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ARCHAEAN TONALJTIC-TRONDHJEMITIC AND GRANITIC PLUTONISM IN THE GAVIÃO BLOCK, SAG FRANCISCO CRATON, BAHIA, BRAZIL: GEOCHEMICAL AND GEOCHRONOLOGICAL CHARACTERISTICS

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RESUMO PLUTONISMO TONALÍTICO-TRONDHJEMÍTICO E GRANÍTICO ARQUEANO NO BLOCO DO GAVIÃO, CRATON DO SÃO FRANCISCO, BAHIA, BRASIL: ENSAIO GEOQUÍMICO E GEOCRONOLÓGICO Os terrenes granito-gnaissicos do Bloco do Gavião (BG) objeto do presente trabalho, representam a maior exposição do embasamento arqueano do Craton do São Francisco, sendo portanto, uma area-chave para o entendimento da evolução da crosta primitiva da plataforma Sul-Americana. As rochas granfticas e gndissicas estao intimamente associadas com os greenstone belts de Umburanas e Contendas Mirante. O grau metamorfico destes terrenes varia de xisto verde a anfibolito. De outra parte, estas rochas foram intensamente deformadas e intrudidas por granites durante o Arqueano e Paleoproterozoico. A evolução primitiva do Bloco do Gavião é marcada pela formação de niicleos granitoides, a partir de vários episódios de plutonismo TTG com idades variando entre 3,2 e 3,4 Ga. As idades modelo Sm-Nd nestes granitbides variam entre 3,2 e 3,6 Ga, indicando o envolvimento de crosta sidlica na gênese destas rochas, conforme corroborado pelos $\varepsilon_{Nd}(t)$ negatives entre -4.0 e -1.3. Entre 3,1 e 2,5 Ga, atividades vulcanicas e sedimentares atingiram o Bloco do Gavião com a formafao dos greenstone belts de Umburanas e Contendas Mirante. Finalmente, a evolução arqueana é representada por intrusão de granitdides ha cerca de 2,8 e 2,5 Ga. Durante o Paleoproterozóico, o Bloco Gavião foi deformado e metamorfisado regionalmente e intrudido por granites com idades entre 2,1 e 1,9 Ga. Durante o Meso e Neoproterozoico, atividades tectono-metamdrficas estiveram presentes neste segmento de crosta arqueana promovendo a intruSão de diques maficos e o rejuvenescimento isotopico das idades K-Ar e Rb-Sr.

Palavras-chave: Geoquimica, geocronologia, Arqueano

ABSTRACT The granitic-gneissic terranes of the Gavião Block in the central-southern São Francisco Craton are a key area to the understanding of the Archaean evolution of the South American Platform. The Archaean granitic-gneissic rocks are intimately associated with the Umburanas and Contendas Mirante greenstone belts. The metamorphic grades vary from greenschist to amphibolite facies. These rocks were intensely deformed and intruded by Paleoproterozoic granites. The main evolution of the Gavião Block is marked by the formation of granitoid nuclei during various episodes of TTG plutonism between 3.2 and 3.4 Ga. The T_{DM} Sm-Nd model ages for these granitoids range from 3.2 and 3.6 Ga, indicating involvement of sialic crust in their genesis, in agreement with the $\varepsilon_{Nd}(t)$ values between -4.0 and -1.3. Between 3.1 and 2.5 Ga, the Gavião Block was affected by volcanic and sedimentary activity associated with the formation of the Umburanas and Contendas Mirante greenstone belts, intruded by granites about 2.75 and 2.5 Ga ago.

During the Paleoproterozoic, the Gavião Block was regionally deformed and metamorphosed, and intruded by granites between 2.1 and 1.9 Ga. During the Mesoproterozoic, tectonic and metamorphic activity occurred between 1.2 and 1.0 Ga as suggested by resetting of Rb-Sr and K-Ar systematics. Finally, regional tectono-thermal overprints in the areas occurred during the Neoproterozoic. These episodes are accompanied by the intrusion of mafic dikes at about 0.9 Ga. K-Ar ages given by biotites fall within the range 0.5-0.7 Ga and mark the end of the cratonization stage.

Keywords: geochemistry, geochronology, Archaean

INTRODUCTION The São Francisco Craton - CSF (Fig.lA) resulted from accretions of crustal segments of Archaean age and mobile belts, whose evolutionary history took place between the PalaeoArchaean and the Paleoproterozoic (Cordani & Brito Neves 1982, Teixeira & Figueiredo 1991, Marinho *et al.* 1992, Alkimim *et al.* 1993). These continental accretion processes are marked by several volcano-plutonic episodes of 1.9 to 3.4 Ga (Brito Neves *et al.* 1980, Cordani *et al.* 1985, Mascarenhas & Garcia 1989, Sabate *et al.* 1990, Martin *etal.* 1991, Marinho 1991, Carneiro 1992, Nutman & Cordani 1993, Noce 1995, Teixeira *et al.* 1996, Bastos Leal *et al.* 1997). Finally, in the Neoproterozoic CSF acted as the foreland for the development of mobile belts, during the Brasiliano Cycle evolution, between 0.57 and 1.0 Ga (Brito Neves *et al.* 1980, Alkimin *et al.* 1993, Fuck *et al.* 1993).

The Gavião Block (BG), subject of present work, is part of an Archaean granite-greenstone terrain and represents the largest exposition of the CSF Archaean basement, thus being a key area to the understanding of the evolution of the primitive crust in the South-American Platform.

Pioneer geochronological studies carried out in BG were based essentially on K-Ar and Rb-Sr geochronology *(e.g.* Cordani & lyer 1979, Brito Neves *et al.* 1980, Cordani *et al.* 1985, Mascarenhas & Garcia 1989). More recently, this eratonic segment has been a target for geochronological investigations by several methodologies (K-Ar, Rb-Sr, Pb-Pb, Sm-Nd and U-Pb) (Marinho 1991, Martin *et al.* 1991, Nutman & Cordani 1993, Bastos Leal & Teixeira 1994, Santos-Pinto 1996, Bastos Leal *et al.* 1996, Cunha *et al.* 1996). Such a variety of geochronological methods allowed defining the main regional tectono-magmatic events and revealed the polycyclic character of the crustal evolution. They also increased significantly the understanding of the geological processes involved in the genesis and evolution of CSF during the Archaean and Palaeoproterozoic.

New geochronological (Rb-Sr, ^{207}Pb-^{206}Pb and Sm-Nd) determinations and geochemical analyses will be presented and discussed, concerning not only the BG gneiss-migmatitic terranes, but also the Lagoa da Macambira and Malhada de Pedras intrusive granites. The results of the latest geochronological studies referred to in the literature will also be commented aiming at integration with the presented data and leading to the understanding of the BG crustal evolution.

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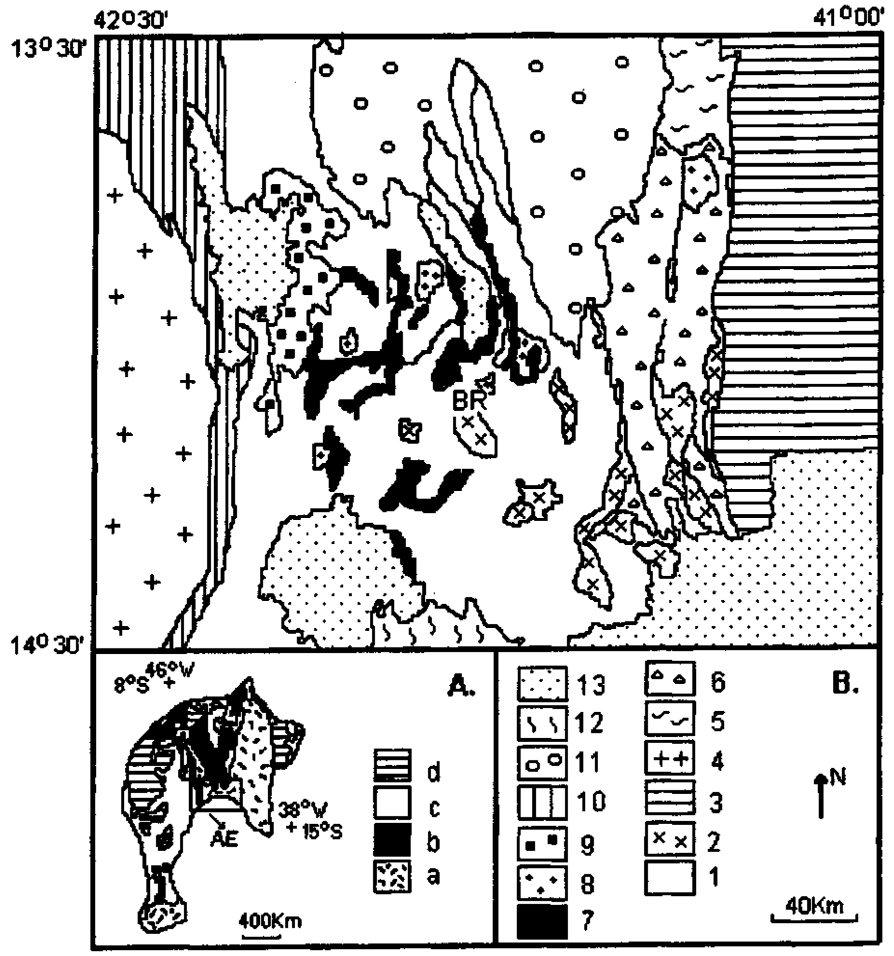

