	Pb206*	Pb207*	Th/U	207/206	1s	206/238	1s	207/235	1s	206/207		206/238		207/235		208/232		Conc	207/235		206/238		RHO	Disc.
4.sSMPABC125	104405	24852	0,121428	0,1876	0,01497	0,4039	0,01993	10,33556	0,9284	2721,235	125,76	2187	91,5	2465,3	83,16	#NOME?	NaN	87,27481	10,33556	0,9284	0,4039	0,01993	0,549329	-11,2887
4.sSMPABC098	260527	47573	0,228875	0,18281	0,00287	0,39554	0,00372	9,9702	0,13831	2678,529	25,78	2148,5	17,17	2432	12,8	2274,5	215,46	86,80475	9,9702	0,13831	0,39554	0,00372	0,677958	-11,6571
4.sSMPABC022	96867	17908	0,420842	0,18267	0,00263	0,39198	0,00376	9,86052	0,12198	2677,262	23,65	2132	17,41	2421,8	11,4	2142,3	116,69	86,40713	9,86052	0,12198	0,39198	0,00376	0,775417	-11,9663
4.sSMPABC116	120819	21333	0,384037	0,18071	0,00421	0,38581	0,00447	9,61862	0,20428	2659,397	38,11	2103,3	20,78	2399	19,53	2593,2	495,86	85,94114	9,61862	0,20428	0,38581	0,00447	0,545533	-12,326
4.sSMPABC087	281168,8034	56103,89	0,243386	0,19246	0,00525	0,39708	0,00529	10,53921	0,25822	2763,298	44,05	2155,6	24,41	2483,4	22,72	1798,7	345,78	84,7931	10,53921	0,25822	0,39708	0,00529	0,543746	-13,1996
4.sSMPABC115	44134	8129	0,350068	0,18565	0,00315	0,37896	0,00379	9,69756	0,14471	2704,003	27,74	2071,4	17,71	2406,5	13,74	2602,9	330,42	83,82254	9,69756	0,14471	0,37896	0,00379	0,670208	-13,9248
4.sSMPABC044	132404,3936	24205,82	0,31918	0,1862	0,00343	0,37517	0,00398	9,61149	0,15593	2708,884	30,05	2053,7	18,64	2398,3	14,92	1889,2	178,48	83,22053	9,61149	0,15593	0,37517	0,00398	0,653907	-14,3685
4.sSMPABC076	28314	5477	0,257901	0,19438	0,00392	0,38718	0,00461	10,37755	0,18375	2779,58	32,68	2109,8	21,41	2469	16,4	3072,6	465,48	82,97469	10,37755	0,18375	0,38718	0,00461	0,672443	-14,5484
4.sSMPABC085	137849,6493	26612,27	0,169197	0,18815	0,00496	0,3774	0,00493	9,79376	0,23419	2726,058	42,75	2064,1	23,09	2415,6	22,03	3208,4	914,89	82,97079	9,79376	0,23419	0,3774	0,00493	0,546294	-14,5513
4.sSMPABC124	78924	14917	0,259393	0,192	0,00547	0,38106	0,00495	10,07909	0,25246	2759,369	46,04	2081,2	23,09	2442,1	23,14	3771,8	1350,77	82,65904	10,07909	0,25246	0,38106	0,00495	0,51861	-14,7783
4.sSMPABC072	45719	8663	0,188364	0,19	0,00341	0,37065	0,00398	9,70481	0,15265	2742,162	29,23	2032,4	18,71	2407,2	14,48	2967,9	364,77	81,55875	9,70481	0,15265	0,37065	0,00398	0,682668	-15,57
4.sSMPABC019	115537	23301	0,212737	0,20029	0,00219	0,38001	0,00315	10,49072	0,09388	2828,561	17,76	2076,3	14,73	2479,1	8,3	1850,7	55,43	80,60011	10,49072	0,09388	0,38001	0,00315	0,926292	-16,2478
4.sSMPABC092	166338,6713	31310,31	0,62849	0,18926	0,00351	0,3624	0,00368	9,45816	0,15696	2735,742	30,23	1993,5	17,4	2383,5	15,24	1720,7	208,17	80,43642	9,45816	0,15696	0,3624	0,00368	0,611896	-16,3625
4.sSMPABC034	939360,2436	116749,4	0,160214	0,12223	0,00132	0,23242	0,00196	3,91561	0,03562	1989,03	19,05	1347,2	10,24	1616,9	7,36	3049,6	95,67	79,9807	3,91561	0,03562	0,23242	0,00196	0,927018	-16,6801
4.sSMPABC042	52994	10227	0,249476	0,19314	0,00562	0,35643	0,00608	9,46849	0,24949	2769,086	46,92	1965,2	28,9	2384,5	24,2	2132,4	376,23	78,66375	9,46849	0,24949	0,35643	0,00608	0,647376	-17,5844
4.sSMPABC138	117162	22375	0,301564	0,1941	0,00354	0,3522	0,00357	9,42346	0,15292	2777,217	29,56	1945,1	17,01	2380,1	14,9	2257,5	260,03	77,63611	9,42346	0,15292	0,3522	0,00357	0,624633	-18,2765
4.sSMPABC135	140654	29352	0,186028	0,20744	0,00293	0,37016	0,00342	10,58238	0,13246	2885,65	22,76	2030,1	16,1	2487,2	11,61	2178,4	180,98	77,48387	10,58238	0,13246	0,37016	0,00342	0,738134	-18,3781
4.sSMPABC060	132081,6227	24758,6	0,15707	0,19305	0,00697	0,34878	0,00615	9,30094	0,30598	2768,321	58,02	1928,8	29,4	2368,1	30,16	1945	406,86	77,22418	9,30094	0,30598	0,34878	0,00615	0,535991	-18,5507
4.sSMPABC113	127130,931	22773,34	0,273381	0,18105	0,00236	0,32799	0,00279	8,18622	0,09011	2662,512	21,41	1828,6	13,54	2251,8	9,96	2259,8	185,08	76,85661	8,18622	0,09011	0,32799	0,00279	0,772777	-18,7939
4.sSMPABC127	143703	25428	0,233793	0,17817	0,00282	0,32047	0,003	7,87174	0,10961	2635,91	26,02	1792	14,67	2216,5	12,54	2064,8	211,44	76,31138	7,87174	0,10961	0,32047	0,003	0,672287	-19,1518
4.sSMPABC009	103918	20663	0,442131	0,1974	0,00233	0,34256	0,003	9,31783	0,0921	2804,82	19,2	1899	14,4	2369,8	9,06	1384,9	52,69	75,208	9,31783	0,0921	0,34256	0,003	0,886012	-19,8667
4.sSMPABC025	129042	21561	0,350629	0,16613	0,00211	0,29067	0,00248	6,65214	0,07006	2519,027	21,2	1644,9	12,4	2066,3	9,3	1532,5	73,8	74,38142	6,65214	0,07006	0,29067	0,00248	0,810108	-20,3939
4.sSMPABC108	264701,428	55640,48	0,299182	0,20996	0,00355	0,3504	0,00343	10,14193	0,15236	2905,236	27,11	1936,5	16,37	2447,8	13,89	1694,4	178,19	73,5967	10,14193	0,15236	0,3504	0,00343	0,651598	-20,8881
4.sSMPABC041	92332	17454	0,567648	0,18834	0,00257	0,31558	0,00293	8,1924	0,09547	2727,72	22,28	1768,1	14,37	2252,5	10,55	911,4	55,23	72,60336	8,1924	0,09547	0,31558	0,00293	0,796714	-21,505
4.sSMPABC016	163263	27545	0,509693	0,16728	0,002	0,28135	0,00241	6,48548	0,06481	2530,611	19,96	1598,2	12,15	2043,9	8,79	931,7	40,32	72,11238	6,48548	0,06481	0,28135	0,00241	0,857176	-21,8064
4.sSMPABC107	256846	56172	0,258865	0,21533	0,00379	0,34839	0,00359	10,3579	0,16566	2946,093	28,12	1926,9	17,16	2467,3	14,81	1725,1	207,05	71,95495	10,3579	0,16566	0,34839	0,00359	0,644292	-21,9025
4.sSMPABC046	225028,7991	43317,84	0,787119	0,19336	0,0026	0,314	0,00261	8,36674	0,09332	2770,953	21,89	1760,4	12,82	2271,6	10,12	1631,1	138,34	70,96115	8,36674	0,09332	0,314	0,00261	0,745234	-22,504
4.sSMPABC110	102219	18702	0,272936	0,18573	0,00311	0,30046	0,00293	7,69341	0,11339	2704,714	27,33	1693,6	14,5	2195,8	13,24	2173,4	256,34	70,34719	7,69341	0,11339	0,30046	0,00293	0,661645	-22,8709
4.sSMPABC099	74643	13791	0,351021	0,18728	0,00307	0,28904	0,00277	7,45858	0,10681	2718,421	26,75	1636,7	13,85	2168	12,82	2505,3	262,98	67,53834	7,45858	0,10681	0,28904	0,00277	0,669216	-24,5065
4.sSMPABC029	363538,9055	64981,09	0,321727	0,17516	0,00228	0,25853	0,0024	6,23873	0,07138	2607,568	21,48	1482,3	12,29	2009,9	10,01	1280	73,78	64,40667	6,23873	0,07138	0,25853	0,0024	0,811372	-26,2501
4.sSMPABC064	365300,7693	80712,42	0,319865	0,20989	0,0032	0,30308	0,003	8,77192	0,12056	2904,696	24,49	1706,6	14,83	2314,6	12,53	1427,7	132,86	64,37361	8,77192	0,12056	0,30308	0,003	0,720204	-26,268
4.sSMPABC096	452324	73468	0,36182	0,15683	0,00454	0,22521	0,00322	4,80989	0,13292	2421,767	48,31	1309,4	16,95	1786,6	23,23	773,8	100,79	63,55583	4,80989	0,13292	0,22521	0,00322	0,517384	-26,71
4.sSMPABC079	192581	39386	0,137831	0,20214	0,00347	0,28855	0,00291	8,04048	0,12241	2843,553	27,67	1634,3	14,58	2235,6	13,75	1736,6	187,64	63,20749	8,04048	0,12241	0,28855	0,00291	0,662425	-26,8966
4.sSMPABC112	191376,3036	36100,15	0,225732	0,19158	0,00295	0,27376	0,0026	7,22967	0,0988	2755,773	25,1	1559,8	13,14	2140,2	12,19	2642,4	239,14	62,7901	7,22967	0,0988	0,27376	0,0026	0,694968	-27,119
4.sSMPABC040	485408,5498	96940,77	0,230341	0,19897	0,00221	0,28088	0,00236	7,70519	0,07176	2817,766	18,01	1595,8	11,88	2197,2	8,37	1413,8	54,61	62,31357	7,70519	0,07176	0,28088	0,00236	0,902178	-27,3712
4.sSMPABC056	98188	16592	0,310117	0,1664	0,00753	0,23696	0,00517	5,42029	0,22092	2521,755	74,05	1370,9	26,92	1888,1	34,94	789,2	206,79	62,27296	5,42029	0,22092	0,23696	0,00517	0,535307	-27,3926
4.sSMPABC123	95984	18280	0,24823	0,1912	0,00285	0,26677	0,00247	7,03071	0,09156	2752,511	24,25	1524,4	12,59	2115,3	11,58	1676,8	161,57	61,23721	7,03071	0,09156	0,26677	0,00247	0,710973	-27,9346
4.sSMPABC136	101015	20727	0,197466	0,20701	0,00568	0,28367	0,00382	8,09463	0,20399	2882,281	43,89	1609,8	19,19	2241,6	22,77	2120,7	410,88	60,75289	8,09463	0,20399	0,28367	0,00382	0,534365	-28,1852
4.sSMPABC068	75428,45252	13443,56	0,268303	0,18168	0,00321	0,24667	0,00253	6,17582	0,09552	2668,266	28,92	1421,3	13,08	2001	13,52	1911	171,85	59,2134	6,17582	0,09552	0,24667	0,00253	0,663139	-28,9705
4.sSMPABC084	158917,8606	23898,32	0,260273	0,15233	0,00255	0,18868	0,00175	3,96211	0,05773	2372,247	28,31	1114,2	9,48	1626,5	11,81	1300,5	174,83	54,02082	3,96211	0,05773	0,18868	0,00175	0,636557	-31,4971
4.sSMPABC066	544972,4866	58586,28	0,472279	0,10724	0,00118	0,1052	0,00086	1,55496	0,01411	1753,036	19,88	644,8	5,03	952,5	5,61	433,2	18,42	52,27978	1,55496	0,01411	0,1052	0,00086	0,900897	-32,3045
4.sSMPABC065	455171,1933	43353,31	0,513846	0,09507	0,00105	0,07461	0,00061	0,97768	0,00892	1529,461	20,58	463,9	3,68	692,4	4,58	351,5	14,76	50,74369	0,97768	0,00892	0,07461	0,00061	0,896117	-33,0012
4.sSMPABC039	389390,4259	80973,19	0,387889	0,20498	0,00224	0,2403	0,00202	6,79011	0,06215	2866,266	17,63	1388,3	10,52	2084,4	8,1	990,2	33,48	49,85954	6,79011	0,06215	0,2403	0,00202	0,918403	-33,3957
4.sSMPABC130	140844	31240	0,258052	0,22756	0,00624	0,2431	0,00316	7,6298	0,19175	3034,966	43,25	1402,8	16,38	2188,4	22,56	2269,1	482,05	43,99772	7,6298	0,19175	0,2431	0,00316	0,517225	-35,8984
4.sSMPABC048	243051,566	36068,35	0,930864	0,14592	0,00166	0,14684	0,00121	2,95337	0,02762	2298,654	19,36	883,2	6,8	1395,7	7,09	432,4	18,29	41,97237	2,95337	0,02762	0,14684	0,00121	0,88112	-36,7199
4.sSMPABC140	135692,3694	26843,24	0,256888	0,19852	0,0065	0,20473	0,00309	5,59962	0,16842	2814,067	52,49	1200,7	16,54	1916	25,91	4911,5	2515,8	40,42642	5,59962	0,16842	0,20473	0,00309	0,501813	-37,333
4.sSMPABC114	102234,1929	17705,38	0,225306	0,17583	0,00321	0,17535	0,00175	4,24747	0,06891	2613,926	30,08	1041,5	9,61	1683,2	13,33	1398,2	178,24	38,38694	4,24747	0,06891	0,17535	0,00175	0,615149	-38,1238
4.sSMPABC010	94743	19020	0,293123	0,19916	0,00243	0,182	0,00151	4,99424	0,04905	2819,325	19,82	1077,9	8,21	1818,3	8,31	1352,7	64,09	31,31088	4,99424	0,04905	0,182	0,00151	0,844765	-40,7194
4.sSMPABC045	49680	9474	0,219543	0,19026	0,00241	0,16278	0,00144	4,26878	0,04489	2744,41	20,66	972,2	8	1687,4	8,65	1476,2	65,54	26,43489	4,26878	0,04489	0,16278	0,00144	0,841232	-42,3847
4.sSMPABC109	92563	17472	0,296969	0,19012	0,00437	0,15667	0,00184	4,10029	0,08509	2743,2	37,33	938,2	10,24	1654,4	16,94	1190,6	192,81	23,66233	4,10029	0,08509	0,15667	0,00184	0,565937	-43,2906
4.sSMPABC012	144088,0071	27117,57	0,200136	0,18928	0,00248	0,15103	0,00136	3,93952	0,0437	2735,916	21,41	906,8	7,64	1621,8	8,98	1575,6	84,6	21,1513	3,93952	0,0437	0,15103	0,00136	0,811779	-44,0868
4.sSMPABC075	113728,3318	23094,38	0,182283	0,20543	0,00296	0,15285	0,00138	4,32753	0,05337	2869,831	23,22	916,9	7,69	1698,6	10,17	971,7	73,14	14,74534	4,32753	0,05337	0,15285	0,00138	0,732077	-46,0203
4.sSMPABC017	107315,1626	19372,84	0,200324	0,17823	0,00219	0,12423	0,00105	3,05099	0,03061	2636,469	20,24	754,9	6,02	1420,5	7,67	1248,6	50,96	11,82938	3,05099	0,03061	0,12423	0,00105	0,842443	-46,8567
4.sSMPABC055	112109,1604	20122,82	0,551944	0,18113	0,00244	0,11465	0,00102	2,86233	0,0327	2663,244	22,17	699,7	5,9	1372,1	8,6	482,4	32,15	3,901672	2,86233	0,0327	0,11465	0,00102	0,77875	-49,0052
4.sSMPABC080	106543	22712	0,180459	0,21466	0,00402	0,12874	0,00135	3,80699	0,06281	2941,059	29,98	780,7	7,7	1594,2	13,27	868,3	103,87	-4,20136	3,80699	0,06281	0,12874	0,00135	0,635584	-51,0287
4.sSMPABC128	108802,2519	20517,22	0,217124	0,19028	0,00422	0,09438	0,00109	2,47079	0,04955	2744,583	35,97	581,4	6,43	1263,5	14,5	1286,4	197,29	-17,3203	2,47079	0,04955	0,09438	0,00109	0,575889	-53,985
4.sSMPABC083	82952,11541	18430,18	0,26581	0,22495	0,00448	0,1141	0,00122	3,53734	0,06216	3016,463	31,63	696,5	7,05	1535,6	13,91	1528,8	236,06	-20,4738	3,53734	0,06216	0,1141	0,00122	0,608471	-54,6431
4.sSMPABC133	135222	25889	0,150048	0,19094	0,00267	0,08202	0,00074	2,15854	0,02638	2750,275	22,77	508,1	4,43	1167,8	8,48	1305,4	122,72	-29,8366	2,15854	0,02638	0,08202	0,00074	0,738239	-56,4908
4.sSMPABC095	108293,0995	23106,96	0,291155	0,21798	0,00433	0,09865	0,00106	2,96371	0,05288	2965,829	31,67	606,5	6,24	1398,4	13,55	1763,1	235,89	-30,5688	2,96371	0,05288	0,09865	0,00106	0,602217	-56,629
4.sSMPABC015	136312,2011	32259,76	0,234023	0,2319	0,00242	0,10622	0,00087	3,39485	0,02868	3065,207	16,59	650,7	5,04	1503,2	6,63	914,4	23,21	-31,0128	3,39485	0,02868	0,10622	0,00087	0,969515	-56,7123
4.sSMPABC078	66429,50466	14915,6	0,224167	0,22366	0,00451	0,10114	0,00113	3,11619	0,05525	3007,227	32	621,1	6,63	1436,7	13,63	1452	158,42	-31,3154	3,11619	0,05525	0,10114	0,00113	0,630155	-56,769
4.sSMPABC134	120113	22884	0,158536	0,18641	0,00559	0,07551	0,00112	1,93645	0,05433	2710,744	48,6	469,2	6,69	1093,8	18,79	1438,2	409,8	-33,1202	1,93645	0,05433	0,07551	0,00112	0,528664	-57,1037
4.sSMPABC077	51805,17191	12177,66	0,253981	0,23533	0,00374	0,0969	0,00093	3,14271	0,04253	3088,657	25,13	596,2	5,47	1443,2	10,42	1561,4	140,15	-42,0664	3,14271	0,04253	0,0969	0,00093	0,709199	-58,689
4.sSMPABC094	133445,5528	31214,04	0,177305	0,23202	0,00279	0,09151	0,00078	2,92642	0,02991	3066,034	19,1	564,5	4,63	1388,8	7,74	2238,6	127,24	-46,023	2,92642	0,02991	0,09151	0,00078	0,833962	-59,3534
4.sSMPABC059	44870	9401	0,071052	0,20912	0,0026	0,07364	0,00064	2,12283	0,0215	2898,738	20,05	458,1	3,84	1156,3	6,99	2019,5	95,81	-52,4121	2,12283	0,0215	0,07364	0,00064	0,85811	-60,3823
4.sSMPABC119	142795,8197	30794,72	0,158419	0,21572	0,00311	0,06359	0,00059	1,8901	0,02409	2949,015	23,11	397,4	3,58	1077,6	8,47	1298,3	114,81	-71,1626	1,8901	0,02409	0,06359	0,00059	0,727966	-63,1218
4.sSMPABC067	120050,1867	25409,5	0,108199	0,21151	0,00333	0,04846	0,00048	1,41306	0,01951	2917,151	25,24	305	2,95	894,4	8,21	1552,4	137,25	-93,2459	1,41306	0,01951	0,04846	0,00048	0,7174	-65,8989
4.sSMPABC074	84652	19928	0,284134	0,23537	0,00322	0,05035	0,00045	1,63372	0,01887	3088,928	21,66	316,7	2,76	983,3	7,28	756,5	53,89	-110,483	1,63372	0,01887	0,05035	0,00045	0,773782	-67,7921
4.sSMPABC013	125775,7971	29170,83	0,221201	0,22738	0,00237	0,04059	0,00033	1,27199	0,01073	3033,698	16,64	256,5	2,04	833,3	4,79	602,3	15,3	-124,873	1,27199	0,01073	0,04059	0,00033	0,963782	-69,2188
4.sSMPABC137	55532,82768	15761,19	0,215671	0,28714	0,00792	0,04344	0,00055	1,72121	0,04183	3402,189	42,3	274,1	3,39	1016,5	15,61	2755,6	1229,65	-170,85	1,72121	0,04183	0,04344	0,00055	0,520977	-73,0349
4.sSMPABC139	32887,32803	9808,441	0,219666	0,30669	0,00957	0,03443	0,0005	1,45826	0,04114	3504,344	47,4	218,2	3,11	913,3	16,99	1798,5	746,93	-218,561	1,45826	0,04114	0,03443	0,0005	0,514759	-76,1086

FILE NAME	CORRECT	0																							
	Pb206*	Pb207*	Th/U	207/206	1s	206/238	1s	207/235	1s	206/207	206/238		207/235		208/232		Conc	207/235		206/238		RHO	Disc.		
Padrões Primários																									
4.sSMPABC001	56533,43	3055,388	0,01017	0,06257	0,00076	0,09725	0,00078	0,83693	0,00837	693,6485	25,68	598,3	4,58	617,5	4,63	601,3	29,2	96,79091	0,83693	0,00837	0,09725	0,00078	0,801989	-3,10931	
4.sSMPABC002	56138,63	2972,032	0,009778	0,06046	0,00076	0,09729	0,00078	0,80909	0,00845	620,0775	26,84	598,5	4,6	601,9	4,74	793	35,81	99,43191	0,80909	0,00845	0,09729	0,00078	0,767656	-0,56488	
4.sSMPABC003	65225,46	4010,283	0,010062	0,06254	0,00075	0,09763	0,00078	0,83983	0,0083	692,6261	25,46	600,5	4,58	619,1	4,58	875,2	35,88	96,90258	0,83983	0,0083	0,09763	0,00078	0,808397	-3,00436	
4.sSMPABC008	68813	4107	0,010061	0,06128	0,00076	0,09754	0,00078	0,8222	0,00843	649,0766	26,31	600	4,57	609,3	4,7	-186,1	43,08	98,45	0,8222	0,00843	0,09754	0,00078	0,779941	-1,52634	
4.sSMPABC009	67826,01	4076,136	0,010137	0,05975	0,00075	0,09825	0,00078	0,80752	0,00838	594,5331	26,92	604,2	4,6	601,1	4,71	565,8	36,96	100,5131	0,80752	0,00838	0,09825	0,00078	0,765017	0,515721	
4.sSMPABC037	66854	3823	0,010319	0,05761	0,00078	0,09613	0,00077	0,7625	0,00894	514,9614	29,82	591,7	4,54	575,4	5,15	1711,1	72,73	102,7548	0,7625	0,00894	0,09613	0,00077	0,683178	2,832812	
4.sSMPABC038	70821	4178	0,010287	0,0596	0,00079	0,09952	0,0008	0,81647	0,00933	589,0835	28,6	611,6	4,67	606,1	5,22	836	71,33	100,8993	0,81647	0,00933	0,09952	0,0008	0,703458	0,907441	
4.sSMPABC082	69329,04	4586,013	0,010101	0,0649	0,00078	0,09967	0,0008	0,89152	0,00892	771,0963	25,11	612,5	4,71	647,2	4,79	229,7	26,57	94,33469	0,89152	0,00892	0,09967	0,0008	0,802217	-5,36156	
4.sSMPABC083	69563	4079	0,010175	0,05787	0,0007	0,09866	0,00079	0,78688	0,00794	524,8436	26,62	606,6	4,64	589,4	4,51	1770,6	61,65	102,8355	0,78688	0,00794	0,09866	0,00079	0,793549	2,918222	
4.sSMPABC127	68641	4261	0,010019	0,05981	0,00073	0,09787	0,0008	0,80752	0,00833	596,7078	26,29	601,9	4,68	601,1	4,68	650,4	32,17	100,1329	0,80752	0,00833	0,09787	0,0008	0,792408	0,133089	
4.sSMPABC128	59108,49	3829,42	0,010696	0,06016	0,00086	0,09612	0,00079	0,79819	0,00973	609,3342	30,46	591,6	4,65	595,8	5,5	537	43,24	99,29006	0,79819	0,00973	0,09612	0,00079	0,674228	-0,70493	
Padrões Secundários																									
4.sSMPABC010	74529,51	4305,488	0,072626	0,0591	0,00072	0,08992	0,00071	0,73108	0,00733	570,7818	26,3	555	4,22	557,2	4,3	285	8,68	99,6036	0,73108	0,00733	0,08992	0,00071	0,787523	-0,39483	
4.sSMPABC011	67998	4087	0,074617	0,06228	0,00078	0,09003	0,00072	0,77084	0,00796	683,7374	26,59	555,7	4,23	580,2	4,56	435,5	13,23	95,59115	0,77084	0,00796	0,09003	0,00072	0,774455	-4,22268	
4.sSMPABC039	83096	4491	0,075449	0,0545	0,00088	0,08992	0,00077	0,67474	0,00968	391,768	35,7	555,1	4,54	523,6	5,87	283,4	19,71	105,6747	0,67474	0,00968	0,08992	0,00077	0,596892	6,016043	
4.sSMPABC040	66944,34	2363,228	0,07574	0,0424	0,00075	0,08968	0,00072	0,52326	0,00845	-202,719	0	553,7	4,27	427,3	5,63	-186,1	15,59	122,8282	0,52326	0,00845	0,08968	0,00072	0,497162	29,58109	
4.sSMPABC084	78511,1	4786,555	0,073495	0,05781	0,00071	0,08844	0,00072	0,70486	0,00721	522,5685	26,79	546,3	4,24	541,7	4,29	196,2	7,07	100,842	0,70486	0,00721	0,08844	0,00072	0,795887	0,849179	
4.sSMPABC085	82997,65	4362,47	0,072642	0,05161	0,00085	0,08936	0,00079	0,63642	0,00938	268,169	37,45	551,7	4,7	500,1	5,82	376,2	22,34	109,3529	0,63642	0,00938	0,08936	0,00079	0,599825	10,31794	
4.sSMPABC129	65134	3838	0,073882	0,05666	0,00071	0,08955	0,00073	0,70007	0,00744	478,3244	27,69	552,9	4,33	538,8	4,44	264,1	10,07	102,5502	0,70007	0,00744	0,08955	0,00073	0,767054	2,616927	
4.sSMPABC130	62221,37	3853,995	0,076703	0,0557	0,00076	0,08998	0,00074	0,6918	0,00804	440,4299	29,49	555,4	4,36	533,9	4,82	283,1	12,78	103,8711	0,6918	0,00804	0,08998	0,00074	0,707637	4,026971	
Amostras																									
4.sSMPABC075	-14645,2	-2268,58	0	-0,0555	0,01356	-71,1723	16,92723	544,2153	168,8608	#NÚM!	0	#NOME?	*******		6398,1	314,48	701,2	6446,03	#NOME?	544,2153	168,8608	-71,1723	16,92723	-0,76651	#NOME?
4.sSMPABC108	1250150	617180,2	0,299938	0,42189	0,00616	1,32161	0,01149	76,77672	0,96917	3988,987	21,66	5429,6	31,91	4420,8	12,65	******		913,21	118,5796	76,77672	0,96917	1,32161	0,01149	0,688726	22,8194
4.sSMPABC097	101099	25862,78	0,32987	0,25228	0,00367	0,69077	0,00668	23,9892	0,30409	3199,131	22,81	3385,6	25,48	3268	12,36	2096,6	133	103,4735	23,9892	0,30409	0,69077	0,00668	0,762881	3,598531	
4.sSMPABC118	52807	11930	0,263562	0,21536	0,00257	0,61871	0,00547	18,38643	0,18617	2946,318	19,18	3104,8	21,78	3010,2	9,75	1391,3	46,33	103,0469	18,38643	0,18617	0,61871	0,00547	0,873148	3,142648	
4.sSMPABC143	169609	36515	0,187663	0,21753	0,00361	0,61419	0,00555	18,4432	0,26802	2962,497	26,52	3086,8	22,17	3013,1	14	2038	205,15	102,3876	18,4432	0,26802	0,61419	0,00555	0,621812	2,445986	
4.sSMPABC102	1099996	128464	0,060721	0,11498	0,00142	0,35655	0,00297	5,65519	0,05904	1879,571	22,02	1965,8	14,1	1924,6	9,01	870,7	37,18	102,0958	5,65519	0,05904	0,35655	0,00297	0,797879	2,140705	
4.sSMPABC106	237025	64489	0,438629	0,26549	0,00288	0,69078	0,00554	25,28815	0,22252	3279,583	16,92	3385,6	21,11	3319,4	8,59	1688,1	52,28	101,9553	25,28815	0,22252	0,69078	0,00554	0,911419	1,994336	
4.sSMPABC094	186803	36673	0,581196	0,19302	0,00239	0,55896	0,00449	14,87896	0,15082	2768,066	20,16	2862,3	18,58	2807,5	9,64	1828,2	102,57	101,9145	14,87896	0,15082	0,55896	0,00449	0,792463	1,951915	
4.sSMPABC041	234383	45588	0,251249	0,1919	0,00214	0,55419	0,00481	14,66591	0,13948	2758,514	18,19	2842,6	19,95	2793,8	9,04	1528,1	45,92	101,7167	14,66591	0,13948	0,55419	0,00481	0,912606	1,746725	
4.sSMPABC093	50899	10041	0,270255	0,194	0,00246	0,55494	0,00479	14,8496	0,15605	2776,372	20,65	2845,7	19,84	2805,7	10	2009,4	101,75	101,4056	14,8496	0,15605	0,55494	0,00479	0,821373	1,425669	
4.sSMPABC119	105814	20418	0,688817	0,18607	0,00225	0,53766	0,00452	13,8061	0,1394	2707,732	19,78	2773,6	18,93	2736,5	9,56	1277,4	49	101,3376	13,8061	0,1394	0,53766	0,00452	0,832605	1,355746	
4.sSMPABC147	205355,5	56257,02	0,418421	0,25854	0,00354	0,67062	0,00564	23,94719	0,27981	3237,831	21,43	3308,3	21,76	3266,2	11,39	1813,5	122,17	101,2726	23,94719	0,27981	0,67062	0,00564	0,71977	1,28896	
4.sSMPABC101	884465,7	107452,5	0,050544	0,11867	0,0014	0,36059	0,00277	5,89872	0,05588	1936,295	20,92	1985	13,11	1961	8,22	1252,1	65,64	101,2091	5,89872	0,05588	0,36059	0,00277	0,8109	1,223865	
4.sSMPABC072	92933	18288	0,53254	0,19684	0,00251	0,55766	0,00473	15,11596	0,15873	2800,173	20,69	2857	19,56	2822,6	10	1988	107,42	101,2041	15,11596	0,15873	0,55766	0,00473	0,807734	1,218735	
4.sSMPABC105	427784	95233,1	0,140411	0,21957	0,0031	0,60099	0,00533	18,20682	0,22379	2977,541	22,57	3033,8	21,45	3000,7	11,83	2826,4	159,44	101,091	18,20682	0,22379	0,60099	0,00533	0,721528	1,103076	
4.sSMPABC122	177927	48347	0,256082	0,26113	0,00339	0,67016	0,00558	24,16092	0,26307	3253,536	20,29	3306,5	21,52	3274,9	10,62	1902,6	112,46	100,9557	24,16092	0,26307	0,67016	0,00558	0,764712	0,964915	
4.sSMPABC100	175068	37328	0,19742	0,20876	0,00227	0,57693	0,00464	16,60565	0,14655	2895,943	17,51	2936,2	18,98	2912,3	8,45	1488,6	45,66	100,814	16,60565	0,14655	0,57693	0,00464	0,911307	0,820657	
4.sSMPABC091	43742	11042	0,414953	0,25779	0,00391	0,66151	0,00645	23,47369	0,30537	3233,251	23,72	3273	25,01	3246,8	12,67	4326,4	598,96	100,8005	23,47369	0,30537	0,66151	0,00645	0,749511	0,806948	
4.sSMPABC016	132037	25059	0,435147	0,1948	0,00238	0,5469	0,00469	14,65437	0,14789	2783,117	19,9	2812,3	19,55	2793,1	9,59	2026,7	84,88	100,6827	14,65437	0,14789	0,5469	0,00469	0,849754	0,687408	
4.sSMPABC117	48274,38	11168,29	0,41385	0,22352	0,00286	0,60127	0,00524	18,54485	0,19858	3006,221	20,43	3034,9	21,11	3018,4	10,32	1837,7	91,61	100,5437	18,54485	0,19858	0,60127	0,00524	0,81386	0,546647	
4.sSMPABC090	49333	12906	0,42045	0,25893	0,00312	0,66008	0,00564	23,56201	0,23304	3240,208	18,88	3267,5	21,88	3250,4	9,63	1574	59,85	100,5233	23,56201	0,23304	0,66008	0,00564	0,863902	0,526089	
4.sSMPABC056	160282	40018	0,00273	0,26298	0,00356	0,6644	0,00563	24,03243	0,26809	3264,647	21,12	3284,2	21,81	3269,7	10,87	******		1392,92	100,4415	24,03243	0,26809	0,6644	0,00563	0,759619	0,443466	
4.sSMPABC109	83055	16364	0,489944	0,19626	0,00306	0,54629	0,00499	14,75375	0,19891	2795,344	25,28	2809,7	20,8	2799,5	12,82	3636,8	626,01	100,363	14,75375	0,19891	0,54629	0,00499	0,677522	0,364351	
4.sSMPABC029	1397634	135502	0,018001	0,09752	0,0011	0,27834	0,00235	3,74025	0,0356	1577,229	20,89	1583	11,83	1580	7,63	902,3	30,99	100,1895	3,74025	0,0356	0,27834	0,00235	0,887039	0,189873	
4.sSMPABC123	418610,6	116492,5	0,320674	0,27516	0,00387	0,67838	0,0063	25,71404	0,31935	3335,677	21,82	3338,1	24,18	3335,7	12,14	3519,2	376,15	100,0719	25,71404	0,31935	0,67838	0,0063	0,747775	0,071949	
4.sSMPABC042	225536	44658	0,272564	0,20021	0,00226	0,5506	0,00461	15,18413	0,14213	2827,909	18,32	2827,7	19,18	2826,9	8,92	1417,3	36,87	100,0283	15,18413	0,14213	0,5506	0,00461	0,894476	0,0283	
4.sSMPABC141	183543	36993,59	0,418182	0,19473	0,00274	0,53967	0,00491	14,49635	0,17897	2782,528	22,84	2782,1	20,56	2782,8	11,73	1216,1	60,98	99,97484	14,49635	0,17897	0,53967	0,00491	0,736939	-0,02515	
4.sSMPABC027	84302	16665	0,367226	0,1988	0,00226	0,54661	0,00465	14,96684	0,13998	2816,37	18,41	2811,1	19,4	2813,1	8,9	1549,7	37,65	99,92885	14,96684	0,13998	0,54661	0,00465	0,909577	-0,0711	
4.sSMPABC023	88695	24488	0,447976	0,28667	0,00338	0,69086	0,00563	27,23904	0,25345	3399,638	18,22	3385,9	21,47	3392,1	9,11	2819,3	117,06	99,81689	27,23904	0,25345	0,69086	0,00563	0,875826	-0,18278	
4.sSMPABC088	182079	49111	0,35087	0,26741	0,00429	0,66192	0,00597	24,35349	0,34016	3290,901	24,96	3274,6	23,17	3282,6	13,62	3419,9	507,32	99,7557	24,35349	0,34016	0,66192	0,00597	0,645724	-0,24371	
4.sSMPABC125	157369,1	33387,79	0,349583	0,21311	0,00298	0,57161	0,00476	16,78144	0,19818	2929,345	22,45	2914,4	19,53	2922,4	11,32	1832	130,54	99,7255	16,78144	0,19818	0,57161	0,00476	0,705142	-0,27375	
4.sSMPABC060	129645,9	25123,02	0,2912	0,19537	0,00226	0,5367	0,00429	14,44398	0,13365	2787,903	18,82	2769,6	18	2779,3	8,79	1585,6	55,16	99,64977	14,44398	0,13365	0,5367	0,00429	0,86386	-0,34901	
4.sSMPABC032	123745,9	24716,74	0,468517	0,20211	0,0022	0,5498	0,00446	15,30129	0,13387	2843,312	17,61	2824,3	18,57	2834,2	8,34	1704,1	39,75	99,64947	15,30129	0,13387	0,5498	0,00446	0,927203	-0,3493	
4.sSMPABC057	95734	25216	0,453125	0,26561	0,00326	0,65745	0,00554	24,04551	0,24005	3280,293	19,13	3257,3	21,53	3270,2	9,73	2624,4	128,23	99,60397	24,04551	0,24005	0,65745	0,00554	0,844072	-0,39447	
4.sSMPABC110	117334	23494	0,364684	0,20294	0,00283	0,55077	0,0046	15,39132	0,18005	2849,988	22,55	2828,4	19,13	2839,8	11,15	1903,6	139,32	99,59695	15,39132	0,18005	0,55077	0,0046	0,713954	-0,40144	
4.sSMPABC050	272406	49236	0,522482	0,19118	0,003	0,52521	0,00474	13,79225	0,18532	2752,339	25,51	2721,2	20,03	2735,5	12,72	3468	402,61	99,4745	13,79225	0,18532	0,52521	0,00474	0,671673	-0,52276	
4.sSMPABC035	132991	22352	0,414587	0,17472	0,00229	0,49053	0,00408	11,77442	0,1267	2603,378	21,72	2573	17,65	2586,6	10,07	2135	143,49	99,47143	11,77442	0,1267	0,49053	0,00408	0,772961	-0,52579	
4.sSMPABC131	130362	34506	0,666191	0,2651	0,00398	0,65451	0,00572	23,91409	0,30865	3277,272	23,4	3245,8	22,29	3264,9	12,58	2475,8	226,91	99,41155	23,91409	0,30865	0,65451	0,00572	0,677123	-0,58501	
4.sSMPABC028	102002	20236	0,546879	0,20329	0,00226	0,5478	0,00435	15,31918	0,13409	2852,794	17,99	2816	18,14	2835,3	8,34	1765,7	45,65	99,31463	15,31918	0,13409	0,5478	0,00435	0,907207	-0,6807	
4.sSMPABC030	826359,5	101983,3	0,062669	0,1215	0,0013	0,35215	0,00297	5,89957	0,05342	1978,369	18,98	1944,9	14,18	1961,2	7,86	1036,1	26,52	99,16191	5,89957	0,05342	0,35215	0,00297	0,931419	-0,83112	
4.sSMPABC053	387479	81184	0,319911	0,20751	0,00241	0,55415	0,00476	15,84872	0,15621	2886,198	18,72	2842,4	19,73	2867,7	9,41	1655,3	68,2	99,10991	15,84872	0,15621	0,55415	0,00476	0,871495	-0,88224	
4.sSMPABC096	84502	16600	0,265278	0,20026	0,00337	0,53931	0,00543	14,87187	0,21946	2828,317	27,16	2780,6	22,75	2807,1	14,04	1926,1	152,08	99,04697	14,87187	0,21946	0,53931	0,00543	0,682294	-0,94403	
4.sSMPABC124	109922	21706	0,29272	0,19986	0,00295	0,53788	0,00467	14,81864	0,18659	2825,053	23,9	2774,6	19,59	2803,7	11,98	1821,8	139,88	98,9512	14,81864	0,18659	0,53788	0,00467	0,689527	-1,03791	
4.sSMPABC013	114724,4	22526,08	0,534736	0,20878	0,00251	0,54966	0,00428	15,75215	0,14616	2896,099	19,35	2823,8	17,81	2861,9	8,86	2378,6	109,2	98,65075	15,75215	0,14616	0,54966	0,00428	0,839191	-1,33128	

FILE NAME	CORRECT		0																					
	Pb206*	Pb207*	Th/U	207/206	1s	206/238	1s	207/235	1s	206/207	206/238		207/235		208/232		Conc	207/235		206/238		RHO	Disc.	
4.sSMPABC079	121810	25076	0,376838	0,20644	0,00263	0,54643	0,00451	15,53867	0,16192	2877,802	20,52	2810,3	18,78	2848,9	9,94	1903,8	109,81	98,62648	15,53867	0,16192	0,54643	0,00451	0,792055	-1,35491
4.sSMPABC034	147497	39487	0,320715	0,26717	0,00342	0,64656	0,0058	23,77074	0,25649	3289,491	19,97	3214,7	22,71	3259	10,51	3015,8	265,83	98,62196	23,77074	0,25649	0,64656	0,0058	0,831364	-1,35931
4.sSMPABC092	91257	17870	0,58023	0,20009	0,00298	0,5336	0,0047	14,68571	0,18522	2826,931	24,1	2756,6	19,77	2795,1	11,99	3892	649,35	98,60335	14,68571	0,18522	0,5336	0,0047	0,698376	-1,37741
4.sSMPABC058	96956	21927	0,290035	0,23624	0,00432	0,59592	0,00639	19,34031	0,31224	3094,813	28,86	3013,4	25,82	3058,9	15,59	2765,7	447,24	98,49008	19,34031	0,31224	0,59592	0,00639	0,664183	-1,48746
4.sSMPABC061	137008	27011	0,7079	0,19752	0,00223	0,52731	0,0042	14,34796	0,12901	2805,813	18,32	2730,1	17,72	2773	8,54	1522,4	49,22	98,42863	14,34796	0,12901	0,52731	0,0042	0,885829	-1,54706
4.sSMPABC048	113316,8	28933,88	0,383993	0,26781	0,00337	0,64215	0,00524	23,64362	0,23821	3293,247	19,63	3197,5	20,59	3253,8	9,81	2285,4	116,69	98,23925	23,64362	0,23821	0,64215	0,00524	0,809932	-1,73028
4.sSMPABC078	119468	25389	0,324934	0,21026	0,00256	0,54932	0,00448	15,92288	0,15754	2907,55	19,58	2822,4	18,64	2872,2	9,45	1987,6	97,23	98,23554	15,92288	0,15754	0,54932	0,00448	0,824296	-1,73386
4.sSMPABC031	131807	25261,11	0,6674	0,20029	0,00265	0,52709	0,00455	14,49237	0,15825	2828,561	21,45	2729,2	19,19	2782,5	10,37	2600,1	181,12	98,04705	14,49237	0,15825	0,52709	0,00455	0,790537	-1,91554
4.sSMPABC047	218073	46260	0,388799	0,20713	0,00225	0,53818	0,00464	15,36738	0,14152	2883,222	17,5	2775,8	19,43	2838,3	8,78	1247,3	32,49	97,7484	15,36738	0,14152	0,53818	0,00464	0,936208	-2,20202
4.sSMPABC043	270094	52274	0,327628	0,19015	0,00262	0,50518	0,00483	13,22101	0,16057	2743,459	22,49	2636	20,67	2695,6	11,46	1846,7	126,68	97,739	13,22101	0,16057	0,50518	0,00483	0,787229	-2,21101

FILE NAME	CORRECT	0																										
	Pb206*	Pb207*	Th/U	207/206	1s	206/238	1s	207/235	1s	206/207		206/238		207/235		208/232		Conc	207/235		206/238		RHO	Disc.				
4.sSMPABC137	255468	62767	0,032404	0,23089	0,00265	0,58008	0,00488	18,49448	0,17945	3058,227	18,23	2949,1	19,92	3015,8	9,35	679,6	28,03	97,73829	18,49448	0,17945	0,58008	0,00488	0,867023	-2,21169				
4.sSMPABC139	170954	35647	0,352692	0,19929	0,00251	0,52285	0,00434	14,39412	0,15215	2820,391	20,42	2711,2	18,37	2776	10,04	1201,1	50,3	97,60991	14,39412	0,15215	0,52285	0,00434	0,785282	-2,33429				
4.sSMPABC067	228880	52456	0,208566	0,23303	0,00292	0,57981	0,00467	18,59069	0,18937	3072,976	19,9	2948	19,04	3020,8	9,82	1982,6	119,9	97,53053	18,59069	0,18937	0,57981	0,00467	0,790707	-2,40996				
4.sSMPABC148	304773	61248	0,399649	0,19293	0,00239	0,5086	0,0044	13,53989	0,14452	2767,301	20,16	2650,7	18,81	2718,1	10,09	1070,9	41,36	97,45728	13,53989	0,14452	0,5086	0,0044	0,81052	-2,47967				
4.sSMPABC033	258900,3	70559,57	0,303651	0,27197	0,00333	0,63849	0,00583	23,92237	0,25378	3317,42	19,04	3183,1	22,92	3265,2	10,34	2344,5	120,06	97,42075	23,92237	0,25378	0,63849	0,00583	0,860719	-2,51439				
4.sSMPABC022	186957	49660	0,367849	0,27269	0,00324	0,63489	0,00516	23,80846	0,22688	3321,562	18,5	3168,9	20,36	3260,6	9,29	3043,2	171,63	97,10625	23,80846	0,22688	0,63489	0,00516	0,852877	-2,81237				
4.sSMPABC052	302703	63378	0,309935	0,206	0,00224	0,52704	0,00432	14,96597	0,13364	2874,335	17,58	2729	18,24	2813,1	8,5	1318,1	34,53	96,91829	14,96597	0,13364	0,52704	0,00432	0,917928	-2,98958				
4.sSMPABC138	159542	33066,25	0,352522	0,20578	0,00348	0,52439	0,0048	14,87674	0,22096	2872,599	27,19	2717,8	20,28	2807,4	14,13	7673,7	2894,6	96,70322	14,87674	0,22096	0,52439	0,0048	0,616284	-3,19157				
4.sSMPABC046	212192	44422	0,394014	0,20753	0,00224	0,5165	0,00424	14,77481	0,13057	2886,354	17,43	2684,3	18,04	2800,8	8,4	1274,7	30,36	95,65995	14,77481	0,13057	0,5165	0,00424	0,928911	-4,15953				
4.sSMPABC026	77416,17	15021,3	0,422535	0,20743	0,0027	0,51128	0,0043	14,57018	0,15236	2885,572	20,97	2662,1	18,33	2787,6	9,94	2282,1	130,61	95,28568	14,57018	0,15236	0,51128	0,0043	0,804273	-4,50208				
4.sSMPABC012	99015	19195	0,414025	0,2136	0,00378	0,51951	0,00534	15,16374	0,22931	2933,059	28,33	2697,1	22,65	2825,6	14,41	2619,4	352,21	95,23562	15,16374	0,22931	0,51951	0,00534	0,679721	-4,54771				
4.sSMPABC103	218357	53845	0,348162	0,24285	0,00554	0,56223	0,00639	18,68746	0,39361	3138,743	35,81	2875,8	26,35	3025,8	20,3	9412,7	4384,44	94,78406	18,68746	0,39361	0,56223	0,00639	0,539599	-4,95737				
4.sSMPABC014	73169	14323	0,235417	0,20953	0,00291	0,50921	0,0044	14,63165	0,16391	2901,913	22,33	2653,2	18,8	2791,6	10,65	2942,6	243,38	94,78366	14,63165	0,16391	0,50921	0,0044	0,771336	-4,95773				
4.sSMPABC149	381576	92928	0,021484	0,2279	0,00261	0,53869	0,00448	16,95904	0,16413	3037,359	18,26	2778	18,77	2932,5	9,28	1356,7	50,86	94,43844	16,95904	0,16413	0,53869	0,00448	0,859315	-5,26854				
4.sSMPABC077	301244,3	74015,08	0,288132	0,2442	0,00288	0,55313	0,00431	18,61646	0,17586	3147,549	18,62	2838,2	17,89	3022,2	9,1	1783,3	90,05	93,51702	18,61646	0,17586	0,55313	0,00431	0,82486	-6,08828				
4.sSMPABC107	195826	52856	0,249455	0,26774	0,00411	0,58495	0,00505	21,54521	0,28429	3292,837	23,87	2968,9	20,54	3163,4	12,8	3473,4	557,36	93,44875	21,54521	0,28429	0,58495	0,00505	0,654277	-6,14845				
4.sSMPABC059	242143,9	50559,08	0,141314	0,21311	0,00259	0,49668	0,00388	14,56557	0,14086	2929,345	19,52	2599,5	16,7	2787,3	9,19	1597,1	87,26	92,77553	14,56557	0,14086	0,49668	0,00388	0,807783	-6,7377				
4.sSMPABC080	159939,2	31371,79	0,300241	0,19487	0,00221	0,46279	0,00363	12,42846	0,11224	2783,706	18,46	2451,9	16,02	2637,3	8,49	1472,6	52,37	92,43852	12,42846	0,11224	0,46279	0,00363	0,868545	-7,02992				
4.sSMPABC104	407840	102977,2	0,306604	0,2494	0,00333	0,53908	0,00496	18,53022	0,2184	3180,962	20,96	2779,6	20,78	3017,7	11,35	2015,1	144,62	91,43402	18,53022	0,2184	0,53908	0,00496	0,78065	-7,89011				
4.sSMPABC020	200852,6	45793,4	0,302403	0,24457	0,00389	0,52752	0,00522	17,63183	0,2417	3149,953	25,04	2731	22,04	2969,9	13,17	4006,9	354,19	91,25229	17,63183	0,2417	0,52752	0,00522	0,721859	-8,04404				
4.sSMPABC071	79062	19357	0,313142	0,24401	0,00294	0,52926	0,00448	17,79893	0,17542	3146,313	19,03	2738,3	18,88	2978,9	9,47	1624,4	62,34	91,21353	17,79893	0,17542	0,52926	0,00448	0,858863	-8,07681				
4.sSMPABC095	64080	12124	0,324046	0,19366	0,00273	0,44597	0,00385	11,88835	0,13976	2773,496	22,97	2377,3	17,15	2595,6	11,01	1682,2	114,46	90,81731	11,88835	0,13976	0,44597	0,00385	0,734334	-8,41039				
4.sSMPABC070	172637	42416	0,488776	0,24213	0,00267	0,51954	0,00442	17,33617	0,16041	3134,024	17,39	2697,2	18,76	2953,6	8,88	1178,4	29,29	90,49385	17,33617	0,16041	0,51954	0,00442	0,919443	-8,68093				
4.sSMPABC064	165229	31337	0,406337	0,19895	0,00341	0,45034	0,00437	12,32083	0,18334	2817,602	27,69	2396,8	19,43	2629,2	13,97	1989,7	235,99	90,30374	12,32083	0,18334	0,45034	0,00437	0,652114	-8,83919				
4.sSMPABC140	206975,9	39732,49	0,564396	0,18642	0,00224	0,42659	0,00367	10,96904	0,11283	2710,832	19,7	2290,3	16,56	2520,5	9,57	966,9	37,53	89,94891	10,96904	0,11283	0,42659	0,00367	0,836372	-9,13311				
4.sSMPABC019	99219	18809	0,239032	0,20329	0,00255	0,45122	0,00359	12,59505	0,12334	2852,794	20,27	2400,7	15,94	2649,9	9,21	1574,7	83,22	89,61969	12,59505	0,12334	0,45122	0,00359	0,81246	-9,40413				
4.sSMPABC146	297140	60287	0,395894	0,20417	0,00322	0,44602	0,00383	12,56861	0,17161	2859,825	25,47	2377,6	17,08	2647,9	12,84	1243,9	113,05	88,63139	12,56861	0,17161	0,44602	0,00383	0,628911	-10,2081				
4.sSMPABC051	457204	88842	0,205176	0,18904	0,00212	0,41712	0,00365	10,8631	0,10533	2733,828	18,35	2247,4	16,62	2511,5	9,02	1237,7	42,9	88,24864	10,8631	0,10533	0,41712	0,00365	0,902472	-10,5156				
4.sSMPABC073	192489,5	38059,94	0,293812	0,19934	0,00244	0,43366	0,00342	11,90247	0,11667	2820,8	19,81	2322,2	15,38	2596,8	9,18	1602,2	86,04	88,17501	11,90247	0,11667	0,43366	0,00342	0,804553	-10,5746				
4.sSMPABC144	297942,7	63008,06	0,212217	0,20354	0,0023	0,43564	0,00356	12,23937	0,11518	2854,795	18,31	2331,1	15,97	2622,9	8,83	1199,3	44,74	87,4823	12,23937	0,11518	0,43564	0,00356	0,868369	-11,1251				
4.sSMPABC055	103479	17189	0,268681	0,16805	0,00202	0,36959	0,00295	8,55246	0,08224	2538,315	20,05	2027,5	13,88	2291,5	8,74	1460,3	66,3	86,97904	8,55246	0,08224	0,36959	0,00295	0,830061	-11,5208				
4.sSMPABC068	331061,7	70514,4	0,102187	0,20326	0,00268	0,42621	0,00369	11,8927	0,1329	2852,554	21,33	2288,6	16,69	2596	10,47	1492	167,66	86,56821	11,8927	0,1329	0,42621	0,00369	0,774744	-11,8413				
4.sSMPABC099	150740,2	39282,12	0,271954	0,26194	0,00394	0,50606	0,00509	18,27116	0,24519	3258,412	23,48	2639,8	21,79	3004,1	12,92	2449,1	239,32	86,19971	18,27116	0,24519	0,50606	0,00509	0,749513	-12,1268				
4.sSMPABC126	52456	11152	0,265728	0,20396	0,00282	0,42564	0,00383	11,98212	0,14013	2858,15	22,33	2286	17,33	2603	10,96	1175,9	65,62	86,13298	11,98212	0,14013	0,42564	0,00383	0,769412	-12,1783				
4.sSMPABC089	304063	79361	0,298833	0,25863	0,00301	0,49949	0,00393	17,81075	0,16678	3238,38	18,23	2611,6	16,9	2979,6	9	1470	64,69	85,90902	17,81075	0,16678	0,49949	0,00393	0,840241	-12,3507				
4.sSMPABC098	66491,16	12905,4	0,315611	0,19209	0,00373	0,40246	0,00443	10,64219	0,18428	2760,139	31,56	2180,4	20,35	2492,4	16,07	2805,9	688,85	85,6907	10,64219	0,18428	0,40246	0,00443	0,635673	-12,5181				
4.sSMPABC150	165628	31264	0,462188	0,1793	0,00204	0,37962	0,00308	9,39611	0,08855	2646,406	18,75	2074,5	14,4	2377,4	8,65	571,1	21,4	85,39889	9,39611	0,08855	0,37962	0,00308	0,860917	-12,7408				
4.sSMPABC142	219405	47952	0,273783	0,19982	0,00258	0,4123	0,00356	11,39486	0,12624	2824,727	20,92	2225,4	16,25	2556	10,34	668	30,73	85,14424	11,39486	0,12624	0,4123	0,00356	0,779379	-12,9343				
4.sSMPABC025	218978,7	39213,26	0,067626	0,18174	0,00194	0,37562	0,00298	9,39776	0,07958	2668,813	17,56	2055,8	13,95	2377,6	7,77	1658	36	84,34673	9,39776	0,07958	0,37562	0,00298	0,936889	-13,5347				
4.sSMPABC024	156510	29498	0,062604	0,20329	0,00286	0,4072	0,00337	11,33994	0,12908	2852,794	22,74	2202,1	15,45	2551,5	10,62	3401,2	341,46	84,13333	11,33994	0,12908	0,4072	0,00337	0,727066	-13,6939				
4.sSMPABC116	181679,1	38798,49	0,022733	0,20492	0,00227	0,41172	0,00344	11,63616	0,10813	2865,79	17,94	2222,8	15,72	2575,6	8,69	871,8	34,56	84,12813	11,63616	0,10813	0,41172	0,00344	0,899125	-13,6978				
4.sSMPABC121	251273	47437	0,427649	0,19225	0,00284	0,38321	0,00321	10,1538	0,12739	2761,506	24,03	2091,3	14,98	2448,9	11,6	1124,1	85,13	82,90059	10,1538	0,12739	0,38321	0,00321	0,667669	-14,6025				
4.sSMPABC133	290530	54073	0,373502	0,19066	0,00305	0,37799	0,00329	9,93719	0,13732	2747,863	26,02	2066,9	15,38	2429	12,75	1123,4	87,79	82,48101	9,93719	0,13732	0,37799	0,00329	0,629862	-14,9074				
4.sSMPABC017	301882,2	60863,17	0,301609	0,20741	0,00247	0,397	0,00324	11,32244	0,10948	2885,415	19,22	2155,2	14,97	2550,1	9,02	1521,3	70,14	81,67687	11,32244	0,10948	0,397	0,00324	0,844034	-15,4857				
4.sSMPABC054	97970	17373	0,268293	0,18667	0,00283	0,3564	0,00315	9,13241	0,11542	2713,042	24,79	1965,1	14,96	2351,4	11,57	2044,1	286,51	80,34197	9,13241	0,11542	0,3564	0,00315	0,699322	-16,4285				
4.sSMPABC136	160435,2	30350,99	0,366248	0,19573	0,00369	0,3711	0,00361	10,01777	0,16745	2790,918	30,53	2034,6	16,95	2436,4	15,43	1375,2	160,44	80,25165	10,01777	0,16745	0,3711	0,00361	0,581972	-16,4915				
4.sSMPABC015	98886,63	18501,78	0,55651	0,20523	0,00344	0,38088	0,00364	10,67732	0,14973	2868,248	26,99	2080,4	16,99	2495,5	13,02	2008,8	218,4	80,04711	10,67732	0,14973	0,38088	0,00364	0,681501	-16,6339				
4.sSMPABC066	474969	94338	0,220233	0,19422	0,00245	0,366	0,00329	9,79786	0,10774	2778,23	20,51	2010,6	15,54	2415,9	10,13	1316,4	75,91	79,84184	9,79786	0,10774	0,366	0,00329	0,817465	-16,7764				
4.sSMPABC021	233801,3	49146,78	0,435223	0,21729	0,0026	0,38972	0,00325	11,64576	0,1139	2960,717	19,15	2121,5	15,07	2576,4	9,15	1559,3	60,08	78,55762	11,64576	0,1139	0,38972	0,00325	0,852658	-17,6564				
4.sSMPABC081	118749,3	27798,05	0,456364	0,24077	0,00312	0,41109	0,00329	13,61708	0,14247	3125,067	20,49	2219,9	15,04	2723,5	9,9	1936,7	120,43	77,31429	13,61708	0,14247	0,41109	0,00329	0,764926	-18,4909				
4.sSMPABC132	696135,8	146641,6	0,074474	0,19313	0,00425	0,34262	0,00401	9,08065	0,18441	2769,001	35,68	1899,2	19,24	2346,2	18,57	3909,9	419,94	76,46377	9,08065	0,18441	0,34262	0,00401	0,576321	-19,0521				
4.sSMPABC062	101692	19567	0,309069	0,20047	0,00268	0,33226	0,00269	9,15894	0,09822	2830,027	21,61	1849,3	13	2354	9,82	747,2	48,31	72,70859	9,15894	0,09822	0,33226	0,00269	0,754952	-21,4401				
4.sSMPABC074	310178,9	69942,01	0,130989	0,2202	0,00239	0,35069	0,00284	10,64701	0,09428	2982,154	17,37	1937,9	13,56	2492,8	8,22	1003,5	28,23	71,36591	10,64701	0,09428	0,35069	0,00284	0,914541	-22,2601				
4.sSMPABC135	243318	44409,35	0,354334	0,18183	0,00256	0,29921	0,00246	7,49833	0,08931	2669,633	23,13	1687,4	12,2	2172,8	10,67	912,3	67,28	71,23385	7,49833	0,08931	0,29921	0,00246	0,690277	-22,3398				
4.sSMPABC063	383910,2	74589,66	0,286533	0,19305	0,00253	0,30462	0,00272	8,0967	0,0919	2768,321	21,32	1714,2	13,44	2241,9	10,26	865,3	48,26	69,21596	8,0967	0,0919	0,30462	0,00272	0,786689	-23,5381				
4.sSMPABC145	233143,5	42316,98	0,435259	0,183	0,00313	0,28082	0,00251	7,09681	0,10651	2680,248	28,01	1595,5	12,61	2123,6	13,36	936,3	100,61	66,90066	7,09681	0,10651	0,28082	0,00251	0,59555	-24,8681				
4.sSMPABC120	352267,9	60161,49	0,487026	0,16134	0,00201	0,24786	0,00205	5,52606	0,05778	2469,752	20,84	1427,4	10,58	1904,7	8,99	536,8	22,92	66,56158	5,52606	0,05778	0,24786	0,00205	0,791016	-25,0591				
4.sSMPABC065	201782	35965	0,239195	0,18944	0,00313	0,28068	0,00255	7,31775	0,10365	2737,306	26,94	1594,8	12,81	2151	12,65	1478,6	163,17	65,12415	7,31775	0,10365	0,28068	0,00255	0,641412	-25,8577				
4.sSMPABC087	313235	62645	0,340049	0,20508	0,00263	0,29323	0,00229	8,27717	0,08608	2867,059	20,73	1657,6	11,43	2261,8	9,42	1002,6	62,89	63,54971	8,27717	0,08608	0,29323	0,00229	0,750943	-26,7132				
4.sSMPABC076	368856	77986	0,210319	0,20896	0,00223	0,29306	0,00234	8,4407	0,07275	2897,496	17,2	1656,8	11,69	2279,6	7,82	747,3	19,68	62,40946	8,4407	0,07275	0,29306	0,00234	0,926413	-27,3206				
4.sSMPABC036	130280	19389	0,159284	0,15807	0,00212	0,21946	0,00177	4,76815	0,05142	2435,12	22,54	1279	9,34	1779,3	9,05	1672,4	105,17	60,8835	4,76815	0,05142	0,21946	0,00177	0,747887	-28,1178				
4.sSMPABC115	442827,2	84369,34	0,219805	0,18409	0,00202	0,25599	0,00203	6,50172	0,05801	2690,067	18,04	1469,3	10,42	2046,1	7,85	723,3	24,16	60,74321	6,50172	0,05801	0,25599	0,00203	0,888789	-28,1902				
4.sSMPABC049	361251,5	76265,01	0,45649	0,20788	0,00219	0,27741	0,00227	7,94664	0,0684	2889,089	16,97	1578,3	11,43	2225	7,76	752,2	16,18	59,02553	7,94664	0,0684	0,27741	0,00227	0,950673	-29,0652				
4.sSMPABC112	442233,4	65615,3	0,45708	0,14443	0,0018	0,19081	0,00149	3,80142	0,03875	2280,999	21,25	1125,7	8,09	1593	8,19	729,4	44,84	58,48805	3,80142	0,03875	0,19081	0,00149	0,766054	-29,3346				
4.sSMPABC114	412044,3	73108,16	0,188016	0,17182	0,0019	0,222	0,00178	5,26293	0,04778	2575,451	18,4	1292,4	9,41	1862,9	7,75	615,3	19,88	55,85732	5,26293	0,04778	0,222	0,00178	0,883178	-30,6243				
4.sSMPABC044	679223,4	118457,9	0,269142	0,17732	0,00192	0,22721	0,00174	5,54584	0,04671	2627,963	17,9	1319,8	9,13	1907,7	7,25	682,5	19,22	55,45537	5,54584	0,04671	0,22721	0,00174	0,909242	-30,8172				