Figure 1 - Geological outline of the Gavião Block (Adapted from Barbosa & Dominguez 1996). 1A - (a) Archaean and Paleoproterozoic granitic-greenstone andgranulite terranes, (b) Mesoproterozoic covers, (c) Neoproterozoic covers, (d) Phanerozoic covers. AE - Study area. IB - 1 = Gavião Block - Archaean gneisses, 2 = Gavião Block -Archaean granitoids, 3 = Jequie Block - Archaean high grade gneisses and granulites, 4 = Correntina-Guanambi Block - Archaean and Paleoproterozoic medium grade gneisses, 5 = Mairi Block - Archaean gneisses, 6 = Gavião Block -Contendas-Mirante supracrustal belt (Archaean and Paleoproterozoic), 7 = Umburanas greenstone belt (Archaean), 8 = Paleoproterozoic granites, 9 = Mesoproterozoic Lagoa Real Complex 10 = Mesoproterozoic Espinhago Supergroup 11 = Neoproterozoic sediments 12 = Neoproterozoic fold belts 13 = Cenozoic sediments, BR= Brumado city, AE = study área.

Figura 1 - Mapa geologico simplificado do Bloco do Gavião (Adaptado de Barbosa & Dominguez 1996) 1A - (a) Terrenos granito-greenstone e granuliticos do Arqueano e Paleoproterozóico, (b) Coberturas do Mesoproterozdico, (c) Coberturas do Neoproterozoico, (d) coberturas Fanerozóicas. AE - Area estudada. IB - 1 = Bloco Gavião - Gnaisses arqueanos, 2=Granitóides arqueanos, 3 = Bloco Jequie -gnaisses de alto grau metamórfico e granulitos, 4 = Bloco Correntina-Guanambi - gnaisses de medio grau metamorfico (Arqueano e Paleoproterozóico), 5 = Bloco de Mairi -gnaisses arqueanos, 6 = Greenstone belt de Contendas Mirante (Arqueano e Paleoproterozóico), 7 = Bloco Gavião -greenstone belt de Umburanas, 8 = granites paleoproterozoicos, 9 = Complexo Lagoa Real (Mesoproterozoico) 10 = Supergrupo Espinhafo 11 = Sedimentos Neoproterozoicos 12 = Cinturoes de dobramentos Neoproterozoicos 13 = Sedimentos cenozóicos, BR = Cidade de Brumado, AE = area estudada.

REGIONAL GEOLOGIC SETTING BG is composed of variably migmatized granitic-gneiss terranes and Archaean volcanosedimentary domains, intruded by syn- to post-tectonic Paleoproterozoic granitoids (Fig. IB). Thrust faults and tangential shear zones that evolved during the Transamazonico Cycle mark the eastern and western limits of this crustal segment (Sabate *et al.* 1990, Cunha & Froes 1994, Barbosa & Dominguez 1996). The BG northern portion is partially covered by Meso-and Neoproterozoic sedimentary rocks, respectively of the Chapada Diamantina and Bambui Groups. The southern limit is represented by the contact with the Ara5uai-Piripa Fold Belt, which evolved during the Brasiliano Cycle between 0.55 and 0.65 Ga (Fuck *et al.* 1993, Rocha& Fuck 1996).

The BG primitive evolution during the PalaeoArchaean is marked by the formation of granitoid nuclei through successive episodes of TTG (Tonalites, Trondhjemites and Granodiorites) plutonism, with ages varying between 3.15 and 3.42 Ga. Such plutonism is well exemplified by the Sete Voltas, Boa Vista/Mata Verde, Bernarda, Aracatu and Lagoa da Macambiramassifs (Martin *etal.* 1991,Nutman&Cordani 1993, Santos-Pintoe/a/. 1995,BastosLealefa/. 1996). On the other hand, Sm-Nd model ages (T_{DM}) between 3.2 to 3.7 Ga referred in the literature indicate a still not well identified recycling of primitive continental crust during the genesis of these TTG terranes (Marinho *et al.* 1992, Santos-Pinto 1996, *Satoetal.* 1996, Cunha *et al.* 1996).

During the MesoArchaean BG was the target of granodioritic and granitic plutonism, represented by the Lagoa do Morro, Serra dos Pombos and Malhada de Pedras massifs. The plutonism evolution seems to be synchronous with the intrusion of enderbitic-charnockitic calc-alkaline rocks in the Jequie Block, whose ages vary from 2.8 to 2.9 Ga. The formation of these calc-alkaline rocks in the Jequie Block has been linked with a geodynamic mechanism of oceanic crust subduction to the west underneath BG (Barbosa *et al.* 1992).

The available Rb-Sr geochronological data set for the BG gneisses show that the ages cluster around 2.7 Ga. These have been linked to the role played by tectonic-metamorphic phenomena associated with the Jequie Cycle (Brito Neves *et al.* 1980, Cordani *et al.* 1985, Mascarenhas & Garcia 1989). Such interpretation is supported by another Rb-Sr geochronological data set obtained for rocks from the Jequie Block with ages around 2.7 Ga which represent the peak of granulite metamorphism in this crustal segment (Barbosa 1990, Barbosa *et al.* 1992). Rb-Sr ages around 2.7 Ga are also found in the Guanambi-Correntina Block, west of BG. On the other hand, the Rb-Sr isotopic pattern obtained for BG migmatites mainly shows ages between 1.8-1.9 Ga, suggesting that isotopic rejuvenation phenomena took place during the Transamazonico Cycle. Barbosa & Dominguez (1996) have recently recognized a tectono-metamorphic overprint in the Jequie Block region that took place in the Paleoproterozoic. Its climax must have occurred *ca.* 2.1-2.0 Ga ago.

The Contendas-Mirante, Umburanas and Ibitira-Brumado volcanosedimentary sequences present lithostratigraphic and tectono-metamorphic arrangements typical of Archaean greenstone belts (Marinho 1991, Schrank & Silva 1993, Cunha & Froes 1994). The geochronologic record of these supracrustals points to the opening of an ocean 3.0-3.3 Ga ago, with the spreading of komatiites and basalts. The felsic calc-alkaline volcanism of the intermediate units of the Umburanas and Contendas-Mirante greenstones occurred *ca.* 2.75 and 2.50 Ga ago respectively (Marinho 1991, Cunha *et al.* 1996, Bastos Leal *et al.* 1997).

The Paleoproterozoic granites in BG are represented by bodies of different compositions and natures (Sabate *et al.* 1990, Froes *et al.* 1994, Bastos Leal & Teixeira 1994), intrusive in both the Archaean volcanosedimentary units and Archaean gneiss-migmatite terranes (Fig. IB). They are coarse- to fine-grained, commonly porphyritic, have an incipient foliation and a tonalitic to alkali granite composition. Sometimes these plutons are lineated and/or foliated especially where regional shear corridors crosscut them. Available Sr and Nd isotopic data show ages ranging between 1.8 and 2.0 Ga, with initial ratios ($^{87}Sr/^{86}Sr$) = 0,711-0,760 and $\bar{Nd}_t$ = -6,9 to -15,6. Such data, together with Sm-Nd model ages [(T_{DM}) = 2.6-3.4 Ga], suggest that these granites are the product of primitive continental crust recycling during the evolution of the Transamazônico Cycle (Bastos Leal & Teixeira 1994, Santos-Pinto *et al.* 1995, Cunha *et al.* 1996).

The apparent K-Ar ages reported for amphiboles from rocks of the BG infrastructure range between 1.8 and 1.0 Ga, revealing the complexity of the Proterozoic thermal evolution. On the other hand, K-Ar micas ages vary from 0.75 to 0.45 Ga, reflecting a strong regional reheating related to the Brasiliano Cycle, especially along the Paramirim Valley (Mascarenhas & Garcia 1989, Teixeira & Canzian 1994).

ANALYTICAL METHODS Eighteen complete chemical analyses including REE were carried out at ACTLAB - Activation Laboratories (Ontario, Canada), twelve corresponding to samples from TTG terranes (Table 1) and six from the intrusive granitoids (Table 2). The major (SiO_2, Al_2O_3, MgO, CaO, Na_2O, K_2O) and minor (MnO and P_2O_5) elements were analyzed by Inductively Coupled Plasma - ICP. Trace (Rb, Sr, Ba, Zr, Ce, V, Pb, Cu, Ni, Zn, Ta, Th, U, Hf and Y) elements were analyzed by Inductively Coupled Plasma Mass Spectrometry -ICP-MS and rare earth (Ce, Nd, Tb, La, Eu, Yb, Sm and Lu) elements by neutron activation. The estimated

Table 1 - Major, trace and rare-earth element of Archaean gneiss-migmatitic rocks of the Gavião Block (GB). mg# - 100.mol. MgO/(MgO+FeO).

Tabela 1 - Analises quimicas de elementos maiores, traços e terras raras para as rochas gnássicas-migmátiticas arqueanas do Bloco do Gavião (BG). mg# = lOO.mol. MgO/(MgO+FeO).

SAMPLE	BR-JC-14D	BR-JC-14E	BR-JC-14C	BR-JC-178A	BR-JC-178B	BR-JC-02	BR-JC-124	BR-JC-188	BR-JC-45C	BR-JC-45A	BR-JC-290A	BR-JC-290J	Martin (1994)	Condie (1993)
Nº ANALYSE	1	2	3	4	5	6	7	8	9	10	11	12	TTG	GRANITES
SiO_2	76.79	72.88	74.31	73.08	68.21	68.91	72.11	71.98	73.19	78.61	75.86	75.60	69.79	72.40
TiO_2	0.21	0.16	0.23	0.22	0.44	0.18	0.21	0.33	0.12	0.18	0.18	0.23	0.34	0.25
$Al2O_3$	113.02	15.06	14.22	14.95	16.87	16.79	15.24	15.44	14.98	10.80	13.31	13.30	15.56	14.80
Fe_2O_3	1.54	1.12	1.58	1.76	3.47	1.69	1.66	2.41	0.96	2.83	1.30	1.79	3.12	1.94
MnO	0.03	0.02	0.04	0.03	0.06	0.03	0.03	0.04	0.02	0.04	0.03	0.30	0.05	-
MgO	0.64	0.41	0.61	0.55	1.23	0.60	0.62	0.77	0.27	0.06	0.24	0.54	1.18	0.37
CaO	1.89	1.30	1.82	2.05	2.90	1.41	2.72	2.73	1.31	0.65	1.10	1.37	3.19	1.18
Na_2O	4.62	1.56	4.61	4.91	5.34	4.67	4.78	5.28	5.04	3.07	3.61	3.45	4.88	3.16
K_2O	1.43	4.30	1.92	2.46	1.39	5.51	2.29	1.46	4.15	3.22	4.83	3.60	1.76	4.94
P_2O_5	0.08	0.06	0.08	0.07	0.13	0.07	0.07	0.09	0.09	0.03	0.03	0.05	0.13	0.08
TOTAL	100.25	99.87	99.42	100.08	100.04	99.86	99.73	100.53	100.13	99.49	100.49	100.23	-	-
mg#	0.29	0.42	0.43	0.38	0.41	0.41	0.43	0.39	0.36	0.40	0.27	0.37	0.43	
Rb	140	119	79	60	86	138	65	75	73	77	175	173	55	150
Cs	1.80	1.50	1.90	0.90	2.10	1.20	0.70	1.10	1.00	0.60	1.70	1.40	-	-
Ba	536	492	217	353	120	696	419	310	648	538	513	516	690	765
Sr	118	244	262	406	463	239	509	319	133	80	110	136	454	145
Ta	3.00	<0.50	4.50	0.60	<0.50	0.90	<0.50	0.60	5.50	5.30	<0.50	1.20	0.71	1.0
Hf	4.50	3.10	3.50	3.20	4.60	3.90	2.60	4.30	7.90	12.60	3.90	4.20	4.5	4.5
Zr	180	91	121	129	201	172	86	197	290	401	126	145	152	155
Y	5	4	9	11	6	16	4	5	90	26	13	20	7.5	20
Th	58.90	13.00	14.60	4.30	3.80	10.80	1.50	9.10	163.00	31.60	15.00	18.00	6.9	15
U	4.60	1.70	3.30	0.20	<0.10	0.80	-0.10	1.50	3.40	1.80	2.70	4.40	1.6	3.5
La	55.00	18.40	23.8	30.30	22.40	33.40	14.60	43.00	260.00	70.20	44.90	50.50	32	50
Ce	46.00	37.00	47.00	55.00	40.00	66.00	28.00	71.00	551.00	142.00	88.00	96.00	56	95
Nd	18.00	16.00	18.00	19.00	16.00	24.00	10.00	24.00	237.00	66.00	30.00	32.00	21.4	46
Sm	3.10	2.31	2.88	2.39	2.87	3.54	1.40	3.06	45.60	12.40	4.70	5.18	3.3	6.3
Eu	0.56	0.54	0.64	0.68	0.67	0.77	0.54	0.76	3.22	2.21	0.64	0.59	0.92	0.85
Tb	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	4.60	1.50	0.60	1.00	2.2	0.65
Yb	0.47	0.30	0.68	0.61	0.44	1.14	0.25	0.31	5.30	2.04	0.89	1.64	0.59	2.0
Lu	0.07	0.04	0.08	0.10	0.07	0.15	0.04	0.04	0.72	0.26	0.16	0.23	0.55	0.32

errors for major and trace elements vary between 2 and 5%. In order to establish geochemical comparisons, samples from BG gneiss terranes affected by either incipient (analyses n. 1 to 5) or strong migmatization processes (analyses n. 6 to 8) were analyzed.

Table 2 - Major, trace and rare-earth element of Archaean granitoid rocks (Lagoa Macambira and Malhada Pedras). mg#=100.mol. MgO/(MgO+FeO).

Tabela 2 - Analises químicas de elementos maiores e tra9os para as rochas granitdides arqueanas (Malhada de Pedras e Lagoa da Macambira) do BG. mg#= lOO.mol. MgO/(MgO+FeO).