FILE NAME	CORRECT		0																					
	Pb206*	Pb207*	Th/U	207/206	1s	206/238	1s	207/235	1s	206/207	206/238		207/235		208/232		Conc	207/235		206/238		RHO	Disc.	
4.sSMPABC045	473434,2	85608,68	0,182575	0,18295	0,00195	0,23376	0,00182	5,88858	0,04937	2679,796	17,57	1354,2	9,48	1959,6	7,28	645,2	16,3	55,29464	5,88858	0,04937	0,23376	0,00182	0,928643	-30,8941
4.sSMPABC113	240515,5	46013,43	0,084971	0,19492	0,00284	0,23881	0,00199	6,41452	0,07904	2784,126	23,7	1380,5	10,33	2034,3	10,82	1258	103,19	52,64035	6,41452	0,07904	0,23881	0,00199	0,676266	-32,1388
4.sSMPABC111	179042	33426	0,003707	0,18224	0,00313	0,21641	0,00198	5,43075	0,08162	2673,362	28,12	1262,9	10,49	1889,7	12,89	******	2916,02	50,3682	5,43075	0,08162	0,21641	0,00198	0,608767	-33,1693
4.sSMPABC069	394820,5	63284,93	0,018222	0,15895	0,00168	0,18449	0,00146	4,04049	0,03425	2444,522	17,82	1091,5	7,95	1642,4	6,9	844,9	22,89	49,52817	4,04049	0,03425	0,18449	0,00146	0,933584	-33,5424
4.sSMPABC086	286097,2	55387,44	0,287105	0,19159	0,00223	0,22304	0,00171	5,8874	0,05428	2755,859	18,98	1297,9	8,99	1959,4	8	1057,5	51,19	49,03305	5,8874	0,05428	0,22304	0,00171	0,831567	-33,7603
4.sSMPABC134	286218	59854	0,400852	0,20334	0,00347	0,22111	0,00198	6,19504	0,09312	2853,195	27,53	1287,8	10,48	2003,7	13,14	2525,8	829,84	44,40907	6,19504	0,09312	0,22111	0,00198	0,595742	-35,7289
4.sSMPABC018	85633	13051	0,28375	0,1622	0,00229	0,16798	0,00139	3,73801	0,04207	2478,724	23,63	1001	7,65	1579,5	9,02	1109,4	102,57	42,20779	3,73801	0,04207	0,16798	0,00139	0,735233	-36,6255

FILE NAME	CORRECT		0															
	Pb206*	Pb207*	Th/U	207/206	1s	206/238	1s	207/235	1s	206/207	206/238	207/235	208/232	Conc	207/235	206/238	RHO	Disc.

a - Corrigido para o backgroung, dentro do fracionamento análitico do Pb/U (no caso do $^{206}Pb/^{238}U$) e correção de Pb comum usando a metodologia de Takenada et al. (2015) e subsequente normalização a GJ-1 (valor ID-TIMS/valor medido); $^{207}Pb/^{235}U$ calculado usando $^{207}Pb/^{206}Pb/(^{238}U/^{206}Pb*1/137,88)$

b - Conteúdo de U e Pb e razão $^{232}Th/^{238}U$ foram calculadas em relação ao zircão de referência GJ-1

c - Rho é o coeficiente de correlação do erro da razão $^{207}Pb/^{235}U/^{206}Pb/^{238}U$

d - Grau de discordância: 100* (($^{206}Pb/^{238}U$-$^{207}Pb/^{235}U$)/$^{207}Pb/^{235}U$)

FILE NAME	CORRECTED Pb206*	Pb207*	0 Th/U	207/206	1s	206/238	1s	207/235	1s	206/207	206/238	207/235	208/232	Conc	207/235	206/238	RHO	Disc.
Padrões Primários																		
4.sSMPABC001	45048,35881	2181,62	0,010727	0,0592	0,00077	0,09802	0,00077	0,79979	0,00863	574,459	28,17	602,8	4,52	596,7	4,87	254,2	52,55	101,0119	0,79979	0,00863	0,09802	0,00077	0,728016	1,022289
4.sSMPABC002	44652,09128	2324,671	0,010269	0,06058	0,00078	0,09736	0,00076	0,81294	0,00864	624,355	27,69	598,9	4,49	604,1	4,84	968,2	63,84	99,13174	0,81294	0,00864	0,09736	0,00076	0,734476	-0,86078
4.sSMPABC003	49301,34479	3083,633	0,010361	0,06072	0,00078	0,09826	0,00077	0,82238	0,00868	629,33	27,52	604,2	4,52	609,4	4,84	613,3	53,06	99,13936	0,82238	0,00868	0,09826	0,00077	0,742449	-0,8533
4.sSMPABC007	46687	2822	0,01102	0,05982	0,00078	0,09792	0,00077	0,80743	0,00861	597,07	27,88	602,2	4,52	601	4,84	683,1	49,5	100,1993	0,80743	0,00861	0,09792	0,00077	0,73743	0,199667
4.sSMPABC008	46123	2808	0,010857	0,06025	0,00078	0,09797	0,00077	0,81368	0,00869	612,565	27,82	602,5	4,53	604,5	4,86	772,9	50,28	99,66805	0,81368	0,00869	0,09797	0,00077	0,735921	-0,33085
4.sSMPABC009	44730	2752	0,011284	0,06089	0,0008	0,09806	0,00077	0,82304	0,00888	635,351	27,94	603	4,55	609,7	4,95	570,2	49,59	98,88889	0,82304	0,00888	0,09806	0,00077	0,727791	-1,0989
4.sSMPABC025	36161,28662	1459,511	0,010672	0,06027	0,00081	0,09707	0,00077	0,80645	0,00896	613,282	28,6	597,2	4,54	600,5	5,04	722	57,35	99,44742	0,80645	0,00896	0,09707	0,00077	0,713962	-0,54954
4.sSMPABC026	44690	2710	0,010381	0,05999	0,0008	0,09799	0,00078	0,81037	0,00894	603,214	28,49	602,6	4,58	602,7	5,02	-66,4	59,63	99,98341	0,81037	0,00894	0,09799	0,00078	0,721537	-0,01659
4.sSMPABC044	45107,42564	2628,675	0,010935	0,05932	0,00078	0,09553	0,00076	0,78117	0,00855	578,86	28,39	588,2	4,48	586,1	4,87	477,5	46,98	100,357	0,78117	0,00855	0,09553	0,00076	0,726864	0,358301
4.sSMPABC045	43065,29069	2116,529	0,010362	0,0612	0,0008	0,09733	0,00077	0,82109	0,00885	646,271	27,76	598,7	4,55	608,7	4,93	918,4	55,09	98,32971	0,82109	0,00885	0,09733	0,00077	0,733992	-1,64285
4.sSMPABC063	37099,13861	1803,273	0,010902	0,05785	0,00081	0,09694	0,00079	0,77305	0,00924	524,086	30,8	596,4	4,64	581,5	5,29	143,1	55,58	102,4983	0,77305	0,00924	0,09694	0,00079	0,681804	2,562339
4.sSMPABC064	34745,52093	1714,155	0,011084	0,06084	0,00085	0,09831	0,0008	0,8244	0,00972	633,582	29,74	604,5	4,71	610,5	5,41	891,1	69,82	99,00744	0,8244	0,00972	0,09831	0,0008	0,690183	-0,9828
4.sSMPABC087	30056,34166	1324,906	0,010429	0,06041	0,00088	0,09669	0,00081	0,80516	0,01008	618,292	31,19	595	4,75	599,7	5,67	660,5	69,12	99,21008	0,80516	0,01008	0,09669	0,00081	0,669153	-0,78373
4.sSMPABC088	37600,67897	2429,691	0,010886	0,05906	0,00087	0,09855	0,00082	0,80227	0,01011	569,309	31,58	605,9	4,84	598,1	5,69	951,3	70,33	101,2873	0,80227	0,01011	0,09855	0,00082	0,660278	1,30413
4.sSMPABC109	34339,23071	2139,598	0,010993	0,06134	0,00093	0,09805	0,00083	0,82907	0,01085	651,178	32,07	603	4,9	613,1	6,02	1370,8	95,46	98,32504	0,82907	0,01085	0,09805	0,00083	0,646833	-1,64737
4.sSMPABC110	34904	2169	0,010979	0,06141	0,0009	0,09812	0,00083	0,83061	0,01051	653,626	31,22	603,4	4,87	614	5,83	500	56,36	98,24329	0,83061	0,01051	0,09812	0,00083	0,668521	-1,72638
4.sSMPABC131	42711	2622	0,010627	0,0607	0,00088	0,09766	0,00082	0,81714	0,01015	628,62	30,78	600,7	4,83	606,5	5,67	566,1	54,61	99,03446	0,81714	0,01015	0,09766	0,00082	0,67597	-0,95631
4.sSMPABC132	39845,42063	1842,138	0,010632	0,05922	0,00085	0,09787	0,00082	0,79889	0,00994	575,193	31,06	601,9	4,83	596,2	5,61	400,4	49	100,947	0,79889	0,00994	0,09787	0,00082	0,673387	0,956055
Padrões Secundário																		
4.sSMPABC004	69816	4079	0,077472	0,05781	0,00071	0,09009	0,00069	0,71786	0,00707	522,569	26,82	556,1	4,1	549,4	4,18	543,5	18,28	101,2048	0,71786	0,00707	0,09009	0,00069	0,777666	1,219512
4.sSMPABC005	68944	4146	0,077142	0,05951	0,00073	0,0892	0,00069	0,73177	0,00722	585,805	26,36	550,8	4,07	557,6	4,23	558,4	18,69	98,76543	0,73177	0,00722	0,0892	0,00069	0,78401	-1,21951
4.sSMPABC006	66026,79546	3348,414	0,077278	0,05707	0,00073	0,08867	0,0007	0,69746	0,00732	494,239	28,31	547,7	4,13	537,3	4,38	509,2	17,53	101,8988	0,69746	0,00732	0,08867	0,0007	0,752193	1,935604
4.sSMPABC027	65229	3831	0,076834	0,05811	0,00073	0,09126	0,00071	0,73101	0,00743	533,912	27,6	563	4,19	557,1	4,36	523,3	18,38	101,048	0,73101	0,00743	0,09126	0,00071	0,765442	1,059056
4.sSMPABC028	62693,13937	3445,696	0,076506	0,05734	0,00072	0,0893	0,00069	0,70576	0,00724	504,634	27,43	551,4	4,11	542,2	4,31	486,2	17,5	101,6685	0,70576	0,00724	0,0893	0,00069	0,75321	1,696791
4.sSMPABC046	76261	4521	0,076365	0,05864	0,00071	0,08879	0,00069	0,71768	0,00706	553,756	26,34	548,4	4,08	549,3	4,17	496,9	18,42	99,83589	0,71768	0,00706	0,08879	0,00069	0,789971	-0,16384
4.sSMPABC047	71160,28466	3946,835	0,076977	0,05758	0,00071	0,08843	0,00069	0,70187	0,00711	513,817	26,72	546,3	4,08	539,9	4,24	483,8	18,2	101,1715	0,70187	0,00711	0,08843	0,00069	0,770259	1,185405
4.sSMPABC065	67282,00365	3273,324	0,077313	0,05863	0,00073	0,0883	0,00069	0,7136	0,00733	553,384	27,11	545,5	4,11	546,9	4,35	498,2	20,48	99,74335	0,7136	0,00733	0,0883	0,00069	0,760745	-0,25599
4.sSMPABC066	73082,70518	4208,859	0,076089	0,05818	0,00073	0,08921	0,0007	0,7154	0,00738	536,547	27,81	550,9	4,14	547,9	4,37	457,7	19,35	100,5446	0,7154	0,00738	0,08921	0,0007	0,760636	0,547545
Amostras																		
4.sSMPABC012	107269	29336	0,353699	-0,10933	0,10863	-0,08094	0,08358	0,15666	0,09217	#NÚM!	0	-544,1	586,25	147,8	80,92	#NOME?	NaN	227,1641	0,15666	0,09217	-0,08094	0,08358	-1,75512	-468,133
4.sSMPABC140	948550,1045	731391,9	0,356364	0,56847	0,01281	3,12007	0,03798	244,0719	5,2483	4429,41	32,49	9127,3	59,43	5586,2	21,74	******	3667,4	138,7968	244,0719	5,2483	3,12007	0,03798	0,566095	63,39014
4.sSMPABC089	314497,9598	572452,7	0,391613	0,70033	0,00807	2,55309	0,02038	246,4423	2,31414	4731,4	16,46	8172,9	36,97	5596	9,5	******	739,84	131,5298	246,4423	2,31414	2,55309	0,02038	0,850088	46,04896
4.sSMPABC141	898614,0324	107473,5	0,056186	0,11811	0,00144	0,3699	0,00296	6,02271	0,06101	1927,83	21,71	2028,9	13,92	1979,1	8,82	1547,2	87,27	102,4545	6,02271	0,06101	0,3699	0,00296	0,789948	2,516295
4.sSMPABC024	878648	110374	0,041497	0,12143	0,00152	0,36994	0,0034	6,19293	0,06886	1977,34	22,19	2029,1	16,01	2003,5	9,72	2183,3	107,66	101,2616	6,19293	0,06886	0,36994	0,0034	0,826565	1,277764
4.sSMPABC125	871383,521	107760,7	0,055141	0,12244	0,00145	0,3707	0,00292	6,25708	0,06036	1992,08	20,86	2032,7	13,72	2012,5	8,45	1960,5	100,58	100,9938	6,25708	0,06036	0,3707	0,00292	0,81655	1,003727
4.sSMPABC093	171634	33692	0,523226	0,19345	0,0038	0,54674	0,00653	14,56348	0,26126	2771,72	31,84	2811,6	27,21	2787,2	17,04	2476,9	252,96	100,8678	14,56348	0,26126	0,54674	0,00653	0,665771	0,875431
4.sSMPABC117	105254	24277	0,494314	0,22733	0,00287	0,61129	0,00522	19,15479	0,20201	3033,35	20,07	3075,2	20,88	3049,6	10,18	2396,4	126,6	100,8325	19,15479	0,20201	0,61129	0,00522	0,809707	0,839454
4.sSMPABC128	1018434	127726	0,017132	0,12392	0,00144	0,37189	0,00308	6,35321	0,06202	2013,42	20,52	2038,3	14,46	2025,8	8,56	6584,1	315,79	100,6133	6,35321	0,06202	0,37189	0,00308	0,848394	0,61704
4.sSMPABC112	51620	9508	0,253947	0,18378	0,00272	0,52361	0,00493	13,26352	0,16917	2687,28	24,22	2714,5	20,85	2698,6	12,04	2099,2	142,62	100,5857	13,26352	0,16917	0,52361	0,00493	0,738201	0,589194
4.sSMPABC118	124285	28536	0,498826	0,22673	0,00294	0,60658	0,00525	18,95436	0,20767	3029,11	20,66	3056,3	21,07	3039,5	10,57	2781,3	178,15	100,5497	18,95436	0,20767	0,60658	0,00525	0,789963	0,552722
4.sSMPABC091	784534,5135	95128,65	0,046276	0,12032	0,00127	0,36008	0,00285	5,97223	0,0505	1960,97	18,66	1982,5	13,51	1971,8	7,35	1709,6	58,05	100,5397	5,97223	0,0505	0,36008	0,00285	0,936033	0,542651
4.sSMPABC043	97333	18996	0,339645	0,18607	0,00688	0,52607	0,01235	13,49374	0,46317	2707,73	59,72	2724,9	52,15	2714,8	32,45	3969,6	1024,63	100,3707	13,49374	0,46317	0,52607	0,01235	0,683936	0,372035
4.sSMPABC139	290865	77492	0,180656	0,26264	0,00329	0,6637	0,00547	24,02477	0,25265	3262,61	19,59	3281,5	21,18	3269,4	10,25	4438,5	238,98	100,3687	24,02477	0,25265	0,6637	0,00547	0,78371	0,370098
4.sSMPABC092	115406	22859	0,358277	0,19571	0,00225	0,54422	0,00433	14,68208	0,13474	2790,75	18,66	2801,1	18,09	2794,9	8,72	2209,3	96,4	100,2213	14,68208	0,13474	0,54422	0,00433	0,866971	0,221833
4.sSMPABC081	132950	29816	0,304805	0,22409	0,00513	0,59665	0,00788	18,38795	0,38643	3010,31	36,3	3016,3	31,82	3010,3	20,24	1980,5	238,25	100,1989	18,38795	0,38643	0,59665	0,00788	0,628448	0,199316
4.sSMPABC056	41617,98558	10565,3	0,501722	0,25133	0,00302	0,64312	0,00594	22,27785	0,22498	3193,16	18,88	3201,3	23,32	3195,9	9,81	3315,4	115,75	100,1687	22,27785	0,22498	0,64312	0,00594	0,914584	0,168966
4.sSMPABC030	143360	28356	0,251394	0,19596	0,00222	0,54383	0,0044	14,68876	0,13211	2792,84	18,42	2799,4	18,36	2795,3	8,55	2610,3	88,93	100,1465	14,68876	0,13211	0,54383	0,0044	0,899578	0,146675
4.sSMPABC061	200960	62059	0,659686	0,30497	0,00339	0,72122	0,00572	30,31752	0,26655	3495,65	17,08	3500,6	21,41	3497,2	8,64	2850,6	106,5	100,0971	30,31752	0,26655	0,72122	0,00572	0,902076	0,097221
4.sSMPABC116	114832,7634	18401,99	1,149479	0,11181	0,00374	0,32211	0,00453	4,89536	0,15289	1829,04	59,38	1800	22,08	1801,5	26,33	73,4	11,16	99,91667	4,89536	0,15289	0,32211	0,00453	0,450298	-0,08326
4.sSMPABC146	153111	39178	0,078128	0,25127	0,00341	0,63913	0,00577	22,12599	0,26123	3192,79	21,34	3185,6	22,71	3189,3	11,47	2900,7	203,93	99,88385	22,12599	0,26123	0,63913	0,00577	0,764656	-0,11601
4.sSMPABC071	126593,6779	29539,62	0,54855	0,23084	0,00256	0,60407	0,00473	19,22094	0,16724	3057,88	17,64	3046,2	19,01	3053	8,4	2583	98,94	99,77677	19,22094	0,16724	0,60407	0,00473	0,899929	-0,22273
4.sSMPABC127	139477	29366	0,342475	0,2096	0,00296	0,56518	0,00521	16,31165	0,20025	2902,45	22,73	2888	21,47	2895,2	11,75	2845,3	217,29	99,75069	16,31165	0,20025	0,56518	0,00521	0,75089	-0,24869
4.sSMPABC145	78323	14553	0,209686	0,18214	0,00259	0,50992	0,0046	12,80046	0,15752	2672,45	23,32	2656,3	19,64	2665,1	11,59	2015,2	128,33	99,66871	12,80046	0,15752	0,50992	0,0046	0,73307	-0,33019
4.sSMPABC111	112536	21270	0,407308	0,18659	0,00234	0,51905	0,00445	13,34898	0,14053	2712,34	20,56	2695,1	18,89	2704,7	9,94	2473,3	142,94	99,6438	13,34898	0,14053	0,51905	0,00445	0,814385	-0,35494
4.sSMPABC062	187304,8679	57912	0,449034	0,30613	0,00345	0,71542	0,00574	30,18757	0,27074	3501,52	17,3	3478,9	21,57	3492,9	8,81	2956,7	112,98	99,59757	30,18757	0,27074	0,71542	0,00574	0,894595	-0,40081
4.sSMPABC022	930457,2815	110068,7	0,046567	0,11736	0,00124	0,34258	0,00256	5,54209	0,04461	1916,41	18,84	1899,1	12,32	1907,2	6,92	1747,3	54,93	99,57348	5,54209	0,04461	0,34258	0,00256	0,928366	-0,42471
4.sSMPABC057	55437	14271	0,575331	0,25424	0,00303	0,63977	0,00552	22,41945	0,21679	3211,36	18,72	3188,1	21,69	3202,1	9,4	2730,9	101,58	99,56087	22,41945	0,21679	0,63977	0,00552	0,892279	-0,43721
4.sSMPABC099	71860	14065	0,279475	0,19343	0,00236	0,53048	0,00446	14,14329	0,14135	2771,55	19,83	2743,5	18,77	2759,4	9,48	1957,4	90,99	99,42045	14,14329	0,14135	0,53048	0,00446	0,841241	-0,57621
4.sSMPABC114	90307,6693	17956,12	0,502559	0,19676	0,00245	0,53631	0,00453	14,54487	0,15071	2799,51	20,24	2768	19,01	2785,9	9,84	2136	109,62	99,35332	14,54487	0,15071	0,53631	0,00453	0,815174	-0,64252
4.sSMPABC052	90125	17157	0,351263	0,18806	0,00218	0,51867	0,00426	13,44486	0,12465	2725,27	18,95	2693,5	18,09	2711,4	8,76	2211,1	81	99,33544	13,44486	0,12465	0,51867	0,00426	0,885895	-0,66018
4.sSMPABC142	710109,881	87635,8	0,037386	0,12208	0,00148	0,35527	0,00283	5,97879	0,0602	1986,85	21,48	1959,7	13,48	1972,8	8,76	1472,6	84,03	99,33153	5,97879	0,0602	0,35527	0,00283	0,791124	-0,66403
4.sSMPABC126	65191,47216	13707,05	0,462172	0,2074	0,00268	0,55636	0,00486	15,90393	0,17316	2885,34	20,83	2851,6	20,14	2871	10,4	2272,4	122,03	99,31968	15,90393	0,17316	0,55636	0,00486	0,802301	-0,67572
4.sSMPABC021	887667	105285	0,04539	0,11733	0,0012	0,33996	0,0027	5,49811	0,04493	1915,95	18,28	1886,5	12,98	1900,3	7,02	1860,9	42,75	99,26849	5,49811	0,04493	0,33996	0,0027	0,971881	-0,7262
4.sSMPABC100	61451	11292	0,470801	0,18364	0,00388	0,50728	0,00679	12,80934	0,24654	2686,02	34,55	2645	29,04	2665,7	18,13	2600,9	249,69	99,21739	12,80934	0,24654	0,50728	0,00679	0,695443	-0,77653
4.sSMPABC016	224009	49876	0,186724	0,22429	0,00336	0,58395	0,00544	18,00146	0,22893	3011,75	23,86	2964,8	22,14	2989,8	12,23	2854,5	250,65	99,15677	18,00146	0,22893	0,58395	0,00544	0,732535	-0,83618
4.sSMPABC115	65942	12886	0,383348	0,19303	0,00242	0,52645	0,00449	14,00694	0,14565	2768,15	20,39	2726,5	18,96	2750,2	9,85	2060,8	101,25	99,13075	14,00694	0,14565	0,52645	0,00449	0,820204	-0,86176
4.sSMPABC076	284207	36879	0,06616	0,12783	0,00156	0,37034	0,00304	6,52474	0,06591	2068,34	21,42	2031	14,3	2049,2	8,89	2122,2	119,9	99,10389	6,52474	0,06591	0,37034	0,00304	0,812615	-0,88815
4.sSMPABC017	202437,1091	45673,5	0,20524	0,22332	0,00267	0,58002	0,00462	17,85483	0,16856	3004,78	19,09	2948,8	18,86	2981,9	9,08	2918,3	162,56	98,87751	17,85483	0,16856	0,58002	0,00462	0,843724	-1,11003