Nº SAMPLE	BR-JC-10A	BR-JC-11H	BR-JC-11I	BR-JC-16A	BR-JC-16C	BR-JC-16D
Nº ANALYSE	1	2	3	4	5	6
SiO_2	71.89	75.38	75.35	73.84	73.31	73.02
TiO_2	0.27	0.21	0.14	0.26	0.26	0.26
Al_2O_3	15.22	14.43	13.57	14.79	14.93	14.98
Fe_2O_3	2.28	1.99	1.41	1.95	2.05	1.83
MnO	0.04	0.03	0.03	0.06	0.04	0.03
MgO	0.51	0.36	0.24	0.54	0.58	0.40
CaO	2.08	1.56	1.03	2.24	2.29	1.85
Na_2O	5.16	4.36	3.84	5.53	5.06	4.66
K_2O	2.64	3.69	4.66	10.21	1.95	3.23
P_2O_5	0.10	0.07	0.05	0.08	0.10	0.09
TOTAL	100.19	100.28	100.32	100.50	100.57	100.35
mg#	0.31	0.26	0.25	0.35	0.36	0.30
Ni	3	2	4	4	5	4
Rb	100	98	115	75	105	103
Cs	1.10	0.80	0.80	2.80	2.30	2.00
Ba	239	625	611	127	274	456
Sr	232	276	214	248	293	368
Ta	0.90	<0.50	0.80	4.60	3.70	4.10
Hf	5.000	5.40	3.90	4.40	4.30	4.40
Zr	188	194	134	160	180	158
Y	7	9	7	11	6	7
Th	9.70	9.50	13.10	8.40	9.70	8.00
U	0.50	<0.10	<0.10	1.30	1.20	1.00
La	44.4	88.30	53.10	42.60	33.70	39.60
Ce	82.00	136.00	88.00	63.00	59.00	77.00
Nd	28.00	49.00	29.00	21.00	19.00	23.00
Sm	3.91	5.28	3.92	3.30	2.68	3.25
Eu	0.69	1.00	0.78	0.64	0.68	0.81
Tb	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Yb	0.46	0.49	0.57	0.60	0.50	0.50
Lu	0.08	0.10	0.10	0.09	0.06	0.05

Sm-Nd and Rb-Sr isotopic analyses (Tables 3 and 4 respectively) were carried out at the Geochronologic Research Center of São Paulo University (CPGeO-USP), whereas ^{207}Pb-^{206}Pb analyses in zircons (Table 4), were carried out at the Isotopic Geology Laboratory of the Federal University of Para, Brazil (LGI-UFPa).

Rb and Sr contents were determined by X-ray fluorescence, whereas Sm and Nd values were determined by isotopic dilution. The spectrometric readings were done with CPGeO's VG-354 mass spectrometer. For the radiometric calculations the constants proposed by Steiger & Jäger(1977) were adopted. To obtain the isochronic diagrams the linear regression method presented by Williamson (1968) was used. $^{143}Nd/^{144}Nd$ yalues wgre normalizedusing $^{146}Nd/^{144}Nd$ = 0,7219 and the calculations were done with the constants proposed by Michard *et al.* (1985). Sm-Nd model ages (T_{DM}) were calculated using the depleted mantle model proposed by DePaolo (1988).

$^{207}Pb/^{206}Pb$ analyses by evaporation of zircon monocrystals at LGI-UFPa (Table 5) followed the procedures proposed by Kober (1986), with modifications introduced by Gaudette *et al.* (1993). The decay constants and the isotopic ratios used in the age calculations are those listed by Steiger & Jager (1977).

GRANITIC-GNEISS TERRANES OF THE GAVIÃO BLOCK Gneiss-Migmatitic Rocks The gneiss-migmatite terranes are composed of gneissic plutons of affinity similar to the TTG suites (see next section), with variable migmatization grades, formed by tonalites, trondhjemites, granodiorites and granites. They vary from gray to light pink and underwent metamorphism of medium amphibolite facies, locally granulite facies. Retro-metamorphism to the greenschist facies is also registered in the regions where expressive regional shear zones developed. The igneous-plutonic characteristic is mainly evidenced by the presence of preserved - however generally deformed and recrystallized -feldspar megacrysts, as well as by igneous textures. Subordinately, migmatized paragneisses also occur in these terranes, but they were not investigated.

The lithologies free from migmatization present compositions which vary from tonalitic-trondhjemitic to granodioritic

Table 3 - Sm-Nd analytical data of gneiss-migmatitic and granitoids. Isotopic ratios were measured with 2σ errors and the $\varepsilon_{Nd}(t)$ values were calculated for the crystallization age using DePaolo's (1988) model.

Tabela 3 - Dados isotopicos Sm-Nd para as rochas gnaissicas-migmatfticas e granitoides arqueanas do Bloco do Gavião. As razoes isotopicas foram medidas com erros de 2σ e os valores do $\varepsilon_{Nd}(t)$ *calculation para a época de cristalização da rocha, usando o modelo de DePaolo (1988).*

SAMPLE	Sm (ppm)	Nd (ppm)	$^{147}Sm/^{144}Nd$	$^{143}Nd/^{144}Nd$	T_{DM} (Ma)	εNd (t)
BR-JC-02	3.865±0.002	24.255±0.011	0.096954±0.000073	0.510441±0.000030	3455±46	-1.3
BR-JC-178	3.698±0.001	19.939±0.013	0.112835±0.000083	0.510702±0.000030	3615±55	-4.0
BR-JC-300	2.851±0.001	18.287±0.010	0.094847±0.000057	0.510540±0.000030	3255±45	0.2
BR-JC-16D	3.419±0.002	24.782±0.013	0.083936±0.000061	0.510239±0.000061	3340±38	-1.8
BR-JC-11H	4.802±0.002	38.737±0.030	0.075428±0.000066	0.510115±0.000024	3269±30	-6.2

Table 4 - Rb-Sr analytical data of the Malhada Pedras granite.

Tabela 4 - Dados analiticos Rb-Sr do granitoide de Malhada de Pedras.

Nº LAB.	SAMPLE	Rb (ppm)	Sr (ppm)	$^{87}Rb/^{86}Sr$	$^{87}Sr/^{86}Sr$
12483	BR-JC-11A	96.4	222.3	1.261±0.035	0.75788±0.00006
12484	BR-JC-11F	103.1	270.7	1.107±0.031	0.75297±0.00006
12485	BR-JC-11H	90.5	272.6	0.964±0.027	0.74492±0.00006
12486	BR-JC-11I	128.0	220.8	1.689±0.047	0.77529±0.00008
12487	BR-JC-10A	130.6	174.7	2.182±0.061	0.79531±0.00008

Table 5- Pb-Pb analytical data on zircons from gneiss-migmatitic and granitic rocks of the Gavião Block (GB)
Tabela 5- Dados isotópicos Pb-Pb obtidos por evaporação de monocristais de zircao.

SAMPLE/Nº ZIRCON	Nº BLOCK	$^{204}Pb/^{206}Pb \pm$ error	$^{207}Pb/^{206}Pb \pm$ error	AGE (Ma) ± error
BR-JC-02/9	3	0.000320±0.000169	0.270965±0.001981	3312±11
BR-JC-02/11	5	0.000470±0.000097	0.243217±0.008819	3145±58
BR-JC02/14	9	0.000341±0.000092	0.264690±0.010711	3283±63
BR-JC-02/18	7	0.000257±0.000094	0.273600±0.05805	3329±33
BR-JC-02/19	17	0.000368±0.000064	0.271471±0.002723	3316±16
BR-JC-02/22	11	0.000134±0.000046	0.280014±0.003920	3365±22
BR-JC-02/26	15	0.000072±0.000030	0.258687±0.002415	3240±15
BR-JC-02/16	31	0.000157±0.000017	0.211181±0.001271	2916±10
BR-JC-02/28	24	0.000195±0.000077	0.209844±0.001647	2906±13
BR-JC-16/3	5	0.000349±0.000064	0.252717±0.004500	3203±28
BR-JC-16/4	4	0.000186±0.000075	0.241810±0.003333	3132±22
BR-JC-16/6	34	0.000141±0.000016	0.241319±0.001141	3129±8
BR-JC-16/8	7	0.000467±0.000040	0.247401±0.001857	3169±12
BR-JC-16/9	17	0.0004000±0.00038	0.251358±0.003980	3196±25
BR-JC-178/4	12	0.000095±0.000011	0.251506±0.001130	3195±7
BR-JC-178/5	13	0.000254±0.000048	0.256370±0.002595	3226±17
BR-JC-178/7	5	0.000333±0.000549	0.257015±0.003422	3229±21
BR-JC-178/8	10	0.000170±0.000051	0.252490±0.002285	3201±14

and are formed by plagioclase (30-63%) - oligoclase and andesine - deformed, saussuritized tabular crystals, quartz (20-35%), microcline (0-25%), biotite (4-9%), muscovite (0-10%), and as accessory minerals apatite, titanite, epidote, sericite and zircon. Granitic-granodioritic compositions are constituted essentially by plagioclase (30-37%), K-feldspar (20-30%), quartz (25-35%), biotite (2-7%), titanite (1-2%), and as accessory minerals apatite, epidote, zircon and opaque minerals.

Amphibolitic enclaves are common in these terranes, and apparently result from the break-up of mafic dikes during deformation. Enclaves of gneissic rocks of tonalitic-trondhjemitic composition are also found and may be relicts of BG most primitive crust. Restricted granitic bodies concordant with the gneissic banding are also present, together with granitic and pegmatitic dikes and inclusions and/or remnants of supracrustal rocks.

In structural terms, these terranes present polycyclic tectono-metamorphic evolution, typical of the CSF Archaean terranes, where multiple deformation and metamorphism events are identified (Figueiredo & Barbosa 1993). Regionally, at least three fold phases and three shear events are recognized in BG, besides an older deformational event which produced the gneissic banding that corresponds to the Fn phase (Cunha & Fróes 1994).

The nature of the migmatization phenomena associated with the deformations present in these terranes reveals variable patterns, from portions totally or partially preserved from migmatization to areas affected by total anatexis. The most frequent migmatitic structures are stromatic, venitic and schlieren. These migmatites are delineated by varied arrangements of leucosomatic mobilized features, apparently related to two anatexis generations. The oldest is represented by more sodic, granodioritic to trondhjemitic composition, and are formed essentially by plagioclase (62-75%), quartz (10-25%) and biotite (1-15%). The youngest is potassic, composed essentially by alkaline feldspar and quartz. This second migmatization phase is linked with Transamazonic tectono-metamorphic events and therefore will not be addressed in this work.

Granitoids The Lagoa da Macambira granite is located south of the city of Brumado (Fig. IB). This body presents a slightly oval shape, homogeneous structure, is light gray, fine-grained and slightly foliated. Partially digested enclaves from the gneissic-migmatitic terranes are present, which suggest their involvement in the granite genesis. The GLM mineral composition is plagioclase (≈55%), quartz (≈25%), microcline (≈45%), biotite + muscovite (≈5%), epidote (≈2%), and apatite and zircon as accessory minerals.

More expressive than the Lagoa da Macambira granite is the Malhada de Pedras biotite granodiorite, situated close to the Malhada de Pedras district (Fig. IB). It varies from light gray to light pink, is medium- to coarse-grained, porphyritic, foliated and sometimes lineated, especially when it is affected by the regional shear zones. Enclaves of migmatized gray orthogneisses and mafic rocks are also common. The rock-forming minerals are plagioclase (≈61%), quartz (≈20%), biotite (≈12%), microcline (≈7%), and opaque minerals, zircon and titanite are accessories. Plagioclase crystals have tabular and lath shapes varying from 2.0 to 7.0mm, whereas biotite occurs as well-developed crystal agglomerates.

GEOCHEMISTRY AND GEOCHRONOLOGY Gneis-SiC-Migmatitic Rocks The average major element compositions of the BG gneiss-migmatitic terranes of tonalitic-trondhjemitic composition (analyses n. 1-8, Table 1) are similar to those of the Archaean tonalitic-trondhjemitic-granodioritic terranes (TTG) from other continents (e.g. Condie 1981, Martin 1994). On the other hand, the rocks of granitic-granodioritic compositions (Granite-Gneiss-GG, analyses n. 9-12) are chemically similar to the Archaean calc-alkaline granites *(e.g.* Sylvester 1994).

Chemical differences between TTG and GG terranes are significant in terms of major elements. The former present lower contents and ample variation of silica (68.2% SiO_2 76.8%) and higher alumina contents (average Al_2O_3 = 15.2%), when compared to the second group (73.2% SiO_2 78.6% and average Al_2O_3 = 13.1%). Both data sets present low ferromagnesian contents (Fe_2O_3+MgO+TiO_2 5.5) and negative Al_2O_3- SiO_2 correlation (Table 1). Striking differences are given by the lower K_2O/Na_2O, FeaOs/MgO and Al_2O_3/TiO_2 ratios and mg# values for TTG in relation to GG.

These chemical differences are enhanced when plotted in the Ab-An-Or diagram (O'Connor 1965, Figure 2), where it is observed that the majority of TTG samples occupies the trondhjemite field. Two samples from outcrops with high rates of felsic mobilized features (analyses n. 2 and 8) plot in the granite field of the Ab-An-Or diagram, as do all GG samples.

The chemical differences observed for both groups of gneissic rocks (TTG and GG) are greater when trace element compositions are analyzed. The average values of the Rb/Sr and Th/U ratios in the TTG are lower and Sc/Hf, Zr and Y are higher than those of the GG. The trace element distribution patterns show slight positive P and Zr anomalies and negative Ba, Ta and Ti anomalies for TTG (Fig. 3A), whereas higher LREE contents are found for GG, besides strong positive Th, Nd and Tb and negative Sr and Ti anomalies (Fig. 3B). The Ti anomaly may be linked with crustal contamination phenomena and/or involvement of continental materials, whereas Sr anomalies possibly reflect plagioclase fractionation phenomena during the genesis of GG (e.g. Kelemen *et al.* 1990, Martin 1994).

The REE distribution patterns for the TTG gneisses (Fig. 4A) are typical of Archaean gneissic terranes from other continents (Sutcliffe 1993, Condie 1993, Martin 1994), characterized by moderately high LREE (La_N = 83.5) and low HREE (YbN = 2.5) contents, $(La/Yb)_N$ = 33.4, and lack of negative Eu anomaly. GG rocks differ from TTG for they present high LREE (La_N = 343,2) and moderate HREE (Yb_N = 47.2) contents and strong negative Eu anomaly (Eu/Eu* = 0.3) (Fig. 4B). Such distribution is typical of Archaean TTG plutonism and post-tectonic calc-alkaline granites *(e.g.* Jahn *et al.* 1981, Martin 1987, Sylvester 1994).

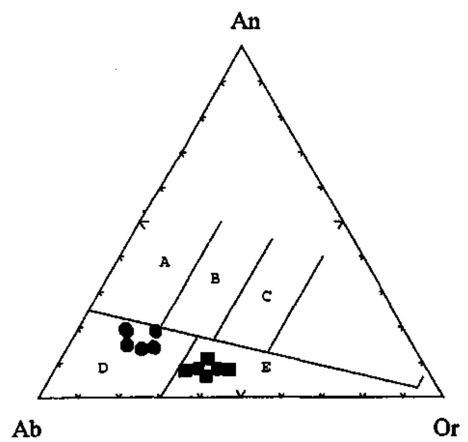

Figure 2 - Compositions of gneissic-migmatitic rocks from the Gavido Block (GB), plotted in O'Connor's (1965) diagram normative Albite (Ab) - Anorthite (An) - Orthoclase (Or). The fields are those drawn by Barker (1979). A = tonalite, B = granodiorite, C = adamellite, D = trondhjemite, E = granite. _ =TTG, = GG.

Figura 2 - Composicao das rochas gnaissicas-migmatiticas do BG, com base no diagrama normativo Albita (Ab) - Anortita (An) - Ortoclásio (Or) segundo O'Connor (1965). Campos defmidos conforme Barker (1979). A = tonalito, B = granodiorito, C = adamelito, D = trondhjemito, E = granito. _ =TTG, = GG.

In summary, the geochemical patterns observed for Archaean TTG and GG terranes of GB suggest that their total compositions were not substantially modified by migmatization, despite the multiple tectono-metamorphic events that affected these terranes during crustal evolution.

For the TTG terranes isotopic analyses by ^{207}Pb-^{206}Pb (42 zircon crystals) and Sm-Nd (whole rock) methods were carried out. The Pb/Pb analyses in monozircon by evaporation were performed in a sample from a strongly migmatized outcrop (BR-JC-02) and in a gneiss sample where this migmatization phenomenon was incipient (BR-JC-178) (Table 2).

Two populations of zircons were identified in sample BR-JC-02. One is composed of well-formed (euhedral), prismatic, colorless, transparent crystals, corresponding to *ca.* 70% of the crystals present in the sample. The other population is represented by subhedral, prismatic, light brown, translucent crystals, which compose 30% of the zircon crystals present in the sample.