FILE NAME	CORRECTED	0																												
	Pb206*		Pb207*	Th/U	207/206	1s	206/238	1s	207/235	1s	206/207		206/238		207/235		208/232		Conc	207/235		206/238		RHO	Disc.					
4.sSMPABC015	1057233		126671	0,052352	0,11939	0,00129	0,34229	0,00276	5,63092	0,04928	1947,11	19,19	1897,7	13,24	1920,8	7,55	2521,6	82	98,78274	5,63092	0,04928	0,34229	0,00276	0,921348	-1,20262					
4.sSMPABC090	916045,2978		115662,7	0,03725	0,12533	0,00138	0,35964	0,00301	6,21135	0,05741	2033,46	19,35	1980,5	14,26	2006	8,08	3309	129,23	98,71245	6,21135	0,05741	0,35964	0,00301	0,905518	-1,27119					
4.sSMPABC098	135977,8757		26434,73	0,276796	0,19396	0,00268	0,5233	0,00452	13,98796	0,16297	2776,03	22,44	2713,2	19,15	2748,9	11,04	2087,5	135,35	98,68421	13,98796	0,16297	0,5233	0,00452	0,741369	-1,2987					
4.sSMPABC058	176943		54858	0,674563	0,30774	0,0033	0,70237	0,00571	29,79371	0,25685	3509,62	16,46	3429,6	21,61	3480	8,47	3385,2	105,63	98,53044	29,79371	0,25685	0,70237	0,00571	0,943008	-1,44828					
4.sSMPABC029	175135		35217	0,282132	0,19886	0,00205	0,52905	0,00417	14,50244	0,11766	2816,86	16,78	2737,4	17,57	2783,2	7,71	2544,1	58,87	98,32688	14,50244	0,11766	0,52905	0,00417	0,97152	-1,64559					
4.sSMPABC097	135416		26638	0,239139	0,19465	0,00222	0,52067	0,00417	13,9718	0,12827	2781,85	18,57	2702	17,7	2747,8	8,7	2120,8	88,9	98,30496	13,9718	0,12827	0,52067	0,00417	0,87237	-1,66679					
4.sSMPABC135	49399		9650	0,365615	0,19566	0,003	0,52146	0,00498	14,06706	0,18857	2790,33	24,91	2705,4	21,11	2754,2	12,71	2013,2	149,66	98,1962	14,06706	0,18857	0,52146	0,00498	0,712425	-1,77184					
4.sSMPABC072	352595,3806		51350,87	0,028898	0,14398	0,00275	0,40574	0,00452	8,03791	0,13878	2275,62	32,55	2195,4	20,73	2235,3	15,59	******	1609,62	98,18256	8,03791	0,13878	0,40574	0,00452	0,645219	-1,785					
4.sSMPABC035	96132,1439		15559,68	0,211198	0,16014	0,00169	0,44544	0,00357	9,833	0,08254	2457,14	17,74	2374,9	15,91	2419,2	7,74	2175	52,01	98,13466	9,833	0,08254	0,44544	0,00357	0,954774	-1,83118					
4.sSMPABC060	168552,4257		52867,57	0,463471	0,31003	0,00359	0,69915	0,00578	29,87751	0,28035	3521,07	17,78	3417,4	21,94	3482,8	9,22	3328,8	147,67	98,08626	29,87751	0,28035	0,69915	0,00578	0,881052	-1,8778					
4.sSMPABC049	146293		38027	0,2162	0,25732	0,00276	0,62523	0,00528	22,17392	0,19713	3230,37	16,85	3130,7	20,94	3191,4	8,64	3693,8	102,17	98,06114	22,17392	0,19713	0,62523	0,00528	0,949913	-1,90199					
4.sSMPABC023	1051876,341		125662,3	0,047057	0,11865	0,00126	0,33426	0,00277	5,46704	0,04821	1935,99	18,92	1859	13,36	1895,4	7,57	2507,7	77,35	98,04196	5,46704	0,04821	0,33426	0,00277	0,939746	-1,92044					
4.sSMPABC096	137978		27244	0,251771	0,19597	0,00229	0,5193	0,00429	14,02777	0,13441	2792,92	19,01	2696,2	18,2	2751,6	9,08	2424,7	113,57	97,94526	14,02777	0,13441	0,5193	0,00429	0,862176	-2,01337					
4.sSMPABC018	96156,68512		22256,36	0,371915	0,22819	0,00257	0,57341	0,00455	18,03093	0,15715	3039,4	17,9	2921,8	18,63	2991,4	8,38	2737,3	93,02	97,61791	18,03093	0,15715	0,57341	0,00455	0,910437	-2,32667					
4.sSMPABC106	623605		76977	0,045811	0,12205	0,00139	0,34012	0,00263	5,72218	0,05207	1986,41	20,14	1887,3	12,65	1934,7	7,86	1664,2	80,29	97,48848	5,72218	0,05207	0,34012	0,00263	0,849762	-2,44999					
4.sSMPABC079	821733,9595		100653,1	0,028101	0,12158	0,00128	0,33867	0,0027	5,67603	0,04787	1979,54	18,61	1880,3	12,99	1927,7	7,28	3126,2	92,8	97,47913	5,67603	0,04787	0,33867	0,0027	0,945297	-2,45889					
4.sSMPABC108	85857		17108	0,37083	0,19735	0,0023	0,51688	0,00421	14,06139	0,13308	2804,41	18,94	2685,9	17,91	2753,9	8,97	2147,3	95,9	97,46826	14,06139	0,13308	0,51688	0,00421	0,860613	-2,46923					
4.sSMPABC039	837748		103978	0,014637	0,12175	0,00134	0,3386	0,00293	5,68083	0,05376	1982,03	19,53	1879,9	14,1	1928,5	8,17	2118	81,79	97,41476	5,68083	0,05376	0,3386	0,00293	0,914394	-2,52009					
4.sSMPABC136	770036,1064		93286,43	0,040551	0,11971	0,00132	0,32866	0,00267	5,42373	0,0495	1951,9	19,64	1831,9	12,93	1888,6	7,82	1787,3	76,25	96,90485	5,42373	0,0495	0,32866	0,00267	0,890138	-3,00222					
4.sSMPABC013	1035581,207		127106,1	0,01169	0,12286	0,00137	0,33748	0,00278	5,71312	0,05241	1998,17	19,6	1874,6	13,39	1933,4	7,93	7024	248,1	96,86333	5,71312	0,05241	0,33748	0,00278	0,897958	-3,04127					
4.sSMPABC050	245161		60255	0,083851	0,23961	0,00309	0,58077	0,00564	19,17234	0,21967	3117,38	20,38	2951,9	23,02	3050,5	11,06	2921,1	146,75	96,65978	19,17234	0,21967	0,58077	0,00564	0,847577	-3,23226					
4.sSMPABC051	310962		77386	0,090832	0,24021	0,00302	0,58142	0,00554	19,2403	0,21437	3121,36	19,85	2954,5	22,59	3053,9	10,75	2283,2	104,65	96,63564	19,2403	0,21437	0,58142	0,00554	0,8552	-3,25485					
4.sSMPABC094	148356		33122	0,352391	0,22116	0,00326	0,54834	0,00492	16,71106	0,21085	2989,16	23,5	2818,3	20,48	2918,4	12,09	2523,8	218,96	96,44821	16,71106	0,21085	0,54834	0,00492	0,711124	-3,42996					
4.sSMPABC034	761339,8352		93674,99	0,029713	0,1202	0,0014	0,32456	0,0029	5,37565	0,05476	1959,19	20,59	1812	14,12	1881	8,72	2547,5	100,06	96,19205	5,37565	0,05476	0,32456	0,0029	0,877143	-3,66826					
4.sSMPABC105	426873,7806		53549,88	0,158668	0,12439	0,00134	0,33561	0,00269	5,75479	0,05025	2020,13	19,01	1865,5	12,98	1939,6	7,55	1608,7	59,75	96,02787	5,75479	0,05025	0,33561	0,00269	0,917933	-3,82038					
4.sSMPABC069	206115,0467		37230,78	0,156039	0,17899	0,00202	0,46584	0,00371	11,49274	0,10342	2643,53	18,57	2465,3	16,32	2564	8,41	1969,2	75,9	95,99643	11,49274	0,10342	0,46584	0,00371	0,885026	-3,84945					
4.sSMPABC041	181587,9617		29879,88	0,158553	0,16269	0,00177	0,43078	0,00332	9,66076	0,08157	2483,81	18,27	2309,3	14,96	2403	7,77	1990,7	64,89	95,94249	9,66076	0,08157	0,43078	0,00332	0,912774	-3,89929					
4.sSMPABC053	67948		13675	0,276239	0,19895	0,00234	0,5022	0,00421	13,77192	0,13054	2817,6	19,11	2623,2	18,05	2734,2	8,97	2413,6	89,57	95,76853	13,77192	0,13054	0,5022	0,00421	0,884415	-4,05969					
4.sSMPABC033	347801,5406		43429,99	0,104036	0,12346	0,00133	0,33072	0,0025	5,62808	0,04652	2006,82	18,98	1841,9	12,13	1920,4	7,13	1710,3	54,93	95,7381	5,62808	0,04652	0,33072	0,0025	0,914535	-4,08769					
4.sSMPABC124	678113,2766		83253,26	0,036429	0,12152	0,00137	0,32511	0,00256	5,44596	0,04976	1978,66	20,04	1814,6	12,44	1892,1	7,84	1786	84,47	95,72909	5,44596	0,04976	0,32511	0,00256	0,861794	-4,09598					
4.sSMPABC036	904797,0517		114215,4	0,014779	0,12277	0,00156	0,32682	0,00303	5,53044	0,0625	1996,87	22,35	1822,9	14,73	1905,3	9,72	6576,8	323,83	95,47973	5,53044	0,0625	0,32682	0,00303	0,820377	-4,32478					
4.sSMPABC077	314895		39689	0,077669	0,12445	0,0014	0,33039	0,00256	5,66748	0,05048	2020,99	19,85	1840,3	12,41	1926,4	7,69	1350,5	56,24	95,32141	5,66748	0,05048	0,33039	0,00256	0,869929	-4,46948					
4.sSMPABC107	682451,1491		84141,59	0,027441	0,12212	0,00132	0,32314	0,00257	5,43998	0,04738	1987,43	19,09	1805,1	12,51	1891,2	7,47	1996,2	76,84	95,23018	5,43998	0,04738	0,32314	0,00257	0,913155	-4,55266					
4.sSMPABC084	507303		63786	0,078177	0,12418	0,00143	0,32572	0,00255	5,5752	0,05149	2017,14	20,29	1817,6	12,41	1912,3	7,95	1456,2	65,98	94,78983	5,5752	0,05149	0,32572	0,00255	0,847683	-4,95215					
4.sSMPABC078	686929,0144		86405,39	0,038272	0,12466	0,00135	0,32694	0,00273	5,61675	0,05098	2023,97	19,11	1823,5	13,24	1918,7	7,82	2425,4	87,91	94,77927	5,61675	0,05098	0,32694	0,00273	0,919983	-4,96169					
4.sSMPABC070	469397		110124	0,251611	0,23241	0,00412	0,54711	0,00571	17,47413	0,2776	3068,72	28,06	2813,1	23,81	2961,2	15,26	7483,2	829,57	94,73535	17,47413	0,2776	0,54711	0,00571	0,656958	-5,00135					
4.sSMPABC014	255497,3953		43278,23	0,190361	0,16748	0,00201	0,42964	0,00353	9,92352	0,09637	2532,62	20,01	2304,1	15,9	2427,7	8,96	3191,4	153,96	94,63565	9,92352	0,09637	0,42964	0,00353	0,846046	-5,09124					
4.sSMPABC104	441994		55280	0,124421	0,12378	0,00133	0,31978	0,00255	5,45662	0,04729	2011,41	18,95	1788,7	12,44	1893,8	7,44	1603,4	60,67	94,12422	5,45662	0,04729	0,31978	0,00255	0,920117	-5,54969					
4.sSMPABC031	600288,086		76670,11	0,128901	0,12728	0,00131	0,32875	0,00254	5,76793	0,04617	2060,74	18,03	1832,3	12,34	1941,6	6,93	1885,5	46,67	94,03482	5,76793	0,04617	0,32875	0,00254	0,965224	-5,62938					
4.sSMPABC137	601541,8452		74210,57	0,028449	0,12276	0,00137	0,31484	0,00253	5,3281	0,04867	1996,72	19,63	1764,5	12,42	1873,4	7,81	1914,2	87,22	93,82828	5,3281	0,04867	0,31484	0,00253	0,879714	-5,81296					
4.sSMPABC019	74464		18016	0,311178	0,23844	0,00477	0,54469	0,00723	17,85519	0,31962	3109,59	31,5	2803	30,16	2982	17,21	6057,6	824,12	93,61399	17,85519	0,31962	0,54469	0,00723	0,741514	-6,00268					
4.sSMPABC123	164517		26618	0,529125	0,16654	0,00458	0,41813	0,00546	9,60856	0,24799	2523,17	45,44	2252	24,81	2398	23,74	3025,1	817,69	93,51687	9,60856	0,24799	0,41813	0,00546	0,505947	-6,08841					
4.sSMPABC040	98008		16796	0,167829	0,16945	0,00196	0,41773	0,00332	9,75505	0,08836	2552,22	19,2	2250,2	15,08	2411,9	8,34	1908,7	71,98	92,81397	9,75505	0,08836	0,41773	0,00332	0,877438	-6,70426					
4.sSMPABC122	472786		62697	0,101252	0,13124	0,00145	0,32832	0,00267	5,93957	0,05392	2114,62	19,2	1830,2	12,97	1967	7,89	1694,2	68,26	92,52541	5,93957	0,05392	0,32832	0,00267	0,895816	-6,95475					
4.sSMPABC101	382515		48577	0,036917	0,12581	0,00139	0,31169	0,0025	5,40585	0,04838	2040,23	19,36	1749	12,28	1885,8	7,67	1776,9	71,2	92,17839	5,40585	0,04838	0,31169	0,0025	0,896221	-7,25422					
4.sSMPABC032	384816,1226		47134,13	0,097102	0,12131	0,00125	0,28162	0,00221	4,70925	0,03804	1975,58	18,18	1599,5	11,09	1768,9	6,77	1647,8	38,31	89,40919	4,70925	0,03804	0,28162	0,00221	0,971494	-9,57657					
4.sSMPABC080	272754,1592		52587,37	0,343534	0,19	0,00248	0,42591	0,004	11,15012	0,12857	2742,16	21,28	2287,2	18,1	2535,8	10,74	1788,1	99,24	89,13081	11,15012	0,12857	0,42591	0,004	0,814483	-9,80361					
4.sSMPABC067	220397		49589	0,179229	0,22025	0,00285	0,46954	0,00402	14,25643	0,15369	2982,52	20,66	2481,6	17,65	2766,9	10,23	2163,5	134,02	88,50338	14,25643	0,15369	0,46954	0,00402	0,794179	-10,3112					
4.sSMPABC054	345865		69246	0,248417	0,19785	0,00287	0,42231	0,0039	11,50138	0,14373	2808,54	23,49	2270,9	17,67	2564,7	11,67	2586,4	224,68	87,0624	11,50138	0,14373	0,42231	0,0039	0,738985	-11,4555					
4.sSMPABC102	235966		46471	0,323211	0,19711	0,00404	0,41818	0,00501	11,33921	0,21426	2802,42	33,11	2252,2	22,76	2551,4	17,63	2095,4	238,69	86,71521	11,33921	0,21426	0,41818	0,00501	0,634039	-11,7269					
4.sSMPABC129	949245,8568		167926,6	0,017695	0,1775	0,00195	0,38087	0,00307	9,31964	0,08385	2629,65	18,12	2080,4	14,34	2370	8,25	******	565,24	86,0796	9,31964	0,08385	0,38087	0,00307	0,895896	-12,2194					
4.sSMPABC059	189400		38925	0,454223	0,2028	0,0036	0,41865	0,0043	11,70632	0,18338	2848,86	28,63	2254,4	19,52	2581,2	14,65	2238,1	257,64	85,5039	11,70632	0,18338	0,41865	0,0043	0,655671	-12,6608					
4.sSMPABC130	161154		38629	0,116282	0,23708	0,00303	0,45144	0,00375	14,75491	0,15725	3100,47	20,21	2401,7	16,63	2799,6	10,13	2265,6	126,7	83,43257	14,75491	0,15725	0,45144	0,00375	0,77943	-14,2127					
4.sSMPABC086	654304		69685	0,03394	0,10592	0,00172	0,20499	0,0019	2,98983	0,04269	1730,34	29,43	1202,1	10,15	1405	10,87	1094,4	130,19	83,1212	2,98983	0,04269	0,20499	0,0019	0,649144	-14,4413					
4.sSMPABC011	234047,3362		46847,86	0,347381	0,19854	0,00219	0,38142	0,00298	10,43789	0,08939	2814,23	17,87	2082,9	13,91	2474,4	7,94	2012,8	67,18	81,20409	10,43789	0,08939	0,38142	0,00298	0,912298	-15,822					
4.sSMPABC085	204441		22891	0,025486	0,11251	0,00215	0,1988	0,00197	3,08145	0,05283	1840,35	34,26	1168,9	10,57	1428,1	13,14	3439,1	677,37	77,82531	3,08145	0,05283	0,1988	0,00197	0,577995	-18,15					
4.sSMPABC042	251095		64046	0,479001	0,25241	0,00288	0,42793	0,00344	14,88916	0,13556	3199,95	17,93	2296,4	15,54	2808,2	8,66	2571,5	110,98	77,71294	14,88916	0,13556	0,42793	0,00344	0,882926	-18,2252					
4.sSMPABC150	249287,1795		50063,24	0,29026	0,17866	0,00667	0,32534	0,00611	7,92857	0,27778	2640,47	60,66	1815,8	29,71	2222,9	31,59	2423,4	936,5	77,58013	7,92857	0,27778	0,32534	0,00611	0,536041	-18,3139					
4.sSMPABC075	279923,7388		66172,42	0,037659	0,21763	0,00423	0,37382	0,00448	11,19217	0,19768	2963,24	31,03	2047,4	21,04	2539,3	16,46	1493,7	115,64	75,97441	11,19217	0,19768	0,37382	0,00448	0,678527	-19,3715					
4.sSMPABC121	341113		99708	0,126379	0,26835	0,00514	0,40553	0,00464	14,97907	0,2629	3296,41	29,76	2194,4	21,26	2813,9	16,71	1293	93,61	71,76905	14,97907	0,2629	0,40553	0,00464	0,651912	-22,0157					
4.sSMPABC068	177569		28622	0,244851	0,15836	0,00188	0,26138	0,00234	5,70322	0,05826	2438,22	19,92	1496,9	11,96	1931,9	8,83	1036,6	42,65	70,93994	5,70322	0,05826	0,26138	0,00234	0,876381	-22,5167					
4.sSMPABC055	268535,1382		55204,8	0,268243	0,20156	0,0025	0,31293	0,0029	8,69125	0,09426	2838,87	20,06	1755,1	14,24	2306,2	9,88	1850,1	85,6	68,60008	8,69125	0,09426	0,31293	0,0029	0,854487	-23,8965					
4.sSMPABC037	194467		38281	0,156649	0,1982	0,00292	0,30736	0,0028	8,38057	0,10366	2811,43	23,9	1727,7	13,82	2273,1	11,22	4152,8	278,25	68,43202	8,38057	0,10366	0,30736	0,0028	0,7365	-23,9937					
4.sSMPABC010	214192		39554	0,40117	0,1826	0,00188	0,27626	0,00215	6,95359	0,0556	2676,63	16,89	1572,5	10,88	2105,5	7,1	1387,5	31,17	66,10493	6,95359	0,0556	0,27626	0,00215	0,973318	-25,3147					
4.sSMPABC103	221390,4345		36186,3	0,43216	0,16171	0,00179	0,23945	0,00188	5,33768	0,04713	2473,62	18,55	1383,8	9,78	1874,9	7,55	981,2	40,54	64,51077	5,33768	0,04713	0,23945	0,00188	0,889197	-26,1934					
4.sSMPABC148	97140		17436	0,108644	0,17726	0,00228	0,26147	0,00219	6,38928	0,06897	2627,4	21,22	1497,4	11,18	2030,8	9,48	1883,2	109,46	64,37826	6,38928	0,06897	0,26147	0,00219	0,775915	-26,2655					
4.sSMPABC038	147818,0324		29953,57	0,262915	0,20156	0,00213	0,27918	0,00215	7,75656	0,06291	2838,87	17,11	1587,2	10,82	2203,2	7,29	1186,1	33,81	61,18952	7,75656	0,06291	0,27918	0,00215	0,949519	-27,9593					
4.sSMPABC144	101180,3166		18520,71	0,259755	0,18099	0,00222	0,25264	0,00208	6,30376	0,06426	2661,96	20,22	1452,1	10,7	2019	8,93	1409,9	75,98	60,95999	6,30376	0,06426	0,25264	0,00208	0,807644	-28,0783					
4.sSMPABC095	185336,7396		37450,79	0,394772	0,20063	0,00276	0,26882	0,00232	7,4299	0,0863	2831,33	22,27	1534,8	11,77	2164,6	10,39	1126,5	74,19	58,96534	7,4299	0,0863	0,26882	0,00232	0,743017	-29,0954					

FILE NAME	CORRECTED		0																						
	Pb206*	Pb207*	Th/U	207/206	1s	206/238	1s	207/235	1s	206/207		206/238		207/235		208/232		Conc	207/235		206/238		RHO	Disc.	
4.sSMPABC120	122985,8114	19030,08	0,140171	0,15398	0,00179	0,20604	0,00169	4,37364	0,04196	2390,6	19,69	1207,7	9,05	1707,4	7,93	1190,1	54,53	58,62383	4,37364	0,04196	0,20604	0,00169	0,854954	-29,2667	
4.sSMPABC143	201303	36982	0,348592	0,18322	0,00262	0,24571	0,0021	6,20626	0,07632	2682,23	23,45	1416,3	10,85	2005,3	10,75	1171,5	81,77	58,41277	6,20626	0,07632	0,24571	0,0021	0,695005	-29,3722	
4.sSMPABC149	52086,9874	12368,79	0,428175	0,23612	0,00416	0,29448	0,00303	9,58396	0,15005	3094	27,81	1663,9	15,07	2395,6	14,39	1409,2	132,6	56,025	9,58396	0,15005	0,29448	0,00303	0,657197	-30,5435	
4.sSMPABC147	203817,3123	36771,1	0,408978	0,17909	0,00232	0,22819	0,00188	5,63372	0,0616	2644,46	21,37	1325	9,86	1921,3	9,43	967,8	58,73	54,99623	5,63372	0,0616	0,22819	0,00188	0,753487	-31,0363	
4.sSMPABC073	498294,4729	99357,7	0,137144	0,19869	0,00273	0,24286	0,00222	6,64461	0,07977	2815,47	22,26	1401,6	11,53	2065,3	10,6	4342,6	313,23	52,64697	6,64461	0,07977	0,24286	0,00222	0,761425	-32,1358	
4.sSMPABC020	563421	117133	0,161631	0,20639	0,00214	0,25124	0,002	7,14717	0,05907	2877,41	16,76	1444,9	10,3	2129,9	7,36	3699,1	93,21	52,59187	7,14717	0,05907	0,25124	0,002	0,963182	-32,1611	
4.sSMPABC138	347826,239	68996,54	0,285891	0,19896	0,00342	0,23269	0,00214	6,38319	0,09813	2817,68	27,76	1348,6	11,19	2030	13,5	3434,1	496,27	49,47353	6,38319	0,09813	0,23269	0,00214	0,598235	-33,5665	
4.sSMPABC048	315997	64809	0,425938	0,20305	0,00215	0,23211	0,00191	6,49593	0,05641	2850,87	17,14	1345,6	10,01	2045,3	7,64	1580,5	45,08	48,00089	6,49593	0,05641	0,23211	0,00191	0,947599	-34,2101	
4.sSMPABC113	417228,5255	77370,18	0,022115	0,18375	0,00236	0,20913	0,0019	5,29297	0,05973	2687,01	21,04	1224,2	10,13	1867,7	9,64	3262,3	193,05	47,43506	5,29297	0,05973	0,20913	0,0019	0,80509	-34,4541	
4.sSMPABC074	342798,463	56189,87	0,143252	0,16339	0,0018	0,15692	0,00128	3,53397	0,03173	2491,05	18,42	939,7	7,11	1534,9	7,11	1280,7	51,19	36,66064	3,53397	0,03173	0,15692	0,00128	0,908499	-38,7778	
4.sSMPABC134	272997	47981	0,155846	0,17404	0,00207	0,15492	0,00134	3,7152	0,03794	2596,88	19,73	928,5	7,47	1574,6	8,17	1059,2	57,76	30,41465	3,7152	0,03794	0,15492	0,00134	0,846998	-41,0326	
4.sSMPABC133	213345,193	43110,11	0,203845	0,20009	0,00236	0,17559	0,00143	4,84356	0,04724	2826,93	19,16	1042,9	7,85	1792,5	8,21	1396,2	67,65	28,1235	4,84356	0,04724	0,17559	0,00143	0,835009	-41,8187	
4.sSMPABC119	83820,79044	15529,36	0,074982	0,18408	0,00219	0,1259	0,00102	3,19494	0,0308	2689,98	19,49	764,5	5,85	1455,9	7,45	2676,2	125,07	9,561805	3,19494	0,0308	0,1259	0,00102	0,840401	-47,4895	
4.sSMPABC083	103740,7865	25272,64	0,259698	0,23891	0,00255	0,07254	0,00058	2,38897	0,02037	3112,72	16,9	451,4	3,5	1239,3	6,1	1182,3	37,58	-74,5459	2,38897	0,02037	0,07254	0,00058	0,937713	-63,5762	
4.sSMPABC082	133002	32763	0,150028	0,2437	0,00565	0,06749	0,00084	2,26718	0,04668	3144,29	36,37	421	5,09	1202,1	14,51	3190,3	532,42	-85,5344	2,26718	0,04668	0,06749	0,00084	0,604498	-64,978	

FILE NAME	CORRECTED	0																							
	Pb206*	Pb207*	Th/U	207/206	1s	206/238	1s	207/235	1s	206/207		206/238		207/235		208/232		Conc	207/235		206/238		RHO	Disc.
Padrões Primários																								
4.sSMPABC001	89826,6496	5714,986	0,009616	0,06016	0,00067	0,09698	0,00076	0,80403	0,00709	609,3342	23,77	596,7	4,45	599,1	3,99	579,4	23,43	99,59779	0,80403	0,00709	0,09698	0,00076	0,888705	-0,4006
4.sSMPABC002	91759	5543	0,009742	0,06028	0,00066	0,09731	0,00076	0,80842	0,00708	613,6403	23,64	598,6	4,46	601,6	3,98	600,1	21,75	99,49883	0,80842	0,00708	0,09731	0,00076	0,891784	-0,49867
4.sSMPABC003	83578,61617	4180,196	0,009794	0,05803	0,00065	0,09773	0,00076	0,78169	0,00697	530,8947	24,66	601,1	4,48	586,4	3,97	453,1	23,23	102,4455	0,78169	0,00697	0,09773	0,00076	0,872143	2,506821
4.sSMPABC006	74344,38478	4696,736	0,009809	0,06102	0,00069	0,09841	0,00077	0,82762	0,00745	639,9391	24,13	605,1	4,49	612,3	4,14	739,2	26,95	98,81011	0,82762	0,00745	0,09841	0,00077	0,869213	-1,17589
4.sSMPABC007	73225,52502	4432,084	0,009772	0,06082	0,00069	0,09763	0,00076	0,8184	0,00736	632,8742	24,15	600,5	4,46	607,2	4,11	653,1	25,33	98,88426	0,8184	0,00736	0,09763	0,00076	0,865602	-1,10343
4.sSMPABC022	83514,33908	5282,951	0,009957	0,0609	0,00068	0,09771	0,00076	0,82012	0,0073	635,704	23,91	601	4,46	608,1	4,08	584,8	24,1	98,81864	0,82012	0,0073	0,09771	0,00076	0,873834	-1,16757
4.sSMPABC023	83664	5103	0,009954	0,06071	0,00068	0,09714	0,00075	0,81274	0,0072	628,9751	23,87	597,6	4,43	604	4,03	635,1	23,76	98,92905	0,81274	0,0072	0,09714	0,00075	0,87153	-1,0596
4.sSMPABC049	77552,34931	4676,672	0,009972	0,06151	0,0007	0,09714	0,00075	0,82345	0,0075	657,1161	24,26	597,6	4,43	610	4,17	925,3	36,26	97,92503	0,82345	0,0075	0,09714	0,00075	0,847694	-2,03279
4.sSMPABC050	82401,56332	4739,167	0,009904	0,05903	0,00067	0,09819	0,00076	0,79883	0,00721	568,2027	24,87	603,8	4,48	596,2	4,07	559,4	28,86	101,2587	0,79883	0,00721	0,09819	0,00076	0,857562	1,27474
4.sSMPABC074	84996,6518	4989,518	0,00992	0,05873	0,00066	0,09763	0,00076	0,79022	0,00718	557,1017	24,48	600,5	4,48	591,3	4,07	553,3	26,17	101,5321	0,79022	0,00718	0,09763	0,00076	0,85675	1,555894
4.sSMPABC075	87234	5282	0,009804	0,05989	0,00067	0,09808	0,00077	0,80955	0,00729	599,6027	24,18	603,1	4,5	602,2	4,09	634,2	26,67	100,1492	0,80955	0,00729	0,09808	0,00077	0,871819	0,149452
4.sSMPABC099	83373	5123	0,009802	0,06065	0,00069	0,09785	0,00077	0,81791	0,0075	626,8442	24,41	601,8	4,5	606,9	4,19	572,9	25,32	99,15254	0,81791	0,0075	0,09785	0,00077	0,858172	-0,84034
4.sSMPABC100	80504,6866	4418,949	0,009617	0,05989	0,00068	0,09787	0,00077	0,80788	0,00741	599,6027	24,49	601,9	4,51	601,3	4,16	642,9	26,31	100,0997	0,80788	0,00741	0,09787	0,00077	0,857768	0,099784
4.sSMPABC123	80578,76544	5167,588	0,009893	0,06015	0,0007	0,09709	0,00077	0,80487	0,00761	608,9749	25	597,3	4,5	599,6	4,28	523,1	25,97	99,61493	0,80487	0,00761	0,09709	0,00077	0,838798	-0,38359
4.sSMPABC124	65428,64509	2742,152	0,009785	0,06077	0,00071	0,09729	0,00077	0,81487	0,00771	631,1031	24,86	598,5	4,53	605,2	4,31	677,1	29,44	98,88053	0,81487	0,00771	0,09729	0,00077	0,836482	-1,10707
Padrões Secundários																								
4.sSMPABC004	101829	5988	0,072965	0,05892	0,00067	0,09017	0,00068	0,7322	0,0065	564,1413	24,59	556,5	4,03	557,8	3,81	561,3	11,28	99,7664	0,7322	0,0065	0,09017	0,00068	0,8495	-0,23306
4.sSMPABC005	146678,0301	8988,846	0,067555	0,05932	0,00085	0,09002	0,00083	0,73558	0,00938	578,8605	30,83	555,7	4,92	559,8	5,49	576,5	21,36	99,26219	0,73558	0,00938	0,09002	0,00083	0,723046	-0,7324
4.sSMPABC024	104922,1715	6335,188	0,075684	0,05918	0,00069	0,08958	0,00067	0,7306	0,00661	573,7242	25,1	553,1	3,95	556,9	3,88	526,5	12,35	99,31296	0,7306	0,00661	0,08958	0,00067	0,826689	-0,68235
4.sSMPABC025	135169	7865	0,069794	0,05774	0,0007	0,09164	0,00078	0,72927	0,0076	519,9101	26,67	565,2	4,62	556,1	4,46	545	13,56	101,61	0,72927	0,0076	0,09164	0,00078	0,816741	1,636396
4.sSMPABC051	104446	6331	0,075636	0,06006	0,0007	0,08969	0,00068	0,74234	0,00676	605,7369	24,9	553,7	4	563,8	3,94	543,2	13,81	98,17591	0,74234	0,00676	0,08969	0,00068	0,832571	-1,79142
4.sSMPABC052	88741,84938	5145,934	0,076164	0,05906	0,0008	0,09017	0,00069	0,73394	0,00801	569,3085	29,08	556,5	4,06	558,9	4,69	518,7	18,78	99,56873	0,73394	0,00801	0,09017	0,00069	0,701157	-0,42941
4.sSMPABC076	86501,1797	4781,795	0,076269	0,05788	0,0007	0,0902	0,00069	0,71953	0,00693	525,2225	26,56	556,7	4,05	550,4	4,09	509,1	15,34	101,1317	0,71953	0,00693	0,0902	0,00069	0,794252	1,144622
4.sSMPABC077	96252,28201	5708,378	0,07358	0,05899	0,00069	0,08971	0,00068	0,72932	0,00681	566,727	26,05	553,8	4,04	556,2	4	548,3	15,73	99,56663	0,72932	0,00681	0,08971	0,00068	0,811781	-0,4315
4.sSMPABC101	131888	7837	0,068235	0,05901	0,00072	0,08961	0,00076	0,72882	0,00754	567,465	26,29	553,3	4,5	555,9	4,43	506,6	15,68	99,53009	0,72882	0,00754	0,08961	0,00076	0,819796	-0,46771
4.sSMPABC102	106255,6447	5838,662	0,071326	0,05723	0,00064	0,08977	0,0007	0,70811	0,00641	500,4072	24,85	554,2	4,17	543,6	3,81	491,6	12,88	101,9127	0,70811	0,00641	0,08977	0,0007	0,861409	1,949963
Amostras																								
4.sSMPABC016	287711,7929	73640,21	0,613316	0,25432	0,00272	0,67461	0,00578	23,64645	0,21198	3211,86	16,79	3323,6	22,24	3253,9	8,73	2962	60,14	102,0971	23,64645	0,21198	0,67461	0,00578	0,955754	2,142045
4.sSMPABC008	80604	15707	0,282458	0,19493	0,00216	0,56427	0,00441	15,15762	0,12823	2784,21	18,05	2884,3	18,17	2825,2	8,06	2819,1	59,37	102,049	15,15762	0,12823	0,56427	0,00441	0,923832	2,091887
4.sSMPABC019	122984,9527	24103,46	0,297129	0,19553	0,00226	0,5629	0,00442	15,16702	0,13458	2789,244	18,82	2878,6	18,21	2825,8	8,45	2761,2	75,88	101,8342	15,16702	0,13458	0,5629	0,00442	0,884934	1,868497
4.sSMPABC067	219954,9258	50171,13	0,345912	0,22586	0,00239	0,62001	0,00498	19,30051	0,16312	3022,942	16,88	3109,9	19,81	3057	8,16	2795,2	60,99	101,701	19,30051	0,16312	0,62001	0,00498	0,950369	1,730455
4.sSMPABC073	220192	55554	0,324596	0,24981	0,00267	0,65999	0,00524	22,72511	0,19203	3183,563	16,82	3267,1	20,35	3215,2	8,22	2441,3	58,59	101,5886	22,72511	0,19203	0,65999	0,00524	0,939574	1,614208
4.sSMPABC017	203151	51823	0,634838	0,25472	0,00264	0,66682	0,0051	23,40993	0,18436	3214,343	16,27	3293,6	19,71	3244,1	7,67	3005,8	46,67	101,5029	23,40993	0,18436	0,66682	0,0051	0,971169	1,525847
4.sSMPABC112	218943	50369	0,287656	0,22629	0,00241	0,6179	0,00486	19,27154	0,16206	3025,993	16,97	3101,6	19,36	3055,5	8,12	2450,1	61,68	101,4863	19,27154	0,16206	0,6179	0,00486	0,935317	1,508755
4.sSMPABC064	274638	69548	0,373961	0,25036	0,00273	0,65744	0,00519	22,68248	0,19515	3187,044	17,18	3257,2	20,2	3213,4	8,37	2933,4	81,61	101,3447	22,68248	0,19515	0,65744	0,00519	0,917557	1,363042
4.sSMPABC014	121746	24040	0,408463	0,19717	0,00215	0,55944	0,00426	15,20021	0,125	2802,913	17,75	2864,3	17,63	2827,9	7,83	2760,9	58,63	101,2708	15,20021	0,125	0,55944	0,00426	0,925967	1,287174
4.sSMPABC020	290182,941	57306,77	0,277222	0,19388	0,0023	0,55171	0,00505	14,73865	0,15132	2775,358	19,33	2832,3	20,98	2798,5	9,76	2754,3	92,02	101,1934	14,73865	0,15132	0,55171	0,00505	0,891542	1,20779
4.sSMPABC010	443404	89674	0,275014	0,20009	0,00223	0,56342	0,00497	15,53648	0,14863	2826,931	18,07	2880,8	20,5	2848,7	9,13	2589,6	68,83	101,1143	15,53648	0,14863	0,56342	0,00497	0,922084	1,12683
4.sSMPABC058	206720,2542	40505,89	0,851388	0,19724	0,00282	0,55636	0,00548	15,11385	0,18843	2803,493	23,22	2851,6	22,7	2822,4	11,87	2522,7	120,25	101,024	15,11385	0,18843	0,55636	0,00548	0,790041	1,03458
4.sSMPABC085	63384,69356	13917,24	0,308643	0,21698	0,00236	0,59067	0,00478	17,6648	0,15218	2958,414	17,43	2992,1	19,38	2971,7	8,28	2419,3	54,67	100,6818	17,6648	0,15218	0,59067	0,00478	0,939364	0,686476
4.sSMPABC137	200499	38381	0,14415	0,19419	0,00386	0,54565	0,00634	14,58354	0,26209	2777,977	32,24	2807	26,43	2788,5	17,08	2059,7	171,31	100,6591	14,58354	0,26209	0,54565	0,00634	0,646528	0,663439
4.sSMPABC018	298777,493	76624,6	0,698804	0,25494	0,00262	0,65541	0,0051	23,02927	0,18371	3215,706	16,15	3249,3	19,86	3228,2	7,76	3051,5	46,59	100,6494	23,02927	0,18371	0,65541	0,0051	0,975449	0,653615
4.sSMPABC030	111460	24450	0,349804	0,21825	0,00234	0,59207	0,00451	17,80668	0,14384	2967,825	17,19	2997,8	18,27	2979,3	7,77	2605,1	52,47	100,6171	17,80668	0,14384	0,59207	0,00451	0,942989	0,620951
4.sSMPABC009	137446	27278	0,323359	0,19865	0,00211	0,55438	0,00419	15,17699	0,12106	2815,137	17,27	2843,4	17,37	2826,4	7,6	2689,2	48,51	100,5979	15,17699	0,12106	0,55438	0,00419	0,947527	0,601472
4.sSMPABC028	200072	40400	0,343078	0,2011	0,00217	0,55811	0,0041	15,46546	0,12305	2835,145	17,49	2858,8	16,97	2844,4	7,59	2497,1	56,96	100,5037	15,46546	0,12305	0,55811	0,0041	0,923305	0,506258
4.sSMPABC098	189593,8899	34212,08	0,264602	0,17747	0,00241	0,50896	0,00447	12,44875	0,14219	2629,368	22,41	2652,2	19,09	2638,9	10,74	2279,5	120,44	100,5015	12,44875	0,14219	0,50896	0,00447	0,768919	0,503998
4.sSMPABC071	732850	194581	0,277304	0,25849	0,00378	0,65648	0,00643	23,39178	0,30562	3237,526	22,89	3253,5	25,02	3243,4	12,72	1576,8	69,21	100,3104	23,39178	0,30562	0,65648	0,00643	0,749671	0,311402
4.sSMPABC068	227060	50952	0,286997	0,22209	0,00231	0,59304	0,0046	18,15309	0,14639	2995,905	16,63	3001,7	18,61	2997,9	7,76	2634,7	51,46	100,1266	18,15309	0,14639	0,59304	0,0046	0,961863	0,126755
4.sSMPABC011	246492	48784	0,3058	0,19743	0,00216	0,54564	0,00398	14,84632	0,11915	2805,068	17,77	2807	16,58	2805,4	7,63	2550,6	62,82	100,057	14,84632	0,11915	0,54564	0,00398	0,90887	0,057033
4.sSMPABC029	65888	13187	0,3587	0,19885	0,00231	0,54764	0,00438	15,00767	0,13435	2816,781	18,87	2815,3	18,25	2815,7	8,52	2405,7	61,32	99,98579	15,00767	0,13435	0,54764	0,00438	0,893418	-0,01421
4.sSMPABC143	158273	34669	0,319748	0,21743	0,00342	0,58122	0,0059	17,40459	0,24281	2961,756	25,17	2953,7	24,07	2957,4	13,4	2695,8	187,09	99,87473	17,40459	0,24281	0,58122	0,0059	0,727627	-0,12511
4.sSMPABC031	107122	23538	0,343753	0,21923	0,00243	0,58285	0,0045	17,60762	0,14803	2975,044	17,75	2960,4	18,33	2968,5	8,08	2651,5	62,46	99,72639	17,60762	0,14803	0,58285	0,0045	0,918347	-0,27287
4.sSMPABC109	168344,8499	29918,9	0,296302	0,17372	0,00215	0,49008	0,00388	11,73136	0,11663	2593,809	20,51	2571	16,81	2583,2	9,3	2019,6	84,31	99,52548	11,73136	0,11663	0,49008	0,00388	0,796348	-0,47228
4.sSMPABC113	223185	50987	0,243967	0,22497	0,00239	0,58788	0,00458	18,22795	0,1518	3016,605	16,95	2980,8	18,6	3001,8	8,02	2336,5	59,64	99,29549	18,22795	0,1518	0,58788	0,00458	0,935498	-0,69958
4.sSMPABC111	200209	44432	0,249341	0,22049	0,00285	0,57935	0,00537	17,59842	0,19818	2984,273	20,64	2946,1	21,91	2968	10,82	2595,4	112,6	99,25664	17,59842	0,19818	0,57935	0,00537	0,82309	-0,73787
4.sSMPABC021	307283	69523	0,342193	0,22567	0,00241	0,58627	0,00444	18,22952	0,14748	3021,591	17,04	2974,3	18,05	3001,9	7,79	2798,7	60,73	99,07205	18,22952	0,14748	0,58627	0,00444	0,936111	-0,91942
4.sSMPABC084	37118,97278	7938,41	0,253368	0,21182	0,00267	0,56025	0,00494	16,35426	0,16755	2919,522	20,25	2867,7	20,4	2897,7	9,8	2459,8	84,52	98,95387	16,35426	0,16755	0,56025	0,00494	0,86066	-1,0353
4.sSMPABC083	44909	9608	0,127636	0,21184	0,00255	0,5586	0,00511	16,30922	0,16538	2919,674	19,36	2860,8	21,12	2895,1	9,7	2648,9	82,96	98,80103	16,30922	0,16538	0,5586	0,00511	0,902132	-1,18476
4.sSMPABC061	680036,45	218437,4	0,4312	0,31729	0,00339	0,71779	0,00555	31,38648	0,26126	3556,748	16,34	3487,8	20,83	3531,2	8,19	3167	83,18	98,75566	31,38648	0,26126	0,71779	0,00555	0,928892	-1,22904
4.sSMPABC138	228594,3913	42443,56	0,195508	0,18208	0,00202	0,49794	0,004	12,49572	0,11202	2671,908	18,23	2604,9	17,23	2642,4	8,43	2020,4	63,52	98,56041	12,49572	0,11202	0,49794	0,004	0,896084	-1,41916
4.sSMPABC044	133923,5145	17456,77	0,552384	0,13112	0,00213	0,3676	0,004	6,6461	0,09709	2113,019	28,23	2018,1	18,84	2065,5	12,89	1182,7	48,08	97,65126	6,6461	0,09709	0,3676	0,004	0,744864	-2,29484
4.sSMPABC070	508717	137652	0,252397	0,26568	0,00314	0,62936	0,00518	23,04222	0,22314	3280,707	18,44	3147	20,51	3228,7	9,42	2774,7	115,95	97,40388	23,04222	0,22314	0,62936	0,00518	0,849919	-2,53043
4.sSMPABC032	209206,5432	39242,39	0,236976	0,1871	0,00204	0,49292	0,00395	12,7092	0,10994	2716,836	17,89	2583,3	17,06	2658,3	8,14	2438,2	57,2	97,09674	12,7092	0,10994	0,49292	0,00395	0,926367	-2,82135
4.sSMPABC097	325610	56694	0,306476	0,17087	0,00189	0,45929	0,00362	10,81579	0,09524	2566,183	18,38	2436,4	16,01	2507,4	8,18	2158,1	67,62	97,08586	10,81579	0,09524	0,45929	0,00362	0,895077	-2,83162
4.sSMPABC087	457126	101290	0,258541	0,22064	0,00252	0,5445	0,00471	16,55692	0,16103	2985,367	18,25	2802,3	19,67	2909,5	9,31	1682,3	51,77	96,17457	16,55692	0,16103	0,5445	0,00471	0,889397	-3,68448
4.sSMPABC108	135156	24024	0,329211	0,17393	0,00202	0,45159	0,00367	10,82463	0,10127	2595,824	19,2	2402,3	16,3	2508,2	8,7	2262,2	79,26	95,59172	10,82463	0,10127	0,45159	0,00367	0,868668	-4,22215
4.sSMPABC089	239719	44241	0,522824	0,17824	0,00332	0,44157	0,00474	10,83984	0,17954	2636,562	30,62	2357,7	21,2	2509,5	15,4	2032,4	183,29	93,56152	10,83984	0,17954	0,44157	0,00474	0,648098	-6,04901
4.sSMPABC088	117906	22808	0,410901	0,19147	0,00262	0,45265	0,0038	11,94496	0,13297	2754,83	22,27	2407	16,88	2600,1	10,43	1779	91,24	91,97757	11,94496	0,13297	0,45265	0,0038	0,75414	-7,42664
4.sSMPABC015	133603,5119	25588	0,313501	0,19102	0,00236	0,4506	0,00362	11,86325	0,11395	2750,964	20,14	2397,9	16,09	2593,7	9	2494,8	90,94	91,83452	11,86325	0,11395	0,4506	0,00362	0,836386	-7,54906