Initially 18 crystals from the first population were analyzed. After statistical treatment of the results and elimination of the analyses with high common lead content, data for 07 grains were used to define the age of the rock. The average plateau age obtained from 67 blocks of ^{207}Pb/^{206}Pb ratios equals 3300 ± 45 Ma (2o) (Fig. 5). It is assumed that this age represents the time of crystallization of the rock. Twelve grains from the second population were analyzed, from which only two were used in age calculations, yielding an average plateau age taken from 55 blocks of ^{207}Pbr^{206}Pb ratios of 2912 ±10 Ma (2a) (Fig. 6), preliminarily interpreted as the age of the first phase of migmatization.

Sm-Nd systematics points to the involvement of older continental crust in the TTG genesis, as suggested by the model age T_{DM} = 3.45 Ga and $\varepsilon_{Ndt=33}$ = -1.3 (Table 3). This data set signals continental accretion in BG coeval with the formation of Boa Vista, Sete Voltas and Mariana granitoids, located in the eastern part of BG (Martin *et al.* 1991, Nutman & Cordani 1993, Santos-Pinto 1996).

In the case of sample BR-JC-178 (gneiss not affected by migmatization), large, light-brown, prismatic, euhedral, trans-

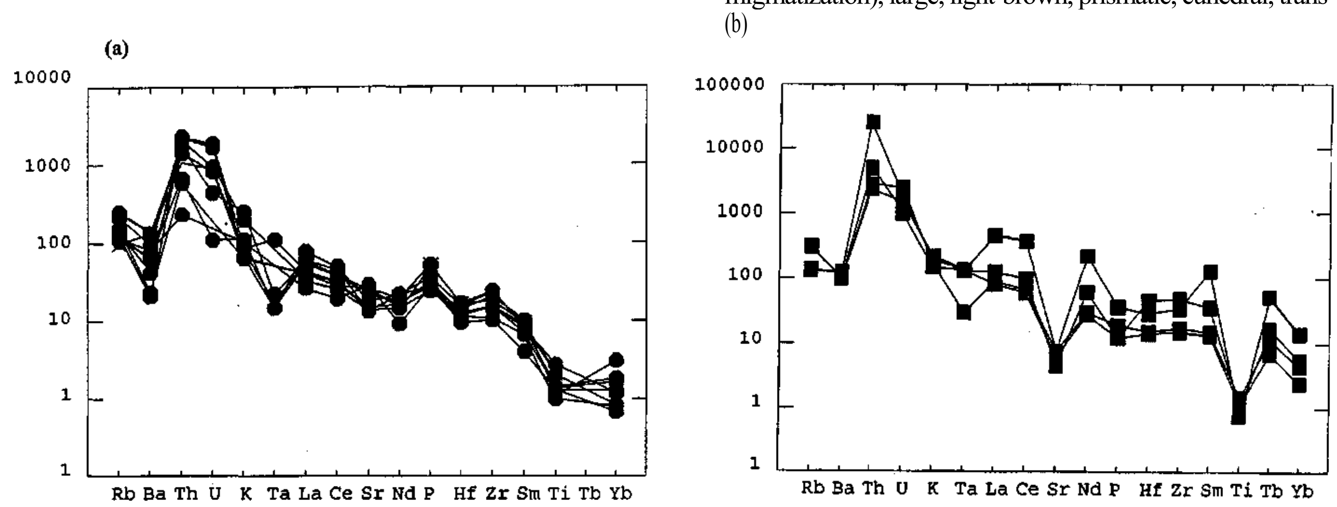

Figure 3 - Primitive mantle normalized spidergram for gneissic-migmatitic rocks from the Gavião Block (GB). (A) -Tonalitic-trodhjemitic rocks and (B) - Granitic-gneissic rocks (GG). Normalizing values after Taylor & McLennan (1985)

Figura 3 - Padrao compositional das rochas gnáissicas-migmatíticas do BG. (A) - Rochas tonalíticas-trondhjemíticas e (B) - Rochas granfticas-gnáissicas (GG). Valores normalizados para o manto primordial segundo Taylor & McLennan (1985).

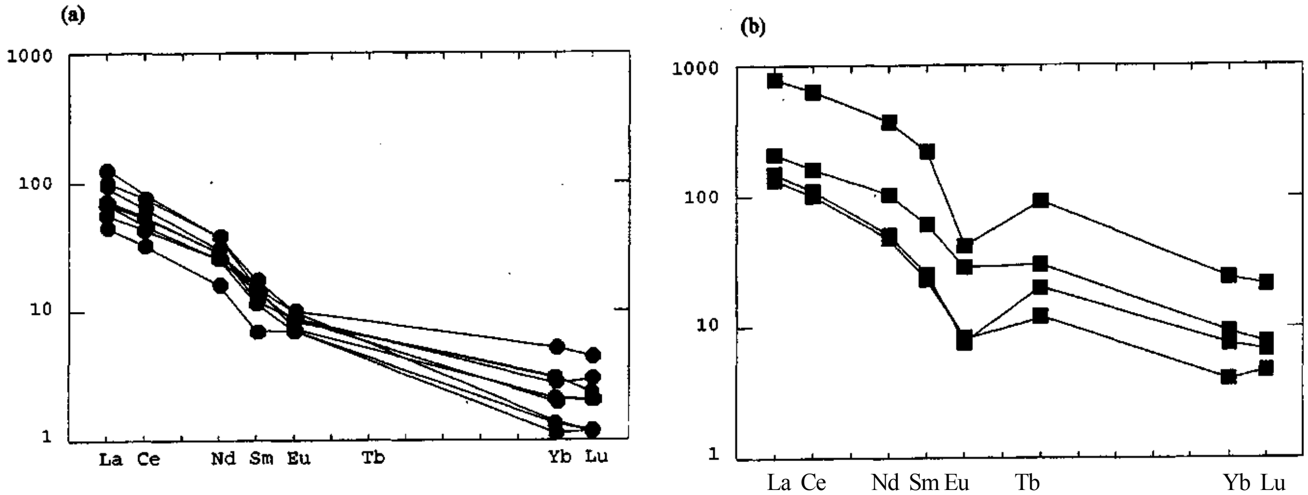

Figure 4 - Rare-earth element (REE) distribution patterns for gneissic-migmatitic rocks from the Gavião Block (GB). (A) - Tonalitic-trodhjemitic rocks and (B) -Granitic-gneissic rocks (GG). Chondritic values after Taylor & McLennan (1985).
Figura 4 - Padrao de distribute dos elementos terras raras (ETR), normalizado para condritos, para as rochas gnáissicas-migmatlticas do BG. (A) - Rochas tonaliticas-trondhjemfticas, (B) - Rochas granfticas-gnáissicas (GG).