FILE NAME	CORRECTED	0																											
	Pb206*	Pb207*	Th/U	207/206	1s	206/238	1s	207/235	1s	206/207		206/238		207/235		208/232		Conc	207/235		206/238		RHO	Disc.					
4.sSMPABC103	179389	24973	1,004683	0,14234	0,00444	0,34489	0,00555	6,77554	0,19315	2255,869	52,87	1910,2	26,62	2082,5	25,22	343,2	40,94	90,98	6,77554	0,19315	0,34489	0,00555	0,564497	-8,27371					
4.sSMPABC012	249539,1907	51513,48	0,563963	0,20618	0,00266	0,46669	0,00408	13,2521	0,14081	2875,755	20,81	2469	17,92	2697,8	10,03	2495,4	107,39	90,73309	13,2521	0,14081	0,46669	0,00408	0,822778	-8,48098					
4.sSMPABC069	76537	28492	0,50833	0,37873	0,01588	0,66616	0,0193	34,55437	1,40128	3826,708	61,95	3291	74,65	3626	40,02	5760	954,76	89,82072	34,55437	1,40128	0,66616	0,0193	0,714425	-9,23883					
4.sSMPABC139	256322,0463	35041,91	0,60524	0,13812	0,00201	0,3211	0,00295	6,11093	0,07753	2203,767	25	1795,1	14,42	1991,8	11,07	1008,5	55,41	89,04239	6,11093	0,07753	0,3211	0,00295	0,724134	-9,87549					
4.sSMPABC130	160669	21271	1,352844	0,12946	0,00189	0,29639	0,00251	5,28528	0,06505	2090,648	25,46	1673,4	12,48	1866,5	10,51	520,5	29,2	88,46062	5,28528	0,06505	0,29639	0,00251	0,688067	-10,3456					
4.sSMPABC035	299371	59084	0,433314	0,19583	0,00229	0,41821	0,00321	11,28304	0,10155	2791,754	18,99	2252,3	14,6	2546,8	8,39	1847,4	62,16	86,92448	11,28304	0,10155	0,41821	0,00321	0,852819	-11,5635					
4.sSMPABC129	121772,0224	16123,88	0,695719	0,13147	0,00167	0,29099	0,00229	5,27151	0,05374	2117,693	22,07	1646,5	11,42	1864,3	8,7	847,4	38,46	86,77194	5,27151	0,05374	0,29099	0,00229	0,77196	-11,6827					
4.sSMPABC092	99603,86901	19165,24	1,413329	0,19029	0,00393	0,39113	0,00454	10,25705	0,18703	2744,67	33,56	2128,1	21,03	2458,2	16,87	983	110,7	84,48851	10,25705	0,18703	0,39113	0,00454	0,63657	-13,4285					
4.sSMPABC140	78972	11371	1,106149	0,1401	0,00202	0,29538	0,00277	5,70284	0,07099	2228,445	24,77	1668,3	13,76	1931,8	10,75	199,3	11,22	84,20548	5,70284	0,07099	0,29538	0,00277	0,753343	-13,6401					
4.sSMPABC081	246803	34292	0,551326	0,13707	0,00155	0,28793	0,00231	5,43916	0,04929	2190,509	19,47	1631,2	11,56	1891	7,77	963,4	30,15	84,07308	5,43916	0,04929	0,28793	0,00231	0,885316	-13,7388					
4.sSMPABC055	298904,3812	41052,02	0,815624	0,13697	0,00145	0,28351	0,00228	5,35183	0,04558	2189,24	18,3	1609	11,46	1877,2	7,29	425,6	9,24	83,33126	5,35183	0,04558	0,28351	0,00228	0,944266	-14,2872					
4.sSMPABC104	67739	9984	1,441093	0,14633	0,00258	0,29915	0,00299	6,03231	0,09148	2303,474	29,96	1687,1	14,83	1980,5	13,21	371,6	24,32	82,60921	6,03231	0,09148	0,29915	0,00299	0,659082	-14,8144					
4.sSMPABC054	244186,2615	32548,96	0,330436	0,13229	0,0014	0,26326	0,00208	4,80009	0,0402	2128,584	18,41	1506,5	10,62	1784,9	7,04	1035,9	21,65	81,52008	4,80009	0,0402	0,26326	0,00208	0,943413	-15,5975					
4.sSMPABC053	226492,4714	34621,03	0,432954	0,15147	0,00161	0,30196	0,00231	6,30374	0,05154	2362,588	18,04	1701	11,46	2019	7,16	1407,3	29,83	81,30511	6,30374	0,05154	0,30196	0,00231	0,935657	-15,7504					
4.sSMPABC027	142012	27198	0,369567	0,19096	0,00215	0,35515	0,0027	9,34622	0,07926	2750,447	18,38	1959,2	12,84	2372,6	7,78	1777,7	46,16	78,89955	9,34622	0,07926	0,35515	0,0027	0,896466	-17,4239					
4.sSMPABC086	341598	71148	0,431902	0,20498	0,00221	0,37121	0,00276	10,48646	0,08531	2866,266	17,4	2035,1	12,96	2478,7	7,54	1485,2	42,26	78,20255	10,48646	0,08531	0,37121	0,00276	0,913941	-17,8965					
4.sSMPABC040	207534,4411	27590,73	1,104349	0,13462	0,0014	0,2507	0,00197	4,65136	0,03805	2159,097	18,09	1442,1	10,14	1758,5	6,84	402,2	7,1	78,05977	4,65136	0,03805	0,2507	0,00197	0,960588	-17,9926					
4.sSMPABC057	161748,6185	25587,67	0,309583	0,15849	0,00207	0,2864	0,00231	6,25559	0,0654	2439,615	22	1623,5	11,57	2012,3	9,15	1353,9	61,85	76,05174	6,25559	0,0654	0,2864	0,00231	0,771489	-19,3212					
4.sSMPABC141	124359,2958	15639,22	0,574327	0,12365	0,00179	0,21662	0,00191	3,69304	0,04534	2009,55	25,47	1264	10,12	1569,9	9,81	1070,5	62,87	75,79905	3,69304	0,04534	0,21662	0,00191	0,718187	-19,4853					
4.sSMPABC078	134481	25126	0,167639	0,18458	0,00245	0,32264	0,00293	8,20656	0,09197	2694,459	21,79	1802,6	14,26	2254,1	10,14	2060,5	96,01	74,95285	8,20656	0,09197	0,32264	0,00293	0,810335	-20,0302					
4.sSMPABC062	469434,452	87916,42	0,24455	0,18585	0,00195	0,32423	0,00257	8,30523	0,0693	2705,78	17,23	1810,4	12,51	2264,9	7,56	1536,7	33,92	74,89505	8,30523	0,0693	0,32423	0,00257	0,949945	-20,0671					
4.sSMPABC090	136731,3965	18357,65	0,456823	0,13425	0,00148	0,23482	0,00178	4,34465	0,03682	2154,294	19,15	1359,7	9,28	1701,9	7	948,8	27,41	74,83268	4,34465	0,03682	0,23482	0,00178	0,89445	-20,1069					
4.sSMPABC059	279445	54507	0,356186	0,19304	0,00239	0,33322	0,00261	8,86291	0,08658	2768,236	20,17	1854	12,64	2324	8,91	1842,6	75,79	74,64941	8,86291	0,08658	0,33322	0,00261	0,801804	-20,2238					
4.sSMPABC034	576436,7578	111307,4	0,134703	0,19146	0,00226	0,322	0,0029	8,49529	0,08721	2754,744	19,27	1799,5	14,14	2285,4	9,33	1256	42,28	72,99806	8,49529	0,08721	0,322	0,0029	0,877312	-21,261					
4.sSMPABC013	179813,8546	30781,24	0,564102	0,16944	0,00196	0,2817	0,00245	6,57734	0,06359	2552,119	19,28	1599,9	12,33	2056,3	8,52	1201,1	31,79	71,47322	6,57734	0,06359	0,2817	0,00245	0,899582	-22,1952					
4.sSMPABC148	104209	16527	0,380271	0,15546	0,00284	0,25851	0,00255	5,53372	0,0884	2406,87	30,7	1482,2	13,06	1905,8	13,74	1320,7	104,02	71,42086	5,53372	0,0884	0,25851	0,00255	0,617487	-22,2269					
4.sSMPABC142	130336,2748	16993,57	0,840243	0,12967	0,00172	0,20882	0,00174	3,73284	0,04111	2093,497	23,16	1222,5	9,29	1578,4	8,82	742,6	38,36	70,88753	3,73284	0,04111	0,20882	0,00174	0,756605	-22,5482					
4.sSMPABC082	229425,03	30780,57	0,600158	0,13392	0,0015	0,21332	0,00174	3,93754	0,03587	2149,996	19,42	1246,5	9,25	1621,4	7,38	798,4	23,05	69,92379	3,93754	0,03587	0,21332	0,00174	0,895388	-23,122					
4.sSMPABC080	146669	22733	1,159558	0,15217	0,0019	0,24277	0,00195	5,08938	0,05075	2370,455	21,15	1401,1	10,1	1834,3	8,46	724,1	28,89	69,08144	5,08938	0,05075	0,24277	0,00195	0,805505	-23,6166					
4.sSMPABC126	265587,8697	55749,81	57,52349	0,20578	0,00289	0,32049	0,00277	9,09409	0,10734	2872,599	22,67	1792,1	13,5	2347,5	10,8	372	22,69	69,00843	9,09409	0,10734	0,32049	0,00277	0,732256	-23,6592					
4.sSMPABC039	130257,1385	16994,8	1,401687	0,13442	0,00159	0,209	0,00159	3,87155	0,03517	2156,502	20,52	1223,5	8,5	1607,8	7,33	317,4	9,76	68,59011	3,87155	0,03517	0,209	0,00159	0,837459	-23,9022					
4.sSMPABC045	74118	11416	4,142945	0,15305	0,00195	0,24066	0,00222	5,07589	0,05495	2380,285	21,6	1390,1	11,52	1832,1	9,18	190,1	5,49	68,20373	5,07589	0,05495	0,24066	0,00222	0,852106	-24,1253					
4.sSMPABC091	211977,9787	30274,82	1,147966	0,14506	0,00165	0,22618	0,00192	4,52138	0,04302	2288,49	19,4	1314,4	10,1	1734,9	7,91	245	7,04	68,00822	4,52138	0,04302	0,22618	0,00192	0,89217	-24,2377					
4.sSMPABC144	98690	20993	0,522181	0,21287	0,00306	0,32321	0,00311	9,47945	0,11872	2927,523	23,07	1805,4	15,16	2385,6	11,5	1200,7	63,53	67,86308	9,47945	0,11872	0,32321	0,00311	0,768307	-24,3209					
4.sSMPABC152	87411	15893	1,168666	0,17853	0,0028	0,26301	0,00236	6,46994	0,08611	2639,262	25,77	1505,2	12,05	2041,8	11,7	285,3	17,61	64,35025	6,46994	0,08611	0,26301	0,00236	0,674196	-26,2807					
4.sSMPABC136	177762,1038	23797,67	0,613651	0,13331	0,00145	0,18675	0,00147	3,4311	0,02984	2142,02	18,95	1103,7	8,01	1511,5	6,84	856,3	24,63	63,05155	3,4311	0,02984	0,18675	0,00147	0,905089	-26,9798					
4.sSMPABC036	684942,7742	105256,6	0,218595	0,1528	0,00158	0,21965	0,00174	4,62586	0,03794	2377,499	17,53	1280	9,18	1753,9	6,85	1060,8	20,05	62,97656	4,62586	0,03794	0,21965	0,00174	0,965858	-27,0198					
4.sSMPABC079	237588,2501	43565,94	0,20428	0,1819	0,00212	0,26143	0,00219	6,5539	0,06302	2670,27	19,2	1497,2	11,17	2053,2	8,47	1664,7	56,59	62,86401	6,5539	0,06302	0,26143	0,00219	0,871184	-27,0797					
4.sSMPABC033	220377	29433	0,21281	0,13205	0,00143	0,18246	0,00155	3,32049	0,03009	2125,405	18,88	1080,4	8,42	1485,9	7,07	916	18	62,4676	3,32049	0,03009	0,18246	0,00155	0,937441	-27,2899					
4.sSMPABC026	598312,9114	120195,1	0,331288	0,20094	0,00228	0,28318	0,00225	7,83666	0,07067	2833,847	18,42	1607,4	11,28	2212,4	8,12	1635	53,62	62,36158	7,83666	0,07067	0,28318	0,00225	0,881081	-27,3459					
4.sSMPABC135	96911,80301	13118,65	1,449777	0,13946	0,00189	0,1934	0,00174	3,71737	0,04324	2220,514	23,32	1139,8	9,41	1575,1	9,31	345	16,5	61,80909	3,71737	0,04324	0,1934	0,00174	0,773469	-27,6363					
4.sSMPABC046	121133,7598	18249,86	3,346939	0,1497	0,00167	0,20432	0,00163	4,2155	0,03712	2342,502	19	1198,5	8,73	1677	7,23	197,9	4,78	60,07509	4,2155	0,03712	0,20432	0,00163	0,905978	-28,5331					
4.sSMPABC037	570339,2963	87434,09	0,062519	0,15313	0,00158	0,20888	0,00159	4,40854	0,03494	2381,176	17,5	1222,8	8,5	1713,9	6,56	1134,3	20,77	59,83808	4,40854	0,03494	0,20888	0,00159	0,960444	-28,6539					
4.sSMPABC153	192917,839	30941,85	0,283592	0,15999	0,00194	0,20887	0,00177	4,60623	0,04687	2455,555	20,35	1222,8	9,42	1750,4	8,49	1241,3	51,12	56,85312	4,60623	0,04687	0,20887	0,00177	0,832814	-30,1417					
4.sSMPABC122	243643,7121	31834,27	0,159952	0,13116	0,00194	0,16233	0,00154	2,93298	0,03801	2113,554	25,66	969,7	8,54	1390,5	9,81	1455,1	79,8	56,60514	2,93298	0,03801	0,16233	0,00154	0,732037	-30,2625					
4.sSMPABC063	371677	77452	0,115196	0,2073	0,00234	0,26637	0,00226	7,60872	0,07168	2884,554	18,22	1522,4	11,49	2185,9	8,45	1673,9	52,05	56,4175	7,60872	0,07168	0,26637	0,00226	0,90061	-30,3536					
4.sSMPABC110	313806	69440	0,253229	0,21912	0,00239	0,2737	0,00225	8,26571	0,07401	2974,236	17,47	1559,6	11,39	2260,6	8,11	1932,3	52,87	55,05258	8,26571	0,07401	0,2737	0,00225	0,918116	-31,0095					
4.sSMPABC120	141318	20669	1,269239	0,1458	0,00231	0,18122	0,00175	3,64234	0,05021	2297,24	26,95	1073,6	9,55	1558,8	10,98	320,8	19,42	54,80626	3,64234	0,05021	0,18122	0,00175	0,700523	-31,1265					
4.sSMPABC127	286242	62557	1,232989	0,21431	0,00352	0,2661	0,00269	7,86456	0,11475	2938,423	26,31	1521	13,71	2215,6	13,14	363,6	26,94	54,33268	7,86456	0,11475	0,2661	0,00269	0,692834	-31,3504					
4.sSMPABC038	147346,3341	21001,22	1,893979	0,14484	0,00168	0,17713	0,00143	3,5342	0,03258	2285,879	19,85	1051,3	7,81	1534,9	7,3	296,8	8,98	53,99981	3,5342	0,03258	0,17713	0,00143	0,875758	-31,5069					
4.sSMPABC041	145372	22820	1,127108	0,15599	0,0018	0,19029	0,00142	4,09089	0,03542	2412,651	19,42	1122,9	7,7	1652,5	7,06	529,1	15,57	52,83641	4,09089	0,03542	0,19029	0,00142	0,86187	-32,0484					
4.sSMPABC125	369216,95	43319,33	0,237082	0,12221	0,00188	0,13022	0,00125	2,19353	0,02982	1988,739	27,05	789,1	7,12	1179	9,48	775,3	40,27	50,58928	2,19353	0,02982	0,13022	0,00125	0,706103	-33,0704					
4.sSMPABC116	325414,8684	59468,32	0,054414	0,17838	0,002	0,21128	0,00163	5,19413	0,0457	2637,866	18,46	1235,7	8,67	1851,7	7,49	1634,5	58,03	50,14971	5,19413	0,0457	0,21128	0,00163	0,876851	-33,2667					
4.sSMPABC056	258162,8671	36654,02	0,303306	0,14257	0,00152	0,16129	0,0013	3,16922	0,02709	2258,656	18,25	964	7,21	1449,7	6,6	1166,3	25,19	49,61618	3,16922	0,02709	0,16129	0,0013	0,94293	-33,5035					
4.sSMPABC048	170158,1614	31632,39	1,406722	0,18536	0,00205	0,21603	0,00166	5,51831	0,04663	2701,423	18,13	1260,9	8,78	1903,5	7,26	292,1	7,82	49,0364	5,51831	0,04663	0,21603	0,00166	0,909358	-33,7589					
4.sSMPABC154	99227	17926	1,990269	0,17894	0,0047	0,20508	0,0027	5,04061	0,11786	2643,071	42,96	1202,5	14,46	1826,2	19,81	256,8	35,93	48,13306	5,04061	0,11786	0,20508	0,0027	0,563063	-34,1529					
4.sSMPABC134	285278,5927	50518,81	1,275871	0,17533	0,00203	0,19735	0,00164	4,76889	0,04581	2609,184	19,14	1161,1	8,83	1779,4	8,06	254	9,55	46,74877	4,76889	0,04581	0,19735	0,00164	0,865095	-34,7477					
4.sSMPABC115	274570,5095	42479,11	0,459557	0,15668	0,0021	0,16884	0,00155	3,6451	0,04256	2420,143	22,57	1005,7	8,53	1559,4	9,3	779,6	36,4	44,94382	3,6451	0,04256	0,16884	0,00155	0,786256	-35,5072					
4.sSMPABC105	159855,2335	23672,25	1,613649	0,1504	0,0016	0,15528	0,00122	3,21882	0,02701	2350,479	18,08	930,5	6,8	1461,7	6,5	293,5	6,98	42,91241	3,21882	0,02701	0,15528	0,00122	0,936303	-36,3412					
4.sSMPABC121	148199	21752	1,770809	0,14332	0,00195	0,14495	0,00121	2,86303	0,03221	2267,707	23,25	872,6	6,84	1372,2	8,47	181,9	9,55	42,74582	2,86303	0,03221	0,14495	0,00121	0,741997	-36,4087					
4.sSMPABC072	165827,6333	32057,96	0,278763	0,19218	0,00202	0,20314	0,00156	5,38057	0,04354	2760,908	17,18	1192,1	8,36	1881,8	6,93	883	19,04	42,14412	5,38057	0,04354	0,20314	0,00156	0,949006	-36,6511					
4.sSMPABC117	242137,6639	36018,87	0,438139	0,14875	0,00171	0,14875	0,00114	3,04964	0,02753	2331,606	19,58	894	6,4	1420,1	6,9	905,3	33,24	41,15213	3,04964	0,02753	0,14875	0,00114	0,848966	-37,0467					
4.sSMPABC119	171477,1756	24963,48	1,100492	0,14552	0,00167	0,14195	0,00109	2,84703	0,02569	2293,935	19,61	855,7	6,18	1368	6,78	420,3	15,21	40,13089	2,84703	0,02569	0,14195	0,00109	0,850979	-37,4488					
4.sSMPABC145	255024,9321	38167,3	1,048962	0,14961	0,00175	0,13985	0,00113	2,88354	0,02742	2341,473	19,84	843,8	6,38	1377,6	7,17	384,6	15,33	36,73856	2,88354	0,02742	0,13985	0,00113	0,849717	-38,7485					
4.sSMPABC114	240639,8787	36697,5	0,514675	0,1539	0,00197	0,14354	0,00128	3,04388	0,03349	2389,717	21,59	864,7	7,24	1418,7	8,41	738	29,46	35,93154	3,04388	0,03349	0,14354	0,00128	0,810493	-39,0498					
4.sSMPABC066	266247	44775	0,908059	0,16679	0,00178	0,1547	0,00125	3,55608	0,03044	2525,686	17,76	927,2	6,97	1539,8	6,78	506,3	11,59	33,93011	3,55608	0,03044	0,1547	0,00125	0,943945	-39,7844					
4.sSMPABC118	130635,3691	22163,96	2,555601	0,16892	0,00269	0,14835	0,00129	3,45363	0,04603	2546,97	26,39	891,7	7,23	1516,7	10,5	203,6	13,95	29,90916	3,45363	0,04603	0,14835	0,00129	0,652435	-41,2079					
4.sSMPABC151	212693,2285	35745,64	0,636822	0,16982	0,00205	0,14578	0,00125	3,41174	0,03483	2555,87	20,05	877,2	7,04	1507,1	8,02	408,7	14,88	28,19197	3,41174	0,03483	0,14578	0,00125	0,839913	-41,7955					
4.sSMPABC065	253561	42978	0,850322	0,16697	0,00183	0,13682	0,00105	3,1485	0,02653	2527,497	18,25	826,7	5,93	1444,6	6,49	314,3	8,96	25,25705	3,1485	0,02653	0,13682	0,00105	0,910765	-42,7731					
4.sSMPABC094	255285,4508	44303,89	1,240943	0,17514	0,00222	0,14265	0,00125	3,44286	0,0369	2607,378	20,93	859,6	7,03	1514,2	8,43	211,5	8,93	23,8483	3,44286	0,0369	0,14265	0,00125	0,817582	-43,2307					

FILE NAME	CORRECTED	0																								
	Pb206*	Pb207*	Th/U	207/206	1s	206/238	1s	207/235	1s	206/207		206/238		207/235		208/232		Conc	207/235		206/238		RHO	Disc.		
4.sSMPABC093	212988,628	35956,38	1,368256	0,16949	0,00181	0,12972	0,00105	3,0302	0,02609	2552,613	17,8	786,3	5,97	1415,3	6,57	220,7	5,5	20,00509	3,0302	0,02609	0,12972	0,00105	0,940112	-44,4429		
4.sSMPABC146	183568,1806	27883,77	1,465748	0,15244	0,00176	0,09931	0,00083	2,08642	0,02001	2373,478	19,51	610,4	4,87	1144,3	6,58	223,3	7,89	12,53277	2,08642	0,02001	0,09931	0,00083	0,871445	-46,6573		
4.sSMPABC106	118815	19772	2,057582	0,16265	0,00198	0,1009	0,0008	2,26183	0,02186	2483,396	20,36	619,7	4,7	1200,5	6,8	198,2	7,88	6,277231	2,26183	0,02186	0,1009	0,0008	0,820368	-48,3798		
4.sSMPABC107	223941,0026	43118,31	1,323254	0,19168	0,00203	0,10857	0,00085	2,86799	0,02376	2756,63	17,28	664,4	4,92	1373,5	6,24	172,9	4,34	-6,72787	2,86799	0,02376	0,10857	0,00085	0,945018	-51,6272		
4.sSMPABC042	112411,594	19874,72	2,283096	0,17971	0,00194	0,09521	0,00073	2,35803	0,01924	2650,196	17,76	586,3	4,27	1230	5,82	179,4	3,78	-9,79021	2,35803	0,01924	0,09521	0,00073	0,93969	-52,3333		
4.sSMPABC128	111508	23113	3,09972	0,20183	0,00285	0,1089	0,00093	3,02645	0,03524	2841,052	22,8	666,3	5,39	1414,3	8,89	126,2	7,4	-12,2617	3,02645	0,03524	0,1089	0,00093	0,73342	-52,8884		
4.sSMPABC043	116511	21011	2,251576	0,17978	0,00218	0,08821	0,00071	2,18499	0,02066	2650,842	19,99	544,9	4,19	1176,3	6,59	188,8	6,27	-15,8745	2,18499	0,02066	0,08821	0,00071	0,851255	-53,6768		
4.sSMPABC047	124888	23407	2,738137	0,186	0,00216	0,08727	0,00069	2,23676	0,02008	2707,111	19,01	539,4	4,08	1192,6	6,3	131,7	4,01	-21,0975	2,23676	0,02008	0,08727	0,00069	0,880724	-54,7711		
4.sSMPABC060	808276	172804	0,13261	0,2102	0,00279	0,10049	0,00092	2,90787	0,03359	2907,088	21,35	617,3	5,37	1384	8,73	561,3	31,3	-24,2022	2,90787	0,03359	0,10049	0,00092	0,792556	-55,3974		
4.sSMPABC133	90235,52684	18502,97	3,714579	0,20096	0,0023	0,06154	0,00048	1,70435	0,01525	2834,009	18,58	385	2,89	1010,2	5,73	79	2,96	-62,3896	1,70435	0,01525	0,06154	0,00048	0,871711	-61,8887		
4.sSMPABC131	62556,06654	11710,34	1,542466	0,18714	0,00284	0,0417	0,00037	1,07511	0,0136	2717,189	24,84	263,4	2,29	741,2	6,66	98,6	5,6	-81,3971	1,07511	0,0136	0,0417	0,00037	0,701422	-64,463		
4.sSMPABC096	75110,653	13989,98	0,274482	0,18482	0,00209	0,03711	0,00029	0,94515	0,00836	2696,605	18,52	234,9	1,83	675,6	4,36	518,2	14,78	-87,6117	0,94515	0,00836	0,03711	0,00029	0,88349	-65,2309		
4.sSMPABC095	94359,53889	20649,2	0,268097	0,21583	0,00269	0,04835	0,00039	1,43819	0,01428	2949,838	20,02	304,4	2,42	905	5,95	890,2	35,72	-97,3062	1,43819	0,01428	0,04835	0,00039	0,812374	-66,3646		
4.sSMPABC132	64994,30924	13745,37	1,891264	0,20695	0,00283	0,04153	0,00035	1,18411	0,01318	2881,81	22,03	262,3	2,16	793,2	6,13	95,6	4,78	-102,402	1,18411	0,01318	0,04153	0,00035	0,757151	-66,9314		
4.sSMPABC150	93743,74751	21481,22	0,154818	0,22186	0,00309	0,03612	0,00033	1,10443	0,01299	2994,239	22,23	228,8	2,02	755,5	6,27	879,5	50,9	-130,201	1,10443	0,01299	0,03612	0,00033	0,776775	-69,7154		
4.sSMPABC149	144571	41754	0,101789	0,28072	0,00372	0,04542	0,0004	1,75724	0,01959	3366,94	20,51	286,4	2,46	1029,8	7,22	2539,4	129,43	-159,567	1,75724	0,01959	0,04542	0,0004	0,789968	-72,1888		
4.sSMPABC147	119735,744	35024,85	0,209094	0,28502	0,00458	0,02685	0,00027	1,05387	0,01475	3390,647	24,8	170,8	1,71	730,8	7,29	691,4	45,52	-227,869	1,05387	0,01475	0,02685	0,00027	0,71848	-76,6284		