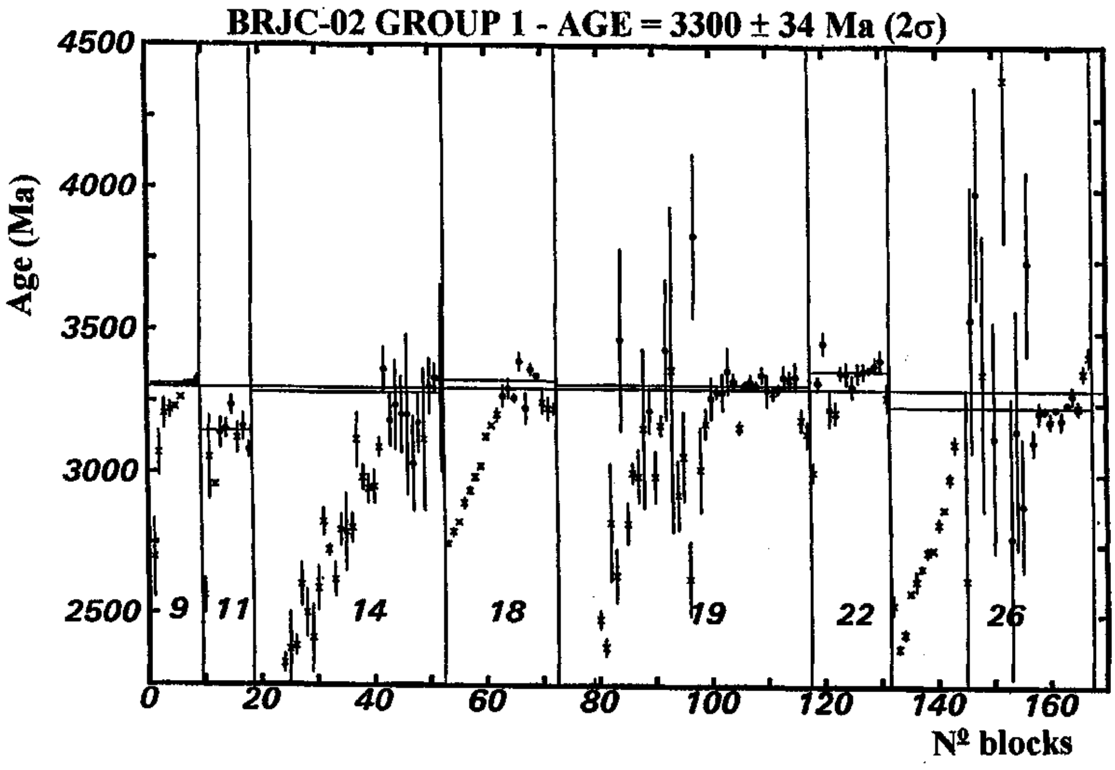

Figure 5 - Diagram age (Ma) vs. number of blocks for zircons from a gneissic-migmatitic rock sample (BR-JC-02) from the Gavião Block (GB). The bar marked with "x" indicates eliminated blocks. The zircon numbers are indicated.
Figura 5 - Diagrama de Idade vs. Numero de blocos de 6 razoes ^{207}Pb-^{206}Pb para zircoes dos TTG migmatizados (afloramento BR-JC-02). A barra indicada pelo "x" mostra os blocos eliminados do calculo da idade. Os numeros dos zircoes analisados São indicados.

lucent zircon crystals, usually bearing opaque minerals inclusions, were separated. Four out of twelve analyzed grains were used in the final calculations. The average plateau age obtained from 40 zircon blocks of $^{207}Pb/^{206}Pb$ ratios equals 3202 ± 15 Ma (2o) (Fig. 7), taken as representative of the time of crystallization of these gneisses. Sm-Nd systematics yields a Sm-Nd model age T_{DM} = 3.6 Ga and ε_{Ndt}=3.2Ga= -4.0, suggesting accretion from older crustal components in the genesis of these gneisses, therefore consistent with the data from the migmatized TTG outcrop. The T_{DM} age and the Sm-Nd isotopic pattern obtained for these gneisses suggest that their formation took place contemporaneously with the gneisses of the Piripa region and the Lagoa do Morro/Anage granitoids, localized south and east of Brumado city respectively (Marinho 1991, Cordani *et al.* 1997).

Granitoids The evaluation of the chemical data (Table 2) produced for the Lagoa Macambira granite (analyses 4,5 and 6) shows patterns very similar to those for TTG rocks. This body has a low- to medium-K calc-alkaline nature, with narrow variations of silica (73.0% < SiOa < 73.8%) and alumina (14.8% < Al_2O_3 < 15.0%) contents, CaO = 1.8-2.5% and K_2O/Na_2O 1 (average ratio of 0.4). Representative trace element ratios are Rb/Sr ≈ 0.3, Th/U ≈ 7.5 and Sc/Hf ≈ 0.7. Their total composition is also very similar to the Archaean granitic-gneissic terranes (Fig. 8). On the other hand, the REE distribution pattern is strongly fractionated $(La/Yb)_N$ = 48, with lack of negative Eu anomaly (Fig. 9).

The Malhada de Pedras biotite granodiorite has a medium- to high-K calc-alkaline nature and some chemical similarities with the Archaean granitic-gneissic terranes (GG) of the BG. Silica contents vary between 71,9% < SiO_2 < 15.0%, alumina 13.6% < $A1_2O_3$ < 15,2% and K_2O/Na_2O * 0.9 (Table 2; analyses 1, 2 and 3). However, they present higher values of K_2O (_ 3.7), Rb (≈ 104.3) and Ba (* 491.7), and lower values of CaO (~ 1.6) and Cs (≈ 0.9) compared to GG and the Lagoa Macambira granite, besides negative Ta anomaly (Fig. 9). Their REE distribution pattern is very similar to that presented for the Lagoa da Macambira granite, with high fractionation $(La/Yb)_N$ = 84, differing from the latter in slightly higher LREE contents (Fig. 10).

For the Lagoa da Macambira granite, $^{207}Pb/^{206}Pb$ analyses were initially carried out in 12 transparent, euhedral, colorless, prismatic zircon crystals. After statistical treatment of the data and elimination of those analyses with high common Pb content, the results for 05 crystals were used to define the age of the rock. The average plateau age obtained from 67 blocks of $^{207}Pb/^{206}Pb$ ratios equals 3146 ± 24 Ma (2a) (Fig. 11), which represents the time of intrusion in the continental crust. This age is comparable to those obtained for Serra do Eixo and Sete Voltas gneissic rocks, located east of Brumado city (Martin *et al.* 1991, Santos-Pinto 1996). Sm-Nd systematics yields a model age T_{DM} = 3.34 Ga and $\varepsilon_{Ndt=3.i5Ga}$= -1.8. This slightly negative parameter signals the contribution of a component with short crustal residence.

In addition, five samples from two contiguous outcrops (BR-JC-10 and BR-JC-11) in the Malhada de Pedras biotite granodiorite were analyzed by the Rb-Sr method. The analytical results (Table 4) allowed the definition of an isochron with a 2839 ± 134 Ma age (MSWD = 0,6) and $^{87}Sr/^{86}Sr$ initial ratio of 0,706 (Fig. 12), interpreted as the intrusion age. The high initial ratio obtained suggests a significant participation of continental material in the genesis of this granitoid, in accordance with a more evolved geochemical pattern of this rock compared to the Lagoa Macambira granite. This interpretation agrees with Sm-Nd evidence that yield $\varepsilon_{Ndt=2.8Ga}$= -6.2 and model age T_{DM} = 3.27 Ga (Table 2). This model age is comparable with that of Lagoa da Macambira granite, which suggests the involvement of crustal materials in the genesis of these granites.

DISCUSSION AND CONCLUSIONS The Gavião Block (BG) presents a polyphase geologic evolution, with recurrence of Archaean magmatic and tectono-thermal events during the Paleo- and NeoArchaean (Table 6). Although field observations do not allow the establishment of a relative chronology between the different plutonic events in BG, the ages obtained by Rb-Sr, Pb-Pb and U-Pb methods indicate the recurrence of Archaean granitoid intrusions with age intervals varying *ca.* 50 Ma.

The BG primitive evolution is represented by the formation of Sete Voltas, Boa Vista/Mata Verde and Bernarda massifs, whose differentiation occurred *ca.* 3.4-3.3 Ga ago (Martin *et al.* 1991,Nutman&Cordani 1993, Santos-Pinto 1996). Moreover, the Sm-Nd model ages (T_{DM}) for these granitoids present values varying between 3.3-3.7 Ga, while $\varepsilon_{Nd(t)}$ values vary between +3.0 and -5.9 (Martin *et al.* 1991, Marinho *et al.* 1992, Santos-Pinto 1996), suggesting the involvement of older protoliths, still not identified in the CSF northern portion.