FILE NAME	CORRECTED		0																						
	Pb206*	Pb207*	Th/U	207/206	1s	206/238	1s	207/235	1s	206/207		206/238		207/235		208/232		Conc	207/235		206/238		RHO	Disc.	
Padrões Primários																									
4.sSMPABC001	68831,89344	4165,352	0,010115	0,06083	0,00071	0,09811	0,00078	0,82247	0,00785	633,228	24,94	603,3	4,6	609,4	4,37	516,5	37,66	98,98889	0,82247	0,00785	0,09811	0,00078	0,832975	-1,000984575	
4.sSMPABC002	71119,14935	4515,164	0,009968	0,0611	0,00071	0,09755	0,00078	0,82133	0,00781	642,756	24,85	600	4,57	608,8	4,36	34,7	40,85	98,53333	0,82133	0,00781	0,09755	0,00078	0,84088	-1,445466491	
4.sSMPABC003	70415,32592	4448,714	0,010239	0,06067	0,00071	0,09814	0,00079	0,82043	0,00785	627,555	24,96	603,5	4,61	608,3	4,38	821,3	40,82	99,20464	0,82043	0,00785	0,09814	0,00079	0,841304	-0,789084333	
4.sSMPABC006	65333,66371	3755,57	0,010113	0,05806	0,0007	0,09798	0,00078	0,78392	0,00777	532,027	26,49	602,6	4,61	587,7	4,42	198,9	40,41	102,4726	0,78392	0,00777	0,09798	0,00078	0,803171	2,535307129	
4.sSMPABC007	65439	3911	0,01	0,06008	0,00071	0,09772	0,00078	0,809	0,00782	606,457	25,25	601	4,6	601,9	4,39	748,7	40,49	99,85025	0,809	0,00782	0,09772	0,00078	0,825758	-0,149526499	
4.sSMPABC008	64004,4514	3732,91	0,010087	0,06133	0,00072	0,09727	0,00078	0,822	0,00793	650,828	25,04	598,4	4,57	609,2	4,42	1147,4	48,21	98,19519	0,822	0,00793	0,09727	0,00078	0,831217	-1,772816809	
4.sSMPABC054	59481,8386	3028,775	0,010058	0,05549	0,0007	0,09576	0,00078	0,73147	0,00788	432,02	27,49	589,5	4,57	557,4	4,62	248,9	43,87	105,4453	0,73147	0,00788	0,09576	0,00078	0,756103	5,758880517	
4.sSMPABC055	66185,02479	3875,336	0,010167	0,06047	0,00072	0,09691	0,00078	0,80675	0,0079	620,434	25,33	596,3	4,61	600,6	4,44	1050	45,22	99,27889	0,80675	0,0079	0,09691	0,00078	0,821936	-0,715950716	
4.sSMPABC101	69066,1467	4475,156	0,009672	0,06386	0,00078	0,09755	0,0008	0,85691	0,00872	736,997	25,5	600	4,72	628,4	4,77	412,5	29,79	95,26667	0,85691	0,00872	0,09755	0,0008	0,805901	-4,519414386	
4.sSMPABC102	67373,35454	3850,987	0,010187	0,05816	0,00071	0,09899	0,00082	0,79197	0,00819	535,794	27,2	608,5	4,78	592,3	4,64	723,2	38,89	102,6623	0,79197	0,00819	0,09899	0,00082	0,801027	2,735100456	
Padrões Secundários																									
4.sSMPABC004	123358	7103	0,066982	0,05803	0,00064	0,08834	0,0007	0,70639	0,00637	530,895	24,56	545,7	4,17	542,6	3,79	487,6	12,4	100,5681	0,70639	0,00637	0,08834	0,0007	0,87871	0,571323258	
4.sSMPABC005	118481,7388	6882,485	0,068793	0,06057	0,00068	0,08907	0,00071	0,74335	0,00678	623,999	24,1	550,1	4,2	564,4	3,95	620,1	18,24	97,40047	0,74335	0,00678	0,08907	0,00071	0,873958	-2,533664068	
4.sSMPABC056	102740,7413	5781,67	0,070367	0,05836	0,00068	0,08959	0,00071	0,71989	0,0068	543,303	25,17	553,1	4,19	550,6	4,01	501,4	18,63	100,452	0,71989	0,0068	0,08959	0,00071	0,838989	0,454050127	
4.sSMPABC057	107659,5613	6291,13	0,071119	0,05825	0,00068	0,08987	0,00071	0,72065	0,00683	539,178	25,91	554,8	4,2	551,1	4,03	432,5	17,98	100,6669	0,72065	0,00683	0,08987	0,00071	0,83358	0,671384504	
4.sSMPABC103	58180,85088	3177,775	0,073839	0,05895	0,00083	0,09886	0,00087	0,80212	0,00987	565,25	29,77	607,7	5,11	598	5,56	401,9	19,28	101,5962	0,80212	0,00987	0,09886	0,00087	0,715189	1,622073579	
4.sSMPABC104	63067,57812	3472,012	0,073009	0,05891	0,00076	0,09475	0,0008	0,76755	0,00847	563,772	27,84	583,6	4,72	578,4	4,87	460,7	21,1	100,891	0,76755	0,00847	0,09475	0,0008	0,765128	0,899031812	
Amostras																									
4.sSMPABC109	-315,6226855	99,4928	0,504348	0,42472	0,04	5,88272	0,4381	343,62189	26,62683	3998,99	134,04	******	410,33	5932,3	78,45	******	1600,95	#VALOR!	343,6219	26,62683	5,88272	0,4381	0,961073	#VALOR!	
4.sSMPABC060	332782,8686	105577,6	0,328021	0,30764	0,00385	0,78008	0,00653	32,99273	0,34384	3509,12	19,2	3717,4	23,65	3580,4	10,27	4401,9	316,33	103,6854	32,99273	0,34384	0,78008	0,00653	0,803223	3,826388113	
4.sSMPABC034	334433	76267	0,517192	0,23009	0,00256	0,63862	0,00519	20,23585	0,18245	3052,67	17,72	3183,6	20,42	3102,7	8,72	3097	114,5	102,5411	20,23585	0,18245	0,63862	0,00519	0,901369	2,607406452	
4.sSMPABC090	322308	68314	0,505736	0,21001	0,00242	0,5859	0,0047	16,92528	0,15876	2905,62	18,56	2972,8	19,11	2930,6	8,99	2820,4	151,39	101,4195	16,92528	0,15876	0,5859	0,0047	0,855203	1,439978161	
4.sSMPABC033	342095,7599	76818,49	0,402678	0,2265	0,00242	0,61472	0,00506	19,18251	0,16791	3027,48	17	3088,9	20,22	3051	8,45	2577,1	65,11	101,227	19,18251	0,16791	0,61472	0,00506	0,940377	1,242215667	
4.sSMPABC040	243375	76663	0,58542	0,31428	0,00344	0,74698	0,006	32,32589	0,2829	3542,07	16,76	3596,4	22,16	3560,3	8,62	3662,3	139,45	101,0038	32,32589	0,2829	0,74698	0,006	0,917825	1,013959498	
4.sSMPABC095	335037	76148	0,1593	0,22363	0,00268	0,60528	0,00495	18,61978	0,18491	3007,01	19,16	3051,1	19,89	3022,3	9,57	2867,4	167,76	100,9439	18,61978	0,18491	0,60528	0,00495	0,823499	0,952916653	
4.sSMPABC035	332953	76794	0,53894	0,23134	0,00242	0,61911	0,00492	19,72414	0,16439	3061,34	16,65	3106,4	19,6	3077,9	8,05	2679,6	68,17	100,9175	19,72414	0,16439	0,61911	0,00492	0,953498	0,925956009	
4.sSMPABC041	316888	100975	0,61389	0,31826	0,00347	0,74851	0,006	32,79939	0,28645	3561,45	16,69	3602	22,12	3574,6	8,61	3547,4	132,62	100,7607	32,79939	0,28645	0,74851	0,006	0,917848	0,766519331	
4.sSMPABC019	215566	68159	0,759153	0,31875	0,00347	0,74892	0,00611	32,88588	0,28805	3563,81	16,65	3603,5	22,53	3577,2	8,63	3542,2	110,49	100,7298	32,88588	0,28805	0,74892	0,00611	0,931424	0,735211898	
4.sSMPABC093	218201	50177	0,183882	0,22009	0,00272	0,59585	0,00484	18,03026	0,18391	2981,35	19,77	3013,1	19,55	2991,3	9,81	3176,6	251,61	100,7235	18,03026	0,18391	0,59585	0,00484	0,796352	0,728780129	
4.sSMPABC075	210984,1747	48756,5	0,349636	0,22745	0,00279	0,60839	0,00489	19,03048	0,18965	3034,19	19,49	3063,6	19,58	3043,4	9,61	3363,7	248,39	100,6594	19,03048	0,18965	0,60839	0,00489	0,806536	0,663731353	
4.sSMPABC094	351362,5997	82515,24	0,130061	0,23587	0,00288	0,62212	0,00539	20,19446	0,21204	3092,31	19,37	3118,4	21,43	3100,7	10,16	2377,1	105,91	100,5676	20,19446	0,21204	0,62212	0,00539	0,825143	0,570838843	
4.sSMPABC020	206201	65856	0,760926	0,32067	0,00342	0,74893	0,00603	33,08547	0,28156	3573,05	16,32	3603,6	22,23	3583,2	8,39	3675,5	109,83	100,5661	33,08547	0,28156	0,74893	0,00603	0,946112	0,56932351	
4.sSMPABC077	87433	24178	0,070193	0,27071	0,00368	0,67717	0,00618	25,19673	0,29138	3310,14	21,17	3333,5	23,76	3315,9	11,29	4184,9	357,45	100,528	25,19673	0,29138	0,67717	0,00618	0,789178	0,530775958	
4.sSMPABC070	143522,3775	37053,31	0,247085	0,26082	0,00295	0,66055	0,00558	23,72413	0,2232	3251,67	17,7	3269,3	21,65	3257,1	9,17	2550,5	89,31	100,3732	23,72413	0,2232	0,66055	0,00558	0,897893	0,374566332	
4.sSMPABC110	90934	18197	0,476541	0,19326	0,00286	0,53532	0,00486	14,22344	0,1818	2770,1	24,07	2763,8	20,4	2764,7	12,13	3213,1	385,14	99,96744	14,22344	0,1818	0,53532	0,00486	0,710287	-0,032553261	
4.sSMPABC069	211907	60431	0,14699	0,28846	0,00353	0,69175	0,00592	27,47855	0,2823	3409,33	18,93	3389,3	22,57	3400,7	10,07	3315,6	175,68	99,66365	27,47855	0,2823	0,69175	0,00592	0,83302	-0,335225101	
4.sSMPABC026	196685	38360	0,343789	0,19505	0,00235	0,5357	0,00428	14,3916	0,13827	2785,22	19,59	2765,4	17,97	2775,9	9,12	2745,9	162,35	99,62031	14,3916	0,13827	0,5357	0,00428	0,831578	-0,378255701	
4.sSMPABC076	156266,199	41126,59	0,254821	0,25595	0,00357	0,63865	0,00567	22,4549	0,26706	3221,95	21,85	3183,7	22,31	3203,6	11,56	4240,9	435,79	99,37494	22,4549	0,26706	0,63865	0,00567	0,746487	-0,621176177	
4.sSMPABC074	295217,7607	66966,47	0,084873	0,22868	0,00281	0,59437	0,00494	18,71527	0,19059	3042,83	19,52	3007,1	19,98	3027,3	9,82	2908,1	154,63	99,32826	18,71527	0,19059	0,59437	0,00494	0,816143	-0,667261256	
4.sSMPABC045	67416	12690	0,294129	0,18778	0,00218	0,51733	0,00446	13,376	0,12882	2722,81	19,02	2687,8	18,94	2706,6	9,1	2804,9	100,52	99,30054	13,376	0,12882	0,51733	0,00446	0,89518	-0,694598389	
4.sSMPABC087	234618,9807	45186,26	0,185893	0,19445	0,00241	0,52913	0,00468	14,16335	0,15241	2780,17	20,21	2737,8	19,74	2760,7	10,21	1791,9	80,6	99,16356	14,16335	0,15241	0,52913	0,00468	0,821932	-0,829499765	
4.sSMPABC059	387936,7107	124466,3	0,434529	0,31966	0,0035	0,72548	0,00565	31,92635	0,27538	3568,2	16,74	3516,6	21,1	3548	8,49	3174,4	129,72	99,10709	31,92635	0,27538	0,72548	0,00565	0,9029	-0,885005637	
4.sSMPABC015	190939,6095	45220,42	0,019846	0,23732	0,0026	0,59999	0,0047	19,61689	0,16753	3102,09	17,36	3029,8	18,94	3072,7	8,25	1316,1	135,69	98,58406	19,61689	0,16753	0,59999	0,0047	0,917258	-1,396166238	
4.sSMPABC016	81018,32299	18289,06	0,006821	0,2272	0,00284	0,58088	0,00519	18,17871	0,1879	3032,43	19,93	2952,3	21,16	2999,2	9,95	3687,4	952,66	98,41141	18,17871	0,1879	0,58088	0,00519	0,864405	-1,563750333	
4.sSMPABC025	183216,289	35213,76	0,312527	0,19063	0,00247	0,51258	0,0044	13,44782	0,14419	2747,6	21,14	2667,6	18,75	2711,6	10,13	4059,7	382,82	98,35058	13,44782	0,14419	0,51258	0,0044	0,800586	-1,622658209	
4.sSMPABC062	219192	42737	0,454953	0,19586	0,00272	0,523	0,005	14,10369	0,1737	2792	22,59	2711,9	21,18	2756,7	11,68	2975,3	219,82	98,34802	14,10369	0,1737	0,523	0,005	0,776249	-1,625131498	
4.sSMPABC023	145555,068	36533,65	0,146722	0,25349	0,00535	0,6181	0,00801	21,55887	0,41359	3206,7	32,98	3102,3	31,9	3164,1	18,62	6723,5	2076,99	98,00793	21,55887	0,41359	0,6181	0,00801	0,675507	-1,953162037	
4.sSMPABC046	333053	103288	0,391584	0,30589	0,00345	0,68924	0,00553	29,01668	0,26278	3500,31	17,31	3379,7	21,1	3454,1	8,89	3983,3	208,89	97,79862	29,01668	0,26278	0,68924	0,00553	0,885952	-2,153961958	
4.sSMPABC012	297447	71574	0,369556	0,24066	0,00256	0,59429	0,00456	19,70111	0,16097	3124,34	16,8	3006,8	18,42	3076,8	7,9	3265,1	104,24	97,67194	19,70111	0,16097	0,59429	0,00456	0,939101	-2,275091004	
4.sSMPABC038	572845	146687	0,033594	0,23303	0,00373	0,58012	0,00607	18,62267	0,269	3072,98	25,38	2949,3	24,78	3022,5	13,92	892,6	50,29	97,51806	18,62267	0,269	0,58012	0,00607	0,72437	-2,421836228	
4.sSMPABC048	234731	61366	0,38083	0,26391	0,00322	0,60787	0,0055	22,07779	0,23356	3270,2	19,08	3061,5	22,05	3187,2	10,28	2406	106,04	95,89417	22,07779	0,23356	0,60787	0,0055	0,855282	-3,943900602	
4.sSMPABC044	122800	24410	0,450837	0,19656	0,00238	0,4977	0,00409	13,46018	0,13198	2797,84	19,7	2603,9	17,6	2712,5	9,27	2749	172,93	95,82933	13,46018	0,13198	0,4977	0,00409	0,838105	-4,003686636	
4.sSMPABC024	371746	96923	0,103164	0,26597	0,00316	0,59791	0,00528	21,89939	0,22236	3282,42	18,52	3021,4	21,29	3179,3	9,86	2802,3	135,48	94,77395	21,89939	0,22236	0,59791	0,00528	0,869708	-4,96650206	
4.sSMPABC097	173839,4848	36191,11	0,332223	0,19942	0,00328	0,49192	0,00454	13,48205	0,19317	2821,46	26,58	2579	19,61	2714	13,54	1644	147,67	94,76541	13,48205	0,19317	0,49192	0,00454	0,644136	-4,974207811	
4.sSMPABC089	263509,306	55386,66	0,674209	0,20676	0,00259	0,50205	0,00404	14,28442	0,14696	2880,32	20,21	2622,6	17,33	2768,8	9,76	2621,4	201,16	94,42538	14,28442	0,14696	0,50205	0,00404	0,782164	-5,280265819	
4.sSMPABC111	126070	25097	0,359434	0,203	0,00389	0,48421	0,00556	13,53869	0,24025	2850,47	30,85	2545,6	24,14	2718	16,78	1434,7	95,2	93,22753	13,53869	0,24025	0,48421	0,00556	0,647074	-6,342899191	
4.sSMPABC037	220360,5548	56564,48	0,35646	0,2612	0,00316	0,55806	0,00503	20,07674	0,20925	3253,96	18,94	2858,6	20,8	3095,1	10,08	3708,2	166,95	91,72672	20,07674	0,20925	0,55806	0,00503	0,864798	-7,641110142	
4.sSMPABC106	0	0	#DIV/0!	0,72001	0,20935	0,63137	0,10481	33,68268	7,51063	4771,18	363,04	3155	414,16	3600,8	219,88	-325,5	588,88	85,87005	33,68268	7,51063	0,63137	0,10481	0,744473	-12,38058209	
4.sSMPABC014	172569,0157	52424,44	0,274257	0,30266	0,00316	0,54722	0,00435	22,81771	0,18803	3483,89	16,05	2813,6	18,12	3219,2	8,02	3358,8	74,49	85,5843	22,81771	0,18803	0,54722	0,00435	0,964655	-12,59940358	
4.sSMPABC123	47449,12361	8925,798	0,102428	0,18885	0,00303	0,37352	0,0039	9,70701	0,13898	2732,17	26,16	2045,9	18,28	2407,4	13,18	1794,5	137,7	82,33051	9,70701	0,13898	0,37352	0,0039	0,729263	-15,01620005	
4.sSMPABC081	289180,348	54336,46	0,443378	0,18853	0,00235	0,37279	0,00322	9,67768	0,10273	2729,38	20,37	2042,5	15,1	2404,6	9,77	1445,4	76,04	82,27173	9,67768	0,10273	0,37279	0,00322	0,813702	-15,05863761	
4.sSMPABC073	213083,1266	43117,95	0,448102	0,20409	0,0025	0,3948	0,00353	11,09578	0,11801	2859,19	19,79	2145,1	16,31	2531,2	9,91	1866,6	77,44	82,00084	11,09578	0,11801	0,3948	0,00353	0,840691	-15,25363464	
4.sSMPABC067	251810,4443	60173,71	0,248975	0,23333	0,00262	0,42806	0,00332	13,75158	0,12181	3075,03	17,8	2297	15,01	2732,8	8,38	2254,2	104,57	81,02743	13,75158	0,12181	0,42806	0,00332	0,875595	-15,94701405	
4.sSMPABC017	295122	65396	0,097121	0,22252	0,00275	0,41042	0,00323	12,58356	0,12354	2999,02	19,72	2216,9	14,78	2649	9,23	1880	117,01	80,50882	12,58356	0,12354	0,41042	0,00323	0,801623	-16,31181578	
4.sSMPABC091	343207,2834	72776,73	0,161227	0,20767	0,00234	0,34273	0,00271	9,79331	0,08895	2887,45	18,18	1899,8	13,01	2415,5	8,37	1876,6	98,75	72,85504	9,79331	0,08895	0,34273	0,00271	0,870564	-21,34961706	
4.sSMPABC096	174936	43470	0,514345	0,2385	0,00301	0,37345	0,00304	12,2281	0,12723	3109,99	19,99	2045,6	14,26	2622,1	9,77	1537,6	108,43	71,81756	12,2281	0,12723	0,37345	0,00304	0,782367	-21,98619427	
4.sSMPABC011	243526,6875	51878,72	0,377304	0,21353	0,00222	0,34187	0,0027	10,05769	0,0825	2932,53	16,7	1895,7	12,99	2440,1	7,58	1381,8	30,25	71,28238	10,05769	0,0825	0,34187	0,0027	0,962824	-22,31056104	
4.sSMPABC092	418922,2144	95379,53	0,148116	0,2318	0,00321	0,35863	0,00333	11,45143	0,14111	3064,52	21,94	1975,7	15,79	2560,6	11,51	1388,1	74,31	70,3953	11,45143	0,14111	0,35863	0,00333	0,753528	-22,84230259	
4.sSMPABC118	52754	7537	0,114864	0,14551	0,0028	0,23399	0,00269	4,68832	0,08244	2293,82	32,71	1355,4	14,07	1765,2	14,72	2254,5	171,84	69,76538	4,68832	0,08244	0,23399	0,00269	0,653784	-23,21549966	
4.sSMPABC083	158764,2183	31336	0,615987	0,18601	0,00302	0,2952	0,00284	7,50683	0,1062	2707,2	26,56	1667,5	14,14	2173,8	12,68	1858,8	270,85	69,63718	7,50683	0,1062	0,2952	0,00284	0,680039	-23,29101113	
4.sSMPABC061	227055,4954	51975,24	0,596893	0,22644	0,00288	0,34752	0,00322	10,84341	0,12137	3027,06	20,27	1922,7	15,41	2509,8	10,41	907,3	35,59	69,46482	10,84341	0,12137	0,34752	0,00322	0,82781	-23,39230218	
4.sSMPABC122	216965,0115	43329,88	0,16836	0,19683	0,00238	0,30789	0,00256	8,33083	0,08448	2800,09	19,68	1730,3	12,63	2267,7	9,19	1343,5	85,53	68,9418	8,33083	0,08448	0,30789	0,00256	0,819934	-23,69802002	

FILE NAME	CORRECTED		0																									
	Pb206*		Pb207*	Th/U	207/206	1s	206/238	1s	207/235	1s	206/207		206/238		207/235		208/232		Conc	207/235		206/238		RHO	Disc.			
4.sSMPABC047	763840,6113		175770,1	0,044632	0,23223	0,00277	0,34936	0,00308	11,18112	0,11589	3067,48	18,91	1931,6	14,72	2538,3	9,66	8542,9	318,95	68,59081	11,18112	0,11589	0,34936	0,00308	0,850583	-23,90182406			
4.sSMPABC058	709803,6355		96690,97	0,353263	0,13853	0,00175	0,21102	0,00165	4,02449	0,04102	2208,91	21,7	1234,2	8,76	1639,2	8,29	1130	90,56	67,18522	4,02449	0,04102	0,21102	0,00165	0,767142	-24,70717423			
4.sSMPABC022	176548,2498		34669,18	0,567778	0,1943	0,00223	0,29494	0,00228	7,88972	0,07043	2778,91	18,69	1666,2	11,37	2218,5	8,04	1378	56,81	66,85272	7,88972	0,07043	0,29494	0,00228	0,865974	-24,89519946			
4.sSMPABC052	836104,4059		150917,9	0,072971	0,18186	0,00205	0,27477	0,00226	6,88312	0,06412	2669,91	18,53	1565	11,44	2096,5	8,26	1188,5	49,83	66,03834	6,88312	0,06412	0,27477	0,00226	0,88294	-25,35177677			
4.sSMPABC108	15838		3198	0,167347	0,20392	0,0048	0,30063	0,00436	8,4391	0,17622	2857,83	37,83	1694,4	21,61	2279,4	18,96	3583	344,04	65,4745	8,4391	0,17622	0,30063	0,00436	0,694537	-25,66464859			
4.sSMPABC072	650548,6084		137327,9	0,401154	0,21221	0,00245	0,30816	0,00254	9,00709	0,08626	2922,5	18,57	1731,7	12,51	2338,7	8,75	1438,8	64,41	64,94774	9,00709	0,08626	0,30816	0,00254	0,860662	-25,95459016			
4.sSMPABC079	431036,4504		99508,5	0,315727	0,23394	0,0028	0,32946	0,00284	10,61204	0,10867	3079,2	18,97	1835,8	13,78	2489,8	9,5	2077	84,04	64,3752	10,61204	0,10867	0,32946	0,00284	0,841792	-26,26717005			
4.sSMPABC080	337866,0112		54832,68	1,156341	0,15938	0,002	0,23439	0,00189	5,13738	0,05294	2449,09	21,06	1357,5	9,85	1842,3	8,76	1306,1	104,5	64,28729	5,13738	0,05294	0,23439	0,00189	0,782493	-26,31493242			
4.sSMPABC064	170087,1124		25314,28	0,141966	0,14875	0,00171	0,21432	0,0017	4,38802	0,04027	2331,61	19,53	1251,8	9,03	1710,1	7,59	1391,8	69,68	63,38872	4,38802	0,04027	0,21432	0,0017	0,864317	-26,79960236			
4.sSMPABC031	253317,2101		60430,08	0,401345	0,24398	0,00338	0,32836	0,00275	11,03962	0,12577	3146,12	21,81	1830,4	13,34	2526,5	10,61	2380	245,66	61,97006	11,03962	0,12577	0,32836	0,00275	0,735122	-27,55194934			
4.sSMPABC032	461347		108143	0,176939	0,23551	0,00292	0,31606	0,00286	10,25502	0,11057	3089,88	19,62	1770,4	14,03	2458,1	9,98	1604,4	78,85	61,15567	10,25502	0,11057	0,31606	0,00286	0,839258	-27,97689272			
4.sSMPABC088	257057,0173		53857,84	0,142294	0,20033	0,00335	0,27573	0,00288	7,62021	0,11543	2828,89	27,04	1569,8	14,54	2187,2	13,6	1584,3	105,3	60,67015	7,62021	0,11543	0,27573	0,00288	0,689536	-28,22787125			
4.sSMPABC010	316715,23		58534,84	0,734784	0,18707	0,00205	0,25763	0,00198	6,64074	0,05629	2716,57	17,94	1477,7	10,15	2064,8	7,48	1606,8	76,03	60,26934	6,64074	0,05629	0,25763	0,00198	0,90668	-28,43374661			
4.sSMPABC050	642225,6037		107062,2	0,049702	0,16903	0,00197	0,22983	0,00185	5,34938	0,05063	2548,06	19,35	1333,6	9,7	1876,8	8,1	3927	174,93	59,26815	5,34938	0,05063	0,22983	0,00185	0,850473	-28,9428815			
4.sSMPABC066	682132,849		114431,1	0,069431	0,16983	0,002	0,23089	0,00199	5,39912	0,05466	2555,97	19,61	1339,2	10,44	1884,7	8,67	1194,5	49,37	59,26673	5,39912	0,05466	0,23089	0,00199	0,851337	-28,94359845			
4.sSMPABC049	336391,7619		90335,6	0,19434	0,25555	0,00422	0,3248	0,00347	11,44728	0,17072	3219,48	25,84	1813,1	16,9	2560,3	13,93	744,5	43,13	58,78881	11,44728	0,17072	0,3248	0,00347	0,71636	-29,18407999			
4.sSMPABC036	474274,0911		90040,57	0,260086	0,19214	0,00218	0,25525	0,00221	6,75706	0,06545	2760,57	18,5	1465,5	11,33	2080,1	8,57	1205,4	43,04	58,06209	6,75706	0,06545	0,25525	0,00221	0,893871	-29,54665641			
4.sSMPABC009	306013,5334		48299,59	0,425346	0,15962	0,00204	0,2107	0,00167	4,63313	0,04762	2451,64	21,48	1232,5	8,91	1755,3	8,58	1308,1	94,2	57,58215	4,63313	0,04762	0,2107	0,00167	0,771147	-29,78408249			
4.sSMPABC085	476793,6047		121524	0,126271	0,25163	0,00272	0,31293	0,00251	10,83552	0,0948	3195,05	16,97	1755,1	12,34	2509,1	8,13	1971,1	67,45	57,03948	10,83552	0,0948	0,31293	0,00251	0,916786	-30,05061576			
4.sSMPABC084	506604		126463	0,055061	0,24281	0,00383	0,30287	0,00303	10,13726	0,14519	3138,48	24,82	1705,5	15,02	2447,4	13,24	1328,5	88,6	56,49956	10,13726	0,14519	0,30287	0,00303	0,698506	-30,3138024			
4.sSMPABC107	263129,4465		59922,05	0,050911	0,21735	0,00381	0,27238	0,00255	8,12988	0,12498	2961,16	27,96	1552,9	12,9	2245,6	13,9	1566,3	183,92	55,39314	8,12988	0,12498	0,27238	0,00255	0,608988	-30,84698967			
4.sSMPABC021	272410,0847		48532,67	0,522247	0,1748	0,00212	0,22234	0,00173	5,34583	0,0514	2604,14	20,1	1294,2	9,12	1876,2	8,22	1004,7	48,42	55,03013	5,34583	0,0514	0,22234	0,00173	0,809246	-31,02014711			
4.sSMPABC082	519010,3605		87665,16	0,145251	0,16663	0,00204	0,2086	0,00165	4,78335	0,04769	2524,07	20,41	1221,4	8,79	1782	8,37	2187,7	161,49	54,10185	4,78335	0,04769	0,2086	0,00165	0,793368	-31,45903479			
4.sSMPABC071	382082		79242	0,198729	0,20858	0,00259	0,25844	0,00224	7,42338	0,07885	2894,54	20,03	1481,9	11,46	2163,8	9,51	1255,4	64,73	53,98475	7,42338	0,07885	0,25844	0,00224	0,815996	-31,51400314			
4.sSMPABC078	699305,2867		169818,1	0,063933	0,24629	0,0035	0,29277	0,00274	9,93008	0,1269	3161,07	22,39	1655,4	13,66	2428,3	11,79	******	645,25	53,31038	9,93008	0,1269	0,29277	0,00274	0,732344	-31,82885146			
4.sSMPABC030	675043,2366		133045,9	0,035176	0,20125	0,00246	0,24772	0,00209	6,86632	0,07027	2836,36	19,76	1426,7	10,82	2094,3	9,07	3044,1	150,76	53,2067	6,86632	0,07027	0,24772	0,00209	0,824403	-31,87699947			
4.sSMPABC042	212731,8858		53662,83	0,620759	0,24979	0,0028	0,29369	0,00236	10,10131	0,09063	3183,44	17,65	1660	11,77	2444,1	8,29	2223,9	91,82	52,76506	10,10131	0,09063	0,29369	0,00236	0,89563	-32,08133873			
4.sSMPABC029	748913,7323		151013,7	0,045052	0,20579	0,00237	0,25101	0,00217	7,11747	0,07028	2872,68	18,63	1443,7	11,18	2126,2	8,79	1498,6	65,55	52,72564	7,11747	0,07028	0,25101	0,00217	0,875513	-32,09952027			
4.sSMPABC053	486813		100677	0,032962	0,20955	0,00246	0,25433	0,0022	7,33959	0,07366	2902,07	18,88	1460,8	11,32	2153,6	8,97	2099,2	89,61	52,57393	7,33959	0,07366	0,25433	0,0022	0,861916	-32,16939079			
4.sSMPABC065	215203,537		31603,6	0,159191	0,14445	0,00188	0,17012	0,0014	3,37413	0,03621	2281,24	22,23	1012,8	7,69	1498,4	8,41	1430,9	133,06	52,05371	3,37413	0,03621	0,17012	0,0014	0,766842	-32,40790176			
4.sSMPABC068	537808,7796		88642,16	0,074493	0,16743	0,002	0,20314	0,00174	4,6815	0,04778	2532,11	19,92	1192,2	9,34	1763,9	8,54	1282	54,01	52,04664	4,6815	0,04778	0,20314	0,00174	0,839253	-32,41113442			
4.sSMPABC043	247482,181		78821,37	0,468837	0,31778	0,00444	0,34251	0,00303	14,96284	0,17509	3559,12	21,33	1898,7	14,53	2812,9	11,14	4896,4	423,61	51,85127	14,96284	0,17509	0,34251	0,00303	0,756	-32,50026663			
4.sSMPABC039	577489		115094	0,031636	0,20145	0,00237	0,23667	0,00195	6,56661	0,06363	2837,98	19,04	1369,3	10,17	2054,9	8,54	1648	81,46	49,93062	6,56661	0,06363	0,23667	0,00195	0,850297	-33,36415397			
4.sSMPABC013	602097,1534		122452	0,072494	0,20805	0,00233	0,24123	0,002	6,91358	0,0639	2890,42	18,06	1393,1	10,38	2100,4	8,2	2815	97,44	49,22834	6,91358	0,0639	0,24123	0,002	0,897017	-33,67453818			
4.sSMPABC063	188306,6529		21993,9	0,139711	0,11911	0,00155	0,11775	0,00099	1,93078	0,02099	1942,92	23,14	717,6	5,7	1091,8	7,27	1356,5	92,79	47,85396	1,93078	0,02099	0,11775	0,00099	0,773383	-34,2736765			
4.sSMPABC051	756862,3146		108417,1	0,578809	0,14584	0,00189	0,15994	0,00126	3,21176	0,03388	2297,71	22,05	956,5	6,99	1460	8,17	575,9	49,79	47,36017	3,21176	0,03388	0,15994	0,00126	0,746815	-34,48630137			
4.sSMPABC018	534079,5096		99139,3	0,224723	0,18764	0,00204	0,2058	0,00164	5,31936	0,04631	2721,59	17,8	1206,4	8,79	1872	7,44	818,9	28,48	44,82759	5,31936	0,04631	0,2058	0,00164	0,915341	-35,55555556			
4.sSMPABC099	350529,3467		55143,03	0,563665	0,15874	0,00196	0,16815	0,00146	3,67418	0,03913	2442,28	20,76	1001,9	8,06	1565,8	8,5	464,2	21,51	43,71694	3,67418	0,03913	0,16815	0,00146	0,81528	-36,0135394			
4.sSMPABC027	193749,1231		31081,05	0,272509	0,16238	0,00182	0,16666	0,00137	3,7284	0,03392	2480,59	18,75	993,7	7,56	1577,5	7,28	1371,2	46,12	41,24987	3,7284	0,03392	0,16666	0,00137	0,903558	-37,00792393			
4.sSMPABC100	339194,9756		59450,93	0,580712	0,1758	0,0029	0,18043	0,0017	4,36261	0,06342	2613,64	27,17	1069,3	9,26	1705,3	12,01	1162,5	143,78	40,52184	4,36261	0,06342	0,18043	0,0017	0,648127	-37,29549053			
4.sSMPABC115	510210,0143		80437,31	0,453104	0,16079	0,00253	0,16089	0,00156	3,56437	0,05091	2463,98	26,31	961,7	8,68	1541,6	11,33	219,5	13,61	39,70053	3,56437	0,05091	0,16089	0,00156	0,678852	-37,61676181			
4.sSMPABC098	439794,1934		63693,68	0,726079	0,14159	0,00181	0,1328	0,00107	2,58691	0,02733	2246,74	21,88	803,8	6,08	1296,9	7,74	697,2	61,21	38,65389	2,58691	0,02733	0,1328	0,00107	0,762654	-38,02143573			
4.sSMPABC028	153442,802		25176,41	0,317851	0,16674	0,00197	0,15975	0,00127	3,66787	0,03449	2525,18	19,73	955,4	7,08	1564,4	7,5	1979	119,28	36,25707	3,66787	0,03449	0,15975	0,00127	0,845442	-38,92866275			
4.sSMPABC114	470572,8066		109519,3	0,176579	0,22372	0,00289	0,21581	0,00181	6,63788	0,07244	3007,66	20,57	1259,7	9,57	2064,4	9,63	1408,1	117,4	36,11971	6,63788	0,07244	0,21581	0,00181	0,768525	-38,97984887			
4.sSMPABC120	338490		78830	0,050145	0,22149	0,00313	0,2122	0,00184	6,45515	0,07819	2991,55	22,55	1240,5	9,8	2039,8	10,65	4860,9	395,69	35,5663	6,45515	0,07819	0,2122	0,00184	0,715859	-39,18521424			
4.sSMPABC113	506506,982		112436,2	0,23439	0,21776	0,00273	0,20295	0,00165	6,07986	0,06331	2964,2	20,07	1191,2	8,84	1987,4	9,08	1229,5	97,99	33,15984	6,07986	0,06331	0,20295	0,00165	0,780757	-40,06239308			
4.sSMPABC119	179299,5091		20781,51	0,05508	0,12377	0,00181	0,09325	0,00089	1,58934	0,02091	2011,27	25,79	574,7	5,22	966	8,2	1664	85,35	31,9123	1,58934	0,02091	0,09325	0,00089	0,725444	-40,50724638			
4.sSMPABC117	238868,3002		29311,18	0,062863	0,12852	0,00188	0,10035	0,00094	1,77521	0,02323	2077,83	25,49	616,4	5,53	1036,4	8,5	1665,2	86,18	31,86243	1,77521	0,02323	0,10035	0,00094	0,715832	-40,52489386			
4.sSMPABC086	419611		95391	0,184402	0,229	0,00289	0,18257	0,00163	5,7574	0,06349	3045,07	20,04	1081	8,88	1940	9,54	2008,1	88,8	20,53654	5,7574	0,06349	0,18257	0,00163	0,809616	-44,27835052			
4.sSMPABC105	85262,492		13540,9	0,4796	0,15048	0,00172	0,06013	0,0005	1,24468	0,01175	2351,39	19,42	376,4	3,03	821	5,32	157,7	6,58	-18,119	1,24468	0,01175	0,06013	0,0005	0,880843	-54,15347138			
4.sSMPABC116	114658,6648		21297,49	0,082354	0,1895	0,00241	0,08194	0,00072	2,13683	0,02333	2737,83	20,8	507,7	4,27	1160,8	7,55	2159,4	95,6	-28,639	2,13683	0,02333	0,08194	0,00072	0,804807	-56,26292212			
4.sSMPABC121	2424		410	0,152411	0,16731	0,00557	0,04955	0,00088	1,13973	0,03296	2530,91	54,81	311,7	5,4	772,4	15,64	964,3	78,96	-47,8024	1,13973	0,03296	0,04955	0,00088	0,614121	-59,64526152			
4.sSMPABC112	6235,844266		2236,424	0,122085	0,41644	0,02133	0,09488	0,00345	5,43308	0,21573	3969,52	74,64	584,3	20,34	1890,1	34,05	7862,6	1240,3	-123,481	5,43308	0,21573	0,09488	0,00345	0,915756	-69,08629173			

Soderlund et al., 2004 | 1 | Decay cst: **1=>1.867E-11**(Sodelund et al., 2004); **2=>1.93E-11**(Blichert-Toft et al., 1997)

Sample	Spot	Spot size	$^{207}Pb/^{206}Pb$ Age Ma	±1s	±2s	$^{176}Hf/^{177}Hf$	±1s	$^{176}Hf/^{177}Hf_{(fudge)}$	$^{176}Lu/^{177}Hf$	±1s	$^{176}Yb/^{177}Hf$	$^{176}Hf/^{177}Hf_T$	±s	eHf_T	±2s		T(DM)Ma	(±)	$T(DM)^c_{felsic}$Ma	(±)	$T(DM)^c_{mafic}$Ma	(±)	$^{176}Hf/^{177}Hf_{T\ CHUR}$	$^{176}Hf/^{177}Hf_{T\ DM}$
																			0,010		0,022			
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-153314\test11xyz.dat			2919,674327	10	19	0,280945	8					0,2808974582	8	-0,183567416		0,71581								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-153314\test12xyz.dat			2919,5	10	20	0,280897	8					0,2808675358	8	-1,252392832		0,71573								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-153314\test13xyz.dat			2958,4	9	17	0,280928	9					0,2808769690	9	0,0009643		0,71582								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-153314\test14xyz.dat			2985,4	9	18	0,280950	10					0,2808522407	10	-0,243127134		0,71581								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-153314\test15xyz.dat			2629,4	11	22	0,281042	9					0,2810103511	9	-2,990391312		0,71561								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-153314\test16xyz.dat			2566,2	9	18	0,281089	9					0,2810362791	9	-3,547641731		0,71557								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-153314\test17xyz.dat			2595,8	10	19	0,281061	10					0,2810293990	10	-3,098534482		0,71560								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-153314\test18xyz.dat			2593,8	10	21	0,281019	10					0,2809923725	10	-4,462826612		0,71550								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-153314\test19xyz.dat			2984,3	10	21	0,280967	8					0,2808917233	8	1,136798607		0,71590								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-153314\test20xyz.dat			3026,0	8	17	0,280967	12					0,2808557879	12	0,843012271		0,71588								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-153314\test21xyz.dat			3016,6	8	17	0,280961	8					0,2808424734	8	0,147045345		0,71583								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-153314\test22xyz.dat			2113,0	14	28	0,281447	8					0,2813983228	8	-1,231616388		0,71574								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-153314\test23xyz.dat			2803,5	12	23	0,280956	9					0,2808769543	9	-3,649434447		0,71556								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-153314\test24xyz.dat			3187,0	9	17	0,280898	10					0,2808163289	10	3,251502439		0,71606								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-153314\test25xyz.dat			3022,9	8	17	0,280834	7					0,2807966120	7	-1,336253244		0,71573								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-153314\test26xyz.dat			2995,9	8	17	0,280865	8					0,2808299978	8	-0,786223068		0,71577								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-153314\test27xyz.dat			3280,7	9	18	0,280628	10					0,2805704557	10	-3,284476544		0,71559								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-153314\test28xyz.dat			3237,5	11	23	0,280651	8					0,2805876575	8	-3,696870232		0,71556								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-153314\test29xyz.dat			3183,6	8	17	0,280842	8					0,2807698110	8	1,51186226		0,71593								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-153314\test30xyz.dat			3556,7	8	16	0,280571	8					0,2804828686	8	0,171393054		0,71584								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-153314\test31xyz.dat			2975,0	9	18	0,280661	11					0,2805575277	11	-10,9798896		0,71504								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-153314\test32xyz.dat			2716,8	9	18	0,281019	9					0,2809862499	9	-1,796277618		0,71569								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-153314\test33xyz.dat			2975,0	9	18	0,281081	9					0,2809915953	9	4,474729266		0,71614								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-153314\test34xyz.dat			2967,8	9	17	0,281021	9					0,2809733082	9	3,65312403		0,71608								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-153314\test35xyz.dat			2816,8	9	19	0,281009	9					0,2809733243	9	0,092987368		0,71583								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-153314\test36xyz.dat			2835,1	9	17	0,281197	9					0,2811057206	9	5,237530578		0,71620								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-153314\test37xyz.dat			3215,7	8	16	0,280991	7					0,2808836499	7	6,329977497		0,71628								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-153314\test38xyz.dat			3214,3	8	16	0,281126	10					0,2809325745	10	8,040510409		0,71640								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-153314\test39xyz.dat			3211,9	8	17	0,281181	13					0,2809989363	13	10,34563771		0,71656								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-153314\test40xyz.dat			2789,2	9	19	0,281042	9					0,2809822797	9	-0,236106485		0,71581								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-153314\test41xyz.dat			2775,4	10	19	0,281060	7					0,2809654691	7	-1,160870865		0,71574								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-153314\test42xyz.dat			3021,6	9	17	0,281056	7					0,2809979717	7	5,801873931		0,71624								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-153314\test43xyz.dat			2802,9	9	18	0,281014	7					0,2809728370	7	-0,250647209		0,71581								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-153314\test44xyz.dat			2815,1	9	17	0,281021	7					0,2809750282	7	0,114946548		0,71583								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-153314\test45xyz.dat			2784,2	9	18	0,281191	7					0,2811078781	7	4,115333924		0,71612								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-153314\test46xyz.dat			2826,9	9	18	0,280964	8					0,2808901664	8	-2,627869483		0,71564								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-153314\test47xyz.dat			2961,8	13	25	0,280959	6					0,2808725466	6	-0,077611135		0,71582								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-153314\test48xyz.dat			2927,5	12	23	0,281247	8					0,2811904423	8	10,43182203		0,71657								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-153314\test49xyz.dat			2643,1	21	43	0,281275	6					0,2812072055	6	4,334102944		0,71613								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-153314\test50xyz.dat			2455,6	10	20	0,281399	7					0,2813542430	7	5,174013963		0,71619								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-153314\test51xyz.dat			2778,0	16	32	0,281451	7					0,2813863335	7	13,87828074		0,71682								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test11xyz.dat			2756,88715	11	22	0,280960	9					0,2809270522	9	-2,962099553		0,71561								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test12xyz.dat			2752,597145	9	18	0,280991	9					0,2809513030	9	-2,199914198		0,71567								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test13xyz.dat			2758,685114	21	42	0,281010	9					0,2809736168	9	-1,262805652		0,71573								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test14xyz.dat			2840,244384	15	30	0,280997	9					0,2809139480	9	-1,468082118		0,71572								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test15xyz.dat			2804,570973	11	22	0,280954	7					0,2808977493	7	-2,88400311		0,71562								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test16xyz.dat			2761,07888	10	20	0,281020	8					0,2809759169	8	-1,124699905		0,71574								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test17xyz.dat			2773,241937	13	26	0,280979	12					0,2809411511	12	-2,076022616		0,71567								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test18xyz.dat			2769,765219	10	20	0,280993	9					0,2809490330	9	-1,877248808		0,71569								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test19xyz.dat			2771,462238	10	21	0,281014	8					0,2809712970	8	-1,045046656		0,71575								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test20xyz.dat			2788,489859	9	18	0,280929	10					0,2808985720	10	-3,232869491		0,71559								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test21xyz.dat			2780,422876	9	19	0,280947	14					0,2809153733	14	-2,824590842		0,71562								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test22xyz.dat			2763,042188	12	24	0,281173	30					0,2810673988	30	2,17695511		0,71598								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test23xyz.dat			2774,765627	10	19	0,280983	10					0,2809342658	10	-2,285234796		0,71566								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test24xyz.dat			2967,751105	14	27	0,280893	9					0,2808256251	9	-1,606663935		0,71571								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test25xyz.dat			2843,392208	9	19	0,281082	8					0,2810224468	8	2,467833126		0,71600								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test26xyz.dat			3294,184577	8	17	0,280675	8					0,2806434498	8	-0,363395303		0,71580								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test27xyz.dat			2798,260159	11	22	0,281056	9					0,2809972680	9	0,509386106		0,71586								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test28xyz.dat			2683,678512	10	19	0,281050	18					0,2809914997	18	-2,387684667		0,71565								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test29xyz.dat			2778,736494	10	19	0,280987	11					0,2809447600	11	-1,818427957		0,71569								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test30xyz.dat			2760,480815	9	18	0,281021	9					0,2809658995	9	-1,495235846		0,71572								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test31xyz.dat			2785,134162	12	24	0,280965	6					0,2809231684	6	-2,436418133		0,71565								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test32xyz.dat			3397,13736	11	22	0,280586	11					0,2805169955	11	-2,42018739		0,71565								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test33xyz.dat			2861,57713	11	22	0,280957	12					0,2808866565	12	-1,937207377		0,71568								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test34xyz.dat			2787,483979	9	18	0,281003	9					0,2809180276	9	-2,564124753		0,71564								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test35xyz.dat			2780,254328	9	19	0,281024	7					0,2809555094	7	-1,400194429		0,71572								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test36xyz.dat			2783,9578	9	18	0,281036	9					0,2809569578	9	-1,261573708		0,71573								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test37xyz.dat			2766,024656	9	18	0,280985	9					0,2809326220	9	-2,549176517		0,71564								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test38xyz.dat			2766,194894	11	22	0,281002	7					0,2809521512	7	-1,850195296		0,71569								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test39xyz.dat			2815,219152	9	18	0,281170	10					0,2810769123	10	3,743015105		0,71609								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test40xyz.dat			2767,896164	10	19	0,280979	10					0,2809335716	10	-2,471398915		0,71565								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test41xyz.dat			2770,698829	9	18	0,280989	10					0,2809489292	10	-1,858997143		0,71569								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test42xyz.dat			2757,914835	9	18	0,280980	8					0,2809415487	8	-2,422081001		0,71565								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test43xyz.dat			2786,980773	9	18	0,280956	11					0,2809201895	11	-2,499017433		0,71564								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test44xyz.dat			2989,155466	10	19	0,280961	10					0,2809080456	10	1,833286297		0,71595								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test46xyz.dat			2755,172695	15	30	0,281031	10					0,2809620938	10	-1,755399712		0,71570								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test47xyz.dat			2754,572149	9	18	0,281034	10					0,2809614288	10	-1,793175277		0,71569								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test48xyz.dat			2802,249187	13	27	0,281014	9					0,2809601217	9	-0,718794414		0,71577								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test49xyz.dat			3062,861073	9	18	0,280928	8					0,2808612142	8	1,908116925		0,71596								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test50xyz.dat			3032,992513	8	17	0,280859	8					0,2808179258	8	-0,339748917		0,71580								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test51xyz.dat			2791,921269	9	19	0,280988	6					0,2809272659	6	-2,131012492		0,71567								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test52xyz.dat			2683,498152	9	19	0,281002	6					0,2809607965	6	-3,484325708		0,71557								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test53xyz.dat			2795,844698	9	19	0,280999	5					0,2809494936	5	-1,247684658		0,71573								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test54xyz.dat			2685,660978	10	19	0,281015	7					0,2809517823	7	-3,754312873		0,71555								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test55xyz.dat			2916,15518	9	18	0,281021	8					0,2809435959	8	1,375913337		0,71592								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test56xyz.dat			2787,148528	10	20	0,281048	7					0,2809858399	7	-0,158679992		0,71581								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test57xyz.dat			2789,913641	10	19	0,280950	7					0,2809040062	7	-3,005999698		0,71561								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test58xyz.dat			2752,511213	15	30	0,280982	7					0,2809262472	7	-3,093557061		0,71560								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test59xyz.dat			2758,770675	9	18	0,281039	6					0,2809814578	6	-0,981764935		0,71575								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test60xyz.dat			2829,375396	9	17	0,280850	11					0,2808071745	11	-5,524183375		0,71543								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test61xyz.dat			2784,378041	9	18	0,280996	8					0,2809476612	8	-1,582540279		0,71571								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test62xyz.dat			3004,567171	10	20	0,280855	7					0,2807989721	7	-1,686336444		0,71570								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test63xyz.dat			2607,283117	9	19	0,281014	8					0,2808843951	8	-7,988457544		0,71525								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test64xyz.dat			2788,908766	9	18	0,280941	6					0,2809006739	6	-3,148220097		0,71560								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test65xyz.dat			2804,902347	13	25	0,280989	9					0,2809549585	9	-0,840138792		0,71576								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test66xyz.dat			2763,042188	9	18	0,280998	5					0,2809535075	5	-1,87602669		0,71569								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test67xyz.dat			2728,244524	10	19	0,281050	6					0,2809822232	6	-1,671672966		0,71570								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test68xyz.dat			2811,925899	10	19	0,281050	7					0,2809797934	7	0,208985992		0,71584								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-120220\test69xyz.dat			2722,99044	9	18	0,281095	7					0,2809801891	7	-1,867437188		0,71569								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-092934\test11xyz.dat			3212,667458	9	18	0,280675	9					0,2806495211	9	-2,08282677		0,71567								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-092934\test12xyz.dat			3543,243411	9	18	0,280595	8					0,2804962135	8	0,324433322		0,71585								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-092934\test13xyz.dat			2785,218151	9	18	0,280983	8					0,2809370687	8	-1,939758809		0,71568								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-092934\test14xyz.dat			2810,936436	11	23	0,280962	8					0,2809311095	8	-1,54697933		0,71571								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-092934\test15xyz.dat			2730,253478	11	22	0,281000	7					0,2809531871	7	-2,657705545		0,71563								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-092934\test16xyz.dat			2794,259931	10	21	0,280937	7					0,2808866728	7	-3,520685864		0,71557								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-092934\test17xyz.dat			3249,611342	10	20	0,280684	9					0,2806197958	9	-2,265023548		0,71566								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-092934\test18xyz.dat			3004,423239	9	18	0,280814	8					0,2807952578	8	-1,821991844		0,71569								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-092934\test19xyz.dat			1932,217249	11	22	0,281129	8					0,2810776693	8	-16,80334068		0,71462								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-092934\test20xyz.dat			3221,146822	8	17	0,280723	13					0,2806529172	13	-1,760657529		0,71570								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-092934\test21xyz.dat			3222,318757	8	17	0,280759	8					0,2806884996	8	-0,46522251		0,71579								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-092934\test22xyz.dat			3219,294403	8	17	0,280738	9					0,2806857049	9	-0,636556818		0,71578								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-092934\test23xyz.dat			3267,276834	9	17	0,280740	7					0,2806821799	7	0,377149865		0,71585								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-092934\test24xyz.dat			3317,477556	8	16	0,280693	7					0,2806210416	7	-0,608073058		0,71578								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-092934\test25xyz.dat			2802,166196	9	17	0,280945	9					0,2808934148	9	-3,094824411		0,71560								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-092934\test26xyz.dat			2834,982482	9	19	0,280933	9					0,2808956826	9	-2,242050025		0,71566								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-092934\test27xyz.dat			2835,874327	9	18	0,280997	8					0,2809563850	8	-0,06050949		0,71582								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-092934\test28xyz.dat			3157,26876	8	16	0,280914	9					0,2807790958	9	1,219136598		0,71591								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-092934\test29xyz.dat			2862,452457	9	19	0,280947	7					0,2809077043	7	-1,167402052		0,71574								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-092934\test30xyz.dat			3241,059476	9	17	0,280780	8					0,2807031108	8	0,500188973		0,71586								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-092934\test31xyz.dat			3213,72243	11	22	0,280726	11					0,2806592026	11	-1,712902334		0,71570								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-092934\test32xyz.dat			2911,398126	9	18	0,280948	7					0,2808933523	7	-0,524889064		0,71579								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-092934\test33xyz.dat			2995,325827	12	24	0,280840	9					0,2808005089	9	-1,849888015		0,71569								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-092934\test34xyz.dat			2775,611419	15	30	0,281000	11					0,2809524245	11	-1,619131502		0,71571								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-092934\test35xyz.dat			2833,440705	9	18	0,280948	8					0,2808997140	8	-2,13485061		0,71567								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-092934\test36xyz.dat			2972,691072	9	18	0,280938	8					0,2808593669	8	-0,28871349		0,71580								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-092934\test37xyz.dat			3012,67565	9	18	0,280979	10					0,2808902429	10	1,755124134		0,71595								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-092934\test38xyz.dat			2852,153206	12	24	0,280924	10					0,2808656935	10	-2,905267088		0,71562								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-092934\test39xyz.dat			3199,75762	9	19	0,280949	8					0,2807953401	8	2,805474599		0,71602								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-092934\test40xyz.dat			2844,037056	12	24	0,280913	8					0,2808631900	8	-3,18543538		0,71560								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-092934\test41xyz.dat			2842,98903	12	25	0,280959	7					0,2809068067	7	-1,657648286		0,71570								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-092934\test42xyz.dat			2963,312578	11	21	0,280979	7					0,2807542378	7	-4,253038565		0,71552								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-092934\test43xyz.dat			2748,552749	12	25	0,280929	9					0,2808826410	9	-4,738285132		0,71548								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-092934\test45xyz.dat			3324,258644	8	17	0,280711	7					0,2806449251	7	0,404250894		0,71585								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-092934\test46xyz.dat			2641,771232	17	33	0,281044	8					0,2809920174	8	-3,351963007		0,71558								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-092934\test48xyz.dat			2795,094239	10	21	0,280942	13					0,2808960110	13	-3,168728181		0,71560								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-092934\test49xyz.dat			2782,780466	9	19	0,281059	7					0,2809868235	7	-0,226395305		0,71581								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-092934\test50xyz.dat			2742,075099	11	21	0,281034	7					0,2809784720	7	-1,480304138		0,71572								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-092934\test52xyz.dat			2887,136159	9	18	0,280908	14					0,2808640207	14	-2,140879477		0,71567								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-092934\test53xyz.dat			3114,122215	8	17	0,280915	9					0,2808490528	9	2,688481903		0,71602								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-092934\test57xyz.dat			2966,864512	9	18	0,280807	7					0,2807266264	7	-5,152289156		0,71545								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-092934\test58xyz.dat			2967,529508	12	23	0,280932	8					0,2808335536	8	-1,329609397		0,71573								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-092934\test60xyz.dat			2898,737518	9	18	0,281034	10					0,2809101904	10	-0,223952582		0,71581								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test11xyz.dat			2805,150828	11	23	0,280853	9					0,2807438362	9	-8,348119854		0,71523								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test12xyz.dat			3245,068971	8	17	0,280839	10					0,2806135221	10	-2,596374815		0,71564								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test13xyz.dat			2865,234005	9	18	0,280706	8					0,2806530330	8	-10,16690429		0,71510								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test14xyz.dat			3022,94163	10	19	0,280956	9					0,2808938707	9	2,12695336		0,71598								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test15xyz.dat			3212,232827	13	25	0,280856	10					0,2807397104	10	1,119780886		0,71590								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test16xyz.dat			2869,277397	11	23	0,280933	8					0,2808774352	8	-2,084087884		0,71567								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test17xyz.dat			2975,925877	9	17	0,280861	9					0,2808037043	9	-2,194166773		0,71567								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test18xyz.dat			2976,366414	10	19	0,280988	9					0,2809337215	9	2,445401722		0,71600								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test19xyz.dat			2714,631762	15	30	0,280948	11					0,2809223032	11	-4,123404967		0,71553								

Soderlund et al., 2004 | 1 | Decay cst: **1=>1.867E-11**(Sodelund et al., 2004); **2=>1.93E-11**(Blichert-Toft et al., 1997)