After the formation of the BG primitive crust, several episodes of TTG and granitic plutonism are registered in this crustal segment, with ages varying between 3.3-3.1 Ga (Martin *et al.* 1991, Marinho *et al.* 1992, Santos-Pinto *et al.* 1995, Cunha *et al.* 1996, Bastos Leal *et al.* 1996). In this scenario, the gneissic-migmatitic (TTG), granitic-gneissic (GG) rocks

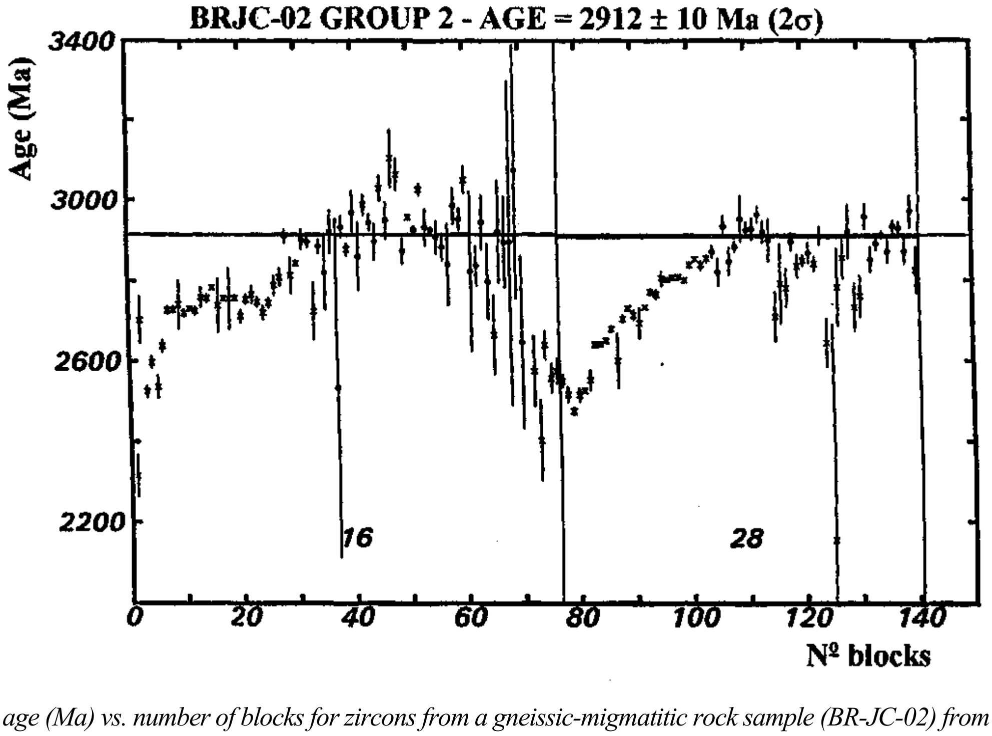

Figure 6 - Diagram age (Ma) vs. number of blocks for zircons from a gneissic-migmatitic rock sample (BR-JC-02) from the Gavião Block (GB). The bar marked with on "x" indicates eliminated blocks. The zircon numbers are indicated.
Figura 6 - Diagrama de Idade vs. Número de blocos de 6 razões $^{207}Pb/^{206}Pb$ para zircões dos TTG migmatizados (afloramento BR-JC-0$_2$). A barra indicada pelo "x" mostra os blocos eliminados do cálculo da idade. Os números dos zircões analisados são indicados.

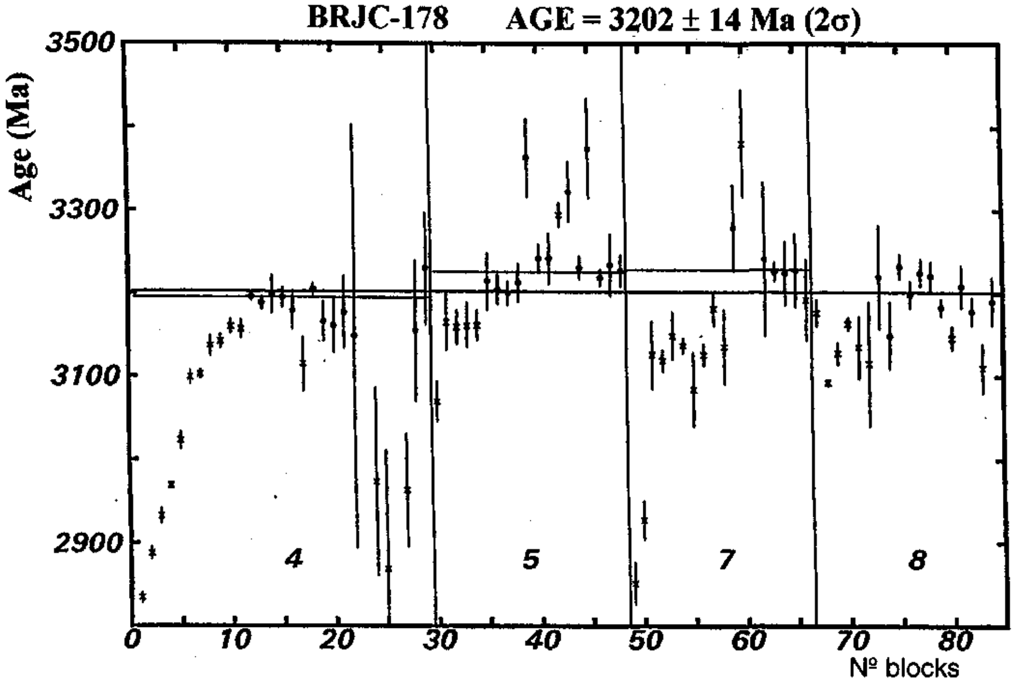

Figure 7 - Diagram age (Ma) vs. *number of blocks for zircons from a gneissic rock sample (BR-JC 178) from the Gavido Block (GB). The bar marked with on "x" indicates eliminated blocks. The zircon numbers are indicated.*
Figura 7 - Diagrama de Idade vs. Numero de blocos de 6 razoes $^{207}Pb/^{206}Pb$ para zircoes dos TTG sem migmatização (afloramento BR-JC-178). A barra indicada pelo "x" mostra os blocos eliminados do calculo da idade. Os numeros dos zircoes analisados São indicados.

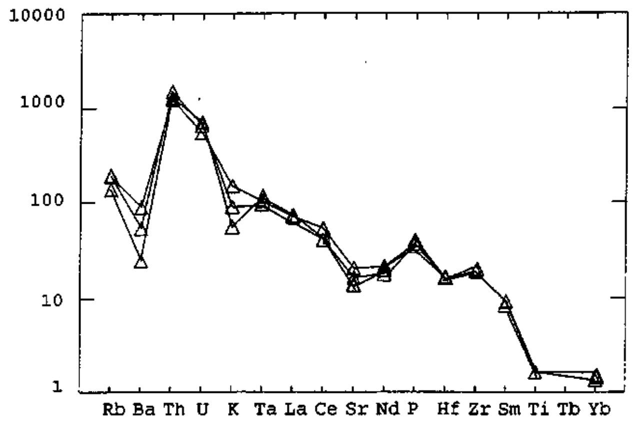

Figure 8 - Primitive mantle normalized spidergram for the Lagoa Macambira granite. Normalizing values after Taylor & McLennan (1985).
Figura 8 - Composição do granite de Lagoa da Macambira. Valores normalizados para o manto primordial segundo Taylor & McLennan (1985).

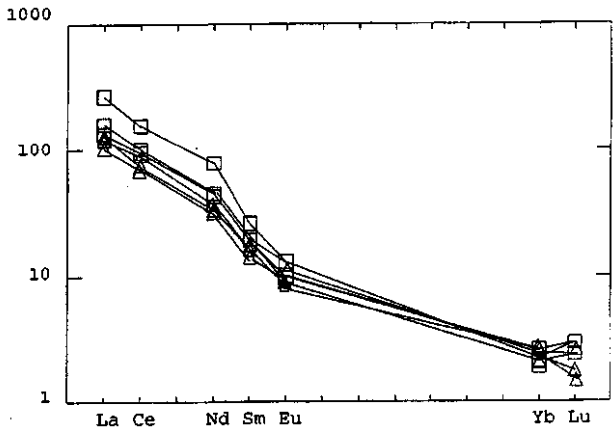

Figure 9 - Primitive mantle normalized spidergram for Malhada Pedras granite. Normalizing values after Taylor & McLennan (1985).
Figura 9 - Composição dos granites de Malhada de Pedras. Valores normalizados para o manto primordial segundo Taylor & McLennan (1985).

and the Lagoa da Macambira granite appear as representatives of this granite genesis of calc-alkaline nature, thus suggesting processes analogous to plate tectonics. This interpretation is corroborated by $\varepsilon_{Nd(t)}$ values (varying between +0.4 and -4.0) which point to differential recycling of primitive continental crust. Similar evolutionary crustal pattern of the Archaean crust has been suggested for several granitoids *(e.g.* Serra do Eixo, Sete Voltas, Mariana, Aracatu etc,) from the BG eastern segment (Martin *et al.* 1991, Santos-Pinto 1996). In this context, the Lagoa da Macambira granite belongs to an ample granitic event that occurred in BG around 3.15 Ga ago.

The Archaean ages obtained for the TTG terranes from BG, together with those obtained for detrital zircons from the Jacobina