Sample	Spot	Spot size	$^{207}Pb/^{206}Pb$ Age Ma	±1s	±2s	$^{176}Hf/^{177}Hf$	±1s	$^{176}Hf/^{177}Hf_{(Budget)}$	$^{176}Lu/^{177}Hf$	±1s	$^{176}Yb/^{177}Hf$	$^{176}Hf/^{177}Hf_T$	±s	eHf_T	±2s		T(DM)Ma	(±)	$T(DM)f_{felsic}$Ma	(±)	$T(DM)f_{mafic}$Ma	(±)	$^{176}Hf/^{177}Hf_{T\,CHUR}$	$^{176}Hf/^{177}Hf_{T\,DM}$
																			0.010		0.022			
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test20xyz.dat			2795,594589	10	19	0,280968	7					0,2809016123	7	-2,957619856		0,71561								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test21xyz.dat			2611,936038	14	29	0,281016	12					0,2809625371	12	-5,099719317		0,71546								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test22xyz.dat			2422,740416	18	35	0,281068	8					0,2810017902	8	-8,124975355		0,71524								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test23xyz.dat			2765,854397	12	24	0,280927	9					0,2808913851	9	-4,020659712		0,71554								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test24xyz.dat			2835,550085	12	24	0,281034	8					0,2809477017	8	-0,377200677		0,71580								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test25xyz.dat			2786,729103	19	37	0,281019	8					0,2809596416	8	-1,100898291		0,71574								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test26xyz.dat			2969,448858	13	25	0,280864	9					0,2807951133	9	-2,652924975		0,71563								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test27xyz.dat			2746,569392	11	22	0,280991	11					0,2809479982	11	-2,459128193		0,71565								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test28xyz.dat			2872,282659	10	19	0,280823	10					0,2807748220	10	-5,665872429		0,71542								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test29xyz.dat			2759,711505	15	30	0,281027	9					0,2809384549	9	-2,489960031		0,71564								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test30xyz.dat			2715,690296	10	20	0,280960	8					0,2809177003	8	-4,262341958		0,71552								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test31xyz.dat			2765,173158	13	25	0,280938	9					0,2808999473	9	-3,731967056		0,71556								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test32xyz.dat			2730,777088	15	30	0,280946	11					0,2809014840	11	-4,48519748		0,71550								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test33xyz.dat			3274,126663	13	26	0,281032	10					0,2809507687	10	10,10955373		0,71655								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test34xyz.dat			3220,097418	15	30	0,281018	7					0,2808660844	7	5,808490259		0,71624								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test35xyz.dat			3223,551317	14	27	0,281040	6					0,2809363406	6	8,3933969		0,71642								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test36xyz.dat			2726,407792	17	34	0,281048	9					0,2809498899	9	-2,865334853		0,71562								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test37xyz.dat			2801,585124	14	28	0,281123	9					0,2810400941	9	2,111770629		0,71597								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test38xyz.dat			2865,234005	26	52	0,281124	11					0,2810395279	11	3,590364688		0,71608								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test39xyz.dat			2681,602993	15	31	0,280973	9					0,2809334434	9	-4,501995456		0,71550								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test40xyz.dat			2390,60183	17	34	0,281068	8					0,2809734962	8	-9,880145836		0,71512								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test41xyz.dat			3745,204715	17	34	0,280993	11					0,2809038224	11	19,7010402		0,71723								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test42xyz.dat			2922,193565	18	37	0,280723	8					0,2806798375	8	-7,871393751		0,71526								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test43xyz.dat			2593,233174	15	30	0,281143	9					0,2809689366	9	-5,309985088		0,71544								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test44xyz.dat			2691,143493	9	19	0,281292	8					0,2810068644	8	-1,66585028		0,71570								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test45xyz.dat			2659,121959	14	29	0,281014	8					0,2809733388	8	-3,609758462		0,71556								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test46xyz.dat			2915,772137	35	70	0,280988	8					0,2809317141	8	0,943894922		0,71589								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test47xyz.dat			2820,882172	9	17	0,281100	10					0,2810181581	10	1,785195218		0,71595								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test48xyz.dat			2779,579935	14	29	0,280947	9					0,2809084681	9	-3,090144859		0,71560								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test49xyz.dat			2743,718885	22	45	0,280963	11					0,2809132034	11	-3,764255636		0,71555								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test50xyz.dat			2137,423435	14	29	0,281221	7					0,2810354421	7	-13,56043235		0,71485								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test51xyz.dat			2991,118382	11	23	0,280834	7					0,2807920021	7	-2,25213329		0,71566								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test52xyz.dat			2679,705322	13	25	0,280965	11					0,2809252729	11	-4,837206199		0,71548								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test53xyz.dat			2709,681542	13	25	0,280965	9					0,2809320941	9	-3,891212373		0,71554								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test54xyz.dat			2656,459184	13	26	0,281162	9					0,2811286170	9	1,852222504		0,71596								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test55xyz.dat			2917,150607	13	25	0,281154	8					0,2810224189	8	4,205434874		0,71612								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test56xyz.dat			2720,883385	13	26	0,280978	7					0,2809152399	7	-4,227989542		0,71552								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test57xyz.dat			2690,515418	12	23	0,280946	7					0,2808990309	7	-5,517341218		0,71543								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test58xyz.dat			3140,76979	17	35	0,280727	7					0,2806620554	7	-3,34064087		0,71558								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test59xyz.dat			3270,259137	11	21	0,280700	6					0,2806506569	6	-0,675132562		0,71577								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test60xyz.dat			3170,189219	16	32	0,281000	7					0,2809019860	7	5,902877353		0,71625								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test61xyz.dat			3434,927618	15	30	0,280976	8					0,2809113212	8	12,53517231		0,71672								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test62xyz.dat			2721,234777	63	126	0,280983	12					0,2809246039	12	-3,88654469		0,71555								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test63xyz.dat			2742,421316	14	29	0,280957	153					0,2809252302	153	-3,366760664		0,71558								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test64xyz.dat			2967,381758	12	25	0,280948	24					0,2809159584	24	1,600802665		0,71594								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test65xyz.dat			2942,338338	24	48	0,281037	8					0,2809659142	8	2,788183812		0,71602								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test66xyz.dat			2991,626841	14	28	0,281010	10					0,2808422985	10	-0,449295216		0,71579								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test67xyz.dat			2718,421221	13	27	0,281183	10					0,2811377829	10	3,632884799		0,71608								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test68xyz.dat			2654,343804	16	32	0,281225	10					0,2811344196	10	2,009043699		0,71597								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test69xyz.dat			2822,437607	14	29	0,280945	9					0,2809082446	9	-2,090160861		0,71567								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-164813\test70xyz.dat			2814,06738	26	52	0,280923	7					0,2808726936	7	-3,552377185		0,71557								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-150248\test11xyz.dat			1951,8965	10	20	0,281057	10					0,2810213317	10	-18,35049386		0,71451								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-150248\test12xyz.dat			3262,61173	10	20	0,280777	9					0,2806683008	9	-0,228164282		0,71581								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-150248\test13xyz.dat			3192,785755	11	21	0,280716	10					0,2806463806	10	-2,66626049		0,71563								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-150248\test14xyz.dat			2629,64936	9	18	0,281015	7					0,2809507084	7	-5,105613254		0,71546								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-150248\test15xyz.dat			2013,419709	10	21	0,281035	7					0,2809774123	7	-18,49057437		0,71450								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-150248\test16xyz.dat			2902,454767	11	23	0,281004	7					0,2809641569	7	1,784778563		0,71595								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-150248\test17xyz.dat			2885,336869	10	21	0,280993	6					0,2809531345	6	0,988879133		0,71589								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-150248\test18xyz.dat			1947,113505	10	19	0,281191	6					0,2811508108	6	-13,86187276		0,71483								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-150248\test19xyz.dat			1998,169543	10	20	0,281095	7					0,2810533142	7	-16,14646323		0,71467								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-150248\test20xyz.dat			3004,783043	10	19	0,280873	7					0,2807597553	7	-3,07761684		0,71560								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-150248\test21xyz.dat			3011,74518	12	24	0,280837	7					0,2807351110	7	-3,790689579		0,71555								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-150248\test22xyz.dat			2707,732113	30	60	0,280907	6					0,2808689675	6	-6,183121855		0,71538								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-150248\test23xyz.dat			3230,372412	8	17	0,280709	6					0,2806412971	6	-1,955694639		0,71568								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-150248\test24xyz.dat			1982,028983	10	20	0,281062	7					0,2810220346	7	-17,63024133		0,71456								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-150248\test25xyz.dat			2483,810715	9	18	0,280868	7					0,2808424318	7	-12,36713707		0,71494								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-150248\test26xyz.dat			1996,867416	11	22	0,281024	7					0,2809694981	7	-19,15392388		0,71445								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-150248\test27xyz.dat			2457,13915	9	18	0,281061	7					0,2810206581	7	-6,651545184		0,71535								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-150248\test29xyz.dat			3039,396174	9	18	0,280830	#DIV/0!					0,2807807223	#DIV/0!	-1,513165192		0,71571								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-150248\test30xyz.dat			3109,586976	16	32	0,280816	9					0,2807800490	9	0,123458768		0,71583								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-150248\test31xyz.dat			1935,993131	9	19	0,281008	8					0,2809638986	8	-20,75715987		0,71434								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-150248\test32xyz.dat			1916,405211	9	19	0,281082	9					0,2810442433	9	-18,35506801		0,71451								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-150248\test33xyz.dat			2816,862927	8	17	0,280907	8					0,2808490997	8	-4,326345997		0,71551								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-150248\test34xyz.dat			2006,821101	9	19	0,281126	7					0,2810822000	7	-14,92051692		0,71476								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-150248\test35xyz.dat			2060,741015	9	18	0,281165	8					0,2811245086	8	-12,17099913		0,71495								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-150248\test36xyz.dat			2776,034127	11	22	0,280926	9					0,2808795063	9	-4,204168384		0,71552								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-150248\test37xyz.dat			2792,924023	10	19	0,280977	9					0,2809189005	9	-2,405145368		0,71565								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-150248\test38xyz.dat			2771,716616	16	32	0,280897	7					0,2808166216	7	-6,543522234		0,71535								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-150248\test39xyz.dat			2989,155466	12	24	0,280933	10					0,2808145702	10	-1,494938515		0,71572								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-150248\test40xyz.dat			2686,021132	17	35	0,280929	8					0,2808824051	8	-6,214303018		0,71538								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-150248\test41xyz.dat			2790,750496	9	19	0,280988	9					0,2809293794	9	-2,083325542		0,71567								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-150248\test42xyz.dat			1960,971378	9	19	0,281010	10					0,2809653986	10	-20,1278905		0,71438								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-150248\test43xyz.dat			2020,131353	10	19	0,281171	9					0,2811415201	9	-12,50565746		0,71493								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-150248\test44xyz.dat			2011,414566	9	19	0,281125	7					0,2810858648	7	-14,68421136		0,71477								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-150248\test45xyz.dat			2275,624934	16	33	0,281042	9					0,2810024468	9	-11,52636594		0,71500								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-150248\test46xyz.dat			2438,224993	10	20	0,281041	7					0,2809984626	7	-7,882151745		0,71526								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-150248\test47xyz.dat			2643,534336	9	19	0,281039	9					0,2809931708	9	-3,269606513		0,71559								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-150248\test48xyz.dat			3057,880464	9	18	0,280819	8					0,2807672572	8	-1,555625783		0,71571								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-150248\test49xyz.dat			2799,507931	10	20	0,280973	8					0,2809007164	8	-2,897478964		0,71562								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-150248\test50xyz.dat			2687,280956	12	24	0,281023	7					0,2809878357	7	-2,433528913		0,71565								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-150248\test51xyz.dat			2712,335577	10	21	0,281025	7					0,2809845563	7	-1,96220224		0,71568								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-150248\test52xyz.dat			1829,043539	30	59	0,281023	7					0,2809943638	7	-22,13779718		0,71424								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-150248\test53xyz.dat			3029,108045	10	21	0,280844	6					0,2807712582	6	-2,093341702		0,71567								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-150248\test54xyz.dat			1978,662321	10	20	0,281158	6					0,2811075522	6	-14,6702469		0,71477								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test11xyz.dat			2783,116946	10	20	0,282462	6					0,2824604532	6	52,22517072		0,71956								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test12xyz.dat			2868,247821	13	27	0,282497	6					0,2824953704	6	55,48241013		0,71979								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test13xyz.dat			2896,098564	10	19	0,282506	7					0,2825042803	7	56,45953185		0,71986								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test15xyz.dat			2816,369994	9	18	0,281018	7					0,2809650105	7	-0,212576369		0,71581								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test16xyz.dat			2852,794094	9	18	0,281015	6					0,2809701623	6	0,828274563		0,71588								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test17xyz.dat			1978,369204	9	19	0,280953	7					0,2809108731	7	-21,66332256		0,71427								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test18xyz.dat			1577,228656	10	21	0,280993	7					0,2809558199	7	-29,27998512		0,71373								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test19xyz.dat			3321,561641	9	19	0,280905	7					0,2808695405	7	8,343919585		0,71642								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test20xyz.dat			2743,459466	11	22	0,280890	9					0,2808646003	9	-5,499878573		0,71543								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test21xyz.dat			2827,909037	9	18	0,281015	7					0,2809403766	7	-0,817772587		0,71576								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test22xyz.dat			2886,354139	9	17	0,280964	7					0,2808943488	7	-1,079723762		0,71575								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test23xyz.dat			3293,24709	10	20	0,280633	6					0,2805751293	6	-2,820008075		0,71562								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test24xyz.dat			2752,339334	13	26	0,280911	7					0,2808562927	7	-5,586963054		0,71542								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test25xyz.dat			2733,827663	9	18	0,280915	6					0,2808482743	6	-6,306982128		0,71537								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test26xyz.dat			2874,335234	9	18	0,280938	8					0,2808641540	8	-2,437703301		0,71565								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test27xyz.dat			2886,197684	9	19	0,280767	9					0,2806886144	9	-8,406880567		0,71522								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test28xyz.dat			3094,813315	14	29	0,280961	7					0,2807912124	7	0,17128959		0,71584								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test29xyz.dat			2805,813231	9	18	0,280916	8					0,2808262525	8	-5,399354309		0,71544								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test30xyz.dat			3072,975551	10	20	0,280937	8					0,2808815256	8	2,870778942		0,71603								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test31xyz.dat			3264,647146	11	21	0,280911	7					0,2808614457	7	6,701668171		0,71630								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test32xyz.dat			2843,311582	9	18	0,280859	7					0,2807552220	7	-7,04542913		0,71532								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test33xyz.dat			3289,490851	10	20	0,280967	8					0,2808974265	8	8,574415936		0,71644								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test34xyz.dat			2907,550139	10	20	0,280867	7					0,2807828670	7	-4,54872177		0,71550								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test35xyz.dat			2877,802081	10	21	0,280876	7					0,2807783049	7	-5,411924743		0,71544								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test36xyz.dat			3290,900622	12	25	0,280896	7					0,2808399539	7	6,560154571		0,71629								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test37xyz.dat			3238,380096	9	18	0,280712	6					0,2806537699	6	-1,321266568		0,71573								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test38xyz.dat			3240,207501	9	19	0,280968	8					0,2808732822	8	6,54257867		0,71629								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test39xyz.dat			3233,250659	12	24	0,280977	6					0,2808943363	6	7,127381905		0,71633								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test40xyz.dat			2826,930625	12	24	0,280681	8					0,2805939418	8	-13,17102303		0,71488								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test41xyz.dat			2776,372203	10	21	0,280673	8					0,2805840873	8	-14,7094511		0,71477								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test42xyz.dat			2768,066179	10	20	0,280883	7					0,2807408858	7	-9,324477565		0,71516								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test43xyz.dat			2895,943178	9	18	0,280844	5					0,2806992490	5	-7,798815355		0,71526								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test44xyz.dat			3258,411834	12	23	0,280958	6					0,2808943687	6	7,726443844		0,71638								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test45xyz.dat			2977,540511	11	23	0,280982	7					0,2809276240	7	2,256033025		0,71598								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test46xyz.dat			1936,294785	10	21	0,280973	7					0,2809341890	7	-21,80542661		0,71426								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test47xyz.dat			1879,571034	11	22	0,280927	7					0,2809044199	7	-24,16928115		0,71409								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test48xyz.dat			2828,316511	14	27	0,280762	7					0,2806473821	7	-11,23640358		0,71502								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test49xyz.dat			2800,172962	10	21	0,280862	7					0,2807415971	7	-8,544816529		0,71521								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test50xyz.dat			2795,344436	13	25	0,281204	6					0,2811189307	6	4,770665995		0,71616								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test51xyz.dat			2849,988074	11	23	0,281188	8					0,2811226857	8	6,191058517		0,71627								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test52xyz.dat			2707,732113	10	20	0,280969	7					0,2809247438	7	-4,198500826		0,71552								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test53xyz.dat			3006,221343	10	20	0,280899	8					0,2808653016	8	0,714519466		0,71587								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test54xyz.dat			2946,318166	10	19	0,280889	7					0,2808416925	7	-1,540393508		0,71571								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test55xyz.dat			2825,053452	12	24	0,280889	7					0,2808499691	7	-4,102725701		0,71553								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test56xyz.dat			3253,536194	10	20	0,280871	8					0,2808194589	8	4,94169342		0,71618								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test57xyz.dat			2929,345143	11	22	0,280767	8					0,2807437916	8	-5,426060157		0,71543								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test58xyz.dat			2858,150219	11	22	0,280781	8					0,2807580822	8	-6,594425659		0,71535								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test59xyz.dat			2820,390629	10	20	0,280911	7					0,2808776279	7	-3,228012698		0,71559								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test60xyz.dat			2782,528053	11	23	0,280651	7					0,2805858028	7	-14,50386598		0,71478								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test61xyz.dat			3277,272301	12	23	0,280910	7					0,2808533987	7	6,715111596		0,71630								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test62xyz.dat			2769,000901	18	36	0,280925	6					0,2808796697	6	-4,363638252		0,71551								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test63xyz.dat			3058,226908	9	18	0,280939	7					0,2808885782	7	2,772951068		0,71602								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test64xyz.dat			2767,30095	10	20	0,280911	6					0,2808640923	6	-4,957932408		0,71547								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test65xyz.dat			2767,30095	10	20	0,280954	8					0,2807605489	8	-8,642703746		0,71520								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-130943\test66xyz.dat			3237,83141	11	21	0,280910	8					0,2807364895	8	1,612704274		0,71594								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-102727\test11xyz.dat			3032,428163	10	20	0,280866	7					0,2807766378	7	-1,823311442		0,71569								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150701-102727\test12xyz.dat			3124,339528	8	17	0,280905	6					0,2808296941	6	2,241027015		0,71598								

Sukrland et al., 2004 — Decay cst: λ_{176Lu}=1.867E-11(Soderlund et al., 2004); λ_{147Sm}=1.35E-11(Blichert-Toft et al., 1997)

Sample	Spot	Spot size	$^{207}Pb_c/^{206}Pb$ Age Ma	±1s	±2s	$^{176}Hf/^{177}Hf$	±1s	$^{176}Hf/^{177}Hf_{(t=Age)}$	$^{176}Lu/^{177}Hf$	±1s	$^{176}Yb/^{177}Hf$	$^{176}Hf/^{177}Hf_i$	±s	εHf_i	±2s	$T(DM)Ma$	(s)	$T(DM)^{C}_{woodMa}$	(s)	$T(DM)^{C}_{ondMa}$	(s)	$^{176}Hf/^{177}Hf_{CHUR}$	$^{176}Hf/^{177}Hf_{TOR}$
																		0,28318		0,28282			
Filename: C:\Neptune\User\Neptune\DataLu-Hf 2400\newn2_20150701-1027\27nm13xyz.dat			3571,059463	8	16	0,280463	7					0,2804235216	7	-1,55487823		0,71571							
Filename: C:\Neptune\User\Neptune\DataLu-Hf 2400\newn2_20150701-1027\27nm14xyz.dat			3563,813393	8	17	0,280444	6					0,2804096142	6	-2,27129889		0,71586							
Filename: C:\Neptune\User\Neptune\DataLu-Hf 2400\newn2_20150701-1027\27nm15xyz.dat			3396,695043	16	33	0,280752	6					0,2806815211	6	-1,0845456136		0,71575							
Filename: C:\Neptune\User\Neptune\DataLu-Hf 2400\newn2_20150701-1027\27nm16xyz.dat			2747,604531	11	21	0,280975	6					0,2805388571	6	-3,0447739143		0,71561							
Filename: C:\Neptune\User\Neptune\DataLu-Hf 2400\newn2_20150701-1027\27nm17xyz.dat			2785,218151	10	20	0,280983	6					0,2805222848	6	-2,4658960668		0,71565							
Filename: C:\Neptune\User\Neptune\DataLu-Hf 2400\newn2_20150701-1027\27nm18xyz.dat			2797,843892	10	20	0,280921	6					0,2806900807	6	-3,3156591691		0,71559							
Filename: C:\Neptune\User\Neptune\DataLu-Hf 2400\newn2_20150701-1027\27nm19xyz.dat			2722,814971	10	19	0,280901	7					0,2805713870	7	-5,7459111345		0,71541							
Filename: C:\Neptune\User\Neptune\DataLu-Hf 2400\newn2_20150701-1027\27nm20xyz.dat			3500,307594	9	17	0,280547	8					0,2804435374	8	-2,5798493676		0,71564							
Filename: C:\Neptune\User\Neptune\DataLu-Hf 2400\newn2_20150701-1027\27nm21xyz.dat			3270,199553	10	19	0,280721	7					0,2805484984	7	-0,7534528943		0,71577							
Filename: C:\Neptune\User\Neptune\DataLu-Hf 2400\newn2_20150701-1027\27nm22xyz.dat			3501,446154	8	17	0,280445	7					0,2804183954	7	-2,618232229		0,71568							
Filename: C:\Neptune\User\Neptune\DataLu-Hf 2400\newn2_20150701-1027\27nm23xyz.dat			3542,067133	8	17	0,280484	7					0,2804568164	7	-1,1082630994		0,71574							
Filename: C:\Neptune\User\Neptune\DataLu-Hf 2400\newn2_20150701-1027\27nm24xyz.dat			3072,975551	13	25	0,280718	7					0,2806357766	7	-5,0893935582		0,71548							
Filename: C:\Neptune\User\Neptune\DataLu-Hf 2400\newn2_20150701-1027\27nm25xyz.dat			3061,341884	8	17	0,280843	7					0,2807548328	7	-1,9447298621		0,71568							
Filename: C:\Neptune\User\Neptune\DataLu-Hf 2400\newn2_20150701-1027\27nm26xyz.dat			3027,480459	9	17	0,280844	6					0,2807461954	6	-3,0242533735		0,71561							
Filename: C:\Neptune\User\Neptune\DataLu-Hf 2400\newn2_20150701-1027\27nm28xyz.dat			2780,170946	10	20	0,281036	6					0,2810038589	6	0,3184759004		0,71585							
Filename: C:\Neptune\User\Neptune\DataLu-Hf 2400\newn2_20150701-1027\27nm29xyz.dat			2792,604858	11	23	0,281001	7					0,2809316343	7	-1,9735810346		0,71568							
Filename: C:\Neptune\User\Neptune\DataLu-Hf 2400\newn2_20150701-1027\27nm30xyz.dat			3568,199046	8	17	0,280573	6					0,2804261398	6	-1,5785331696		0,71571							
Filename: C:\Neptune\User\Neptune\DataLu-Hf 2400\newn2_20150701-1027\27nm31xyz.dat			3409,326934	9	19	0,280618	6					0,2805077841	6	-0,3198561154		0,71580							
Filename: C:\Neptune\User\Neptune\DataLu-Hf 2400\newn2_20150701-1027\27nm32xyz.dat			3251,665712	9	18	0,280595	7					0,2805486813	7	-0,7498826885		0,71548							
Filename: C:\Neptune\User\Neptune\DataLu-Hf 2400\newn2_20150701-1027\27nm33xyz.dat			3042,832311	10	20	0,280825	6					0,2807883099	6	-1,1617403371		0,71574							
Filename: C:\Neptune\User\Neptune\DataLu-Hf 2400\newn2_20150701-1027\27nm34xyz.dat			3034,191859	10	19	0,280812	7					0,2807587233	7	-2,4195677776		0,71565							
Filename: C:\Neptune\User\Neptune\DataLu-Hf 2400\newn2_20150701-1027\27nm35xyz.dat			3211,948778	11	22	0,280689	6					0,2806383784	6	-2,2588669046		0,71566							
Filename: C:\Neptune\User\Neptune\DataLu-Hf 2400\newn2_20150701-1027\27nm36xyz.dat			3310,142348	11	21	0,280683	5					0,2806476386	5	0,1652382376		0,71584							
Filename: C:\Neptune\User\Neptune\DataLu-Hf 2400\newn2_20150701-1027\27nm37xyz.dat			2981,349613	10	20	0,280875	6					0,2807719458	8	-3,2289524494		0,71559							
Filename: C:\Neptune\User\Neptune\DataLu-Hf 2400\newn2_20150701-1027\27nm38xyz.dat			3082,313368	10	19	0,280873	7					0,2807699048	7	-0,6467347351		0,71578							
Filename: C:\Neptune\User\Neptune\DataLu-Hf 2400\newn2_20150701-1027\27nm39xyz.dat			2770,164784	12	24	0,280968	7					0,2809259945	7	-2,699814275		0,71563							
Filename: C:\Neptune\User\Neptune\DataLu-Hf 2400\newn2_20150701-1027\27nm40xyz.dat			2770,164784	12	24	0,280970	6					0,2809241900	6	-2,7533546634		0,71563							

											Soderlund et al., 2004	1	Decay cst: **1**=>**1.867E-11**(Sodeland et al., 2004); **2**=>**1.93E-11**(Blichert-Toft et al., 1997)						
Sample	Spot	Spot size	$^{207}Pb/^{206}Pb$ **Age Ma**	±1s	±2s	$^{176}Hf/^{177}Hf$	±1s	$^{176}Hf/^{177}Hf_{(fudge)}$	$^{176}Lu/^{177}Hf$	±1s	$^{176}Yb/^{177}Hf$	$^{176}Hf/^{177}Hf_T$	±s	eHf_T	±2s	**T(DM)Ma**	(±)	**T(DM) $^{c}_{felsic}$M**	(±)	**T(DM) $^{c}_{mafic}$M**	(±)	$^{176}Hf/^{177}H$ $f_{T\,CHUR}$	$^{176}Hf/^{177}H$ $f_{T\,DM}$
																		0,010		**0,022**			
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-133853\test11xyz.dat			3064,2	8	16	0,281034	8					0,2808465326	8	1,417941018	0,71592								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-133853\test12xyz.dat			3037,3	8	17	0,281046	9					0,2808879645	9	2,255840643	0,71598								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-133853\test13xyz.dat			3060,16543	9	17	0,281005	9					0,2808772533	9	2,415519084	0,71600								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-133853\test14xyz.dat			2917,76283	10	20	0,280977	10					0,2809407011	10	1,310777702	0,71592								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-133853\test15xyz.dat			2687,3709	10	20	0,281034	9					0,2809548049	9	-3,606657332	0,71557								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-133853\test16xyz.dat			2687,19101	9	17	0,280988	10					0,2809500454	10	-3,780220325	0,71555								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-133853\test17xyz.dat			2657,19424	10	21	0,281076	9					0,2809750731	9	-3,593253478	0,71557								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-133853\test18xyz.dat			2651,85654	13	26	0,281004	9					0,2809585475	9	-4,306319494	0,71551								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-133853\test19xyz.dat			2853,91495	10	20	0,280948	7					0,2808680366	7	-2,780392029	0,71562								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-133853\test20xyz.dat			2918,14534	8	17	0,280956	9					0,2809180755	9	0,514339913	0,71586								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-133853\test21xyz.dat			2631,42743	14	28	0,281026	9					0,2809619366	9	-4,66450698	0,71549								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-133853\test22xyz.dat			2780,25433	9	18	0,280967	8					0,2809340088	8	-2,165353853	0,71567								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-133853\test23xyz.dat			3140,57376	10	19	0,280852	9					0,2808185443	9	2,228555921	0,71598								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-133853\test24xyz.dat			2669,81488	9	19	0,280988	10					0,2809580322	10	-3,903611243	0,71554								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-133853\test25xyz.dat			2755,51575	9	18	0,280985	8					0,2809398463	8	-2,539035413	0,71564								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-133853\test26xyz.dat			3110,05451	9	18	0,280897	10					0,2808032536	10	0,96097633	0,71589								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-133853\test27xyz.dat			2863,96312	12	23	0,280847	9					0,2808051081	9	-4,783717681	0,71548								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-133853\test28xyz.dat			2800,17296	10	20	0,280953	8					0,2808889552	8	-3,300413262	0,71559								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-133853\test29xyz.dat			2688,18015	20	39	0,281112	9					0,2809247952	9	-4,655421524	0,71549								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-133853\test30xyz.dat			2706,57893	9	19	0,281007	9					0,2809603744	9	-2,957766259	0,71561								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-133853\test31xyz.dat			2928,35824	11	22	0,281053	10					0,2810028137	10	3,771927133	0,71609								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-133853\test32xyz.dat			2813,32646	9	18	0,280945	8					0,2809068926	8	-2,35264378	0,71565								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-133853\test33xyz.dat			2892,98762	9	19	0,280956	7					0,2809261242	7	0,207716134	0,71584								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-133853\test34xyz.dat			3176,95547	13	27	0,280875	9					0,2807967073	9	2,31324606	0,71599								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-133853\test35xyz.dat			3200,32139	8	17	0,280789	9					0,2806900901	9	-0,930485068	0,71576								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-133853\test36xyz.dat			2780,84416	10	20	0,281006	7					0,2809538071	7	-1,446907264	0,71572								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-133853\test37xyz.dat			2815,46584	11	21	0,281057	9					0,2809967890	9	0,89716907	0,71589								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-133853\test38xyz.dat			2788,15464	9	18	0,280974	9					0,2809108281	9	-2,804575949	0,71562								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-133853\test39xyz.dat			2785,05017	9	18	0,281059	7					0,2809908488	7	-0,029769059	0,71582								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-133853\test40xyz.dat			2785,72198	11	21	0,281004	7					0,2809632894	7	-0,994761216	0,71575								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-133853\test41xyz.dat			2781,01264	9	18	0,281014	8					0,2809686340	8	-0,915290891	0,71576								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-133853\test42xyz.dat			2855,11489	11	23	0,280678	10					0,2806536622	10	-10,38260542	0,71508								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-133853\test43xyz.dat			2164,40059	11	23	0,281256	14					0,2812191148	14	-6,408130401	0,71536								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-133853\test44xyz.dat			2531,11214	14	29	0,281251	11					0,2811902697	11	1,109020926	0,71590								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-133853\test45xyz.dat			2259,86586	11	22	0,281159	9					0,2811486189	9	-6,696905103	0,71534								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-133853\test46xyz.dat			2199,48675	13	26	0,281173	12					0,2811557240	12	-7,846786826	0,71526								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-133853\test47xyz.dat			2620,44311	10	20	0,280908	7					0,2808573069	7	-8,643982925	0,71520								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-133853\test48xyz.dat			2837,08958	10	20	0,281563	9					0,2813531606	9	14,09037365	0,71683								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-133853\test49xyz.dat			2225,84714	11	21	0,280942	13					0,2809176924	13	-15,69481226	0,71470								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-133853\test50xyz.dat			2793,42514	10	21	0,280941	7					0,2809155597	7	-2,512259496	0,71564								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-133853\test51xyz.dat			2769,68032	9	19	0,280981	6					0,2809468598	6	-1,956579269	0,71568								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-133853\test52xyz.dat			2818,997	10	19	0,280991	6					0,2809575348	6	-0,41682583	0,71579								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-133853\test53xyz.dat			2823,66438	10	19	0,280955	6					0,2809130842	6	-1,889045478	0,71569								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-133853\test54xyz.dat			2567,35699	9	19	0,281090	6					0,2810786065	6	-2,014580493	0,71568								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-133853\test55xyz.dat			2411,67098	10	19	0,281139	7					0,2811303462	7	-3,811991743	0,71555								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-133853\test56xyz.dat			2824,1548	10	20	0,281003	6					0,2809570013	6	-0,314430104	0,71580								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-133853\test57xyz.dat			2863,64522	9	17	0,280875	9					0,2808393461	9	-3,572508286	0,71557								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-133853\test58xyz.dat			2835,79327	9	19	0,281047	7					0,2809949519	7	1,310275659	0,71592								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-133853\test59xyz.dat			2957,52162	8	17	0,281005	7					0,2809365587	7	2,101451799	0,71597								
Filename: C:\Neptune\User\Neptune\Data\Lu-Hf 2406\teste2_20150702-133853\test60xyz.dat			2884,16219	9	18	0,281002	10					0,2809465517	10	0,726868085	0,71588								

ANEXO 4

TABELA EVOLUÇÃO QUADRILÁTERO FERRÍFRO

Table 4: Summary table indicating the main characteristics of the eastern and northern sectors. These reflect the tectonic environment of their formation portrayed in Figure 19.

Cycles (Baltazar and Zucchetti, 2007)	Enviroment	Sediment source				Sediment timming		Implications to gold mineralization
		Associated minerals	Geochemistry	Lu-Hf	LA-ICP-MS on sulfide minerals	Archean U-Pb geochronology	Proterozoic U-Pb geochronology	
C Córrego do Sítio lineament	Clastic-chemical-sedimentary association+turbidites	Quartz-ankerite-arsenopyrite-pyrite-pyrrhotite, free gold, berthierite, stibnite, sphalerite, cobaltite, cinnabar, tetrahedrite, boulangerite-group minerals and ullmanite.	Major and trace elements suggest mixture of felsic and mafic rock sources, with a higher proportion of mafic inheritance.	Zircon grains record mainly reworked crustal εHft values with minor juvenile εHft values.	Large variety of ore minerals including sulfides and sulfosalts that contain Sb, Pb, Hg, As, Zn, Cu, as well as Ni and Co Pt. This seems to reflect a variety in the source to the sediments - mixed and felsic rocks.	Rocks of Rio das Velhas II (2800-2770 Ma) and mainly Mamona (2760-2680 Ma) events considered to be significant sources of zircons. Santa Bárbara (3220-3200 Ma) event perseveres and is more persistent than in northern sector.	Paleoproterozoic record is present in all deposits and are best recorded for the Carvoaria deposit.	Mixed source of host rocks may have facilitated sulfidation reactions, and consequently enhanced gold precipitation, since sediments in eastern sector were probably more prone to form sulfide minerals.
E Cuiabá-Lamego area	Volcaniclastic association Resedimented association	Gold-rich zones are related to iron-rich bands of BIF and silicification zones, with pyrite, As-pyrite, and arsenopyrite.	Major and trace elements suggest mixture of felsic and mafic rock sources, with a smaller proportion of mafic inheritance.	Zircon grains have negative εHf values indicating consistent derivation from reworked crustal sources.	–	Rocks of the Rio das Velhas II (2800-2770 Ma) and mainly Mamona (2760-2680 Ma) events considered to be significant sources of zircons.	Paleoproterozoic record is present and more important than the eastern sector; best recorded at the Lamego deposit.	Gold in carbonaceous pelite pyrite displays excellent affinity with crustal elements such as Bi, Pb and Sb; good correlation is also observed with Ni, Co, Cu, Ag and Te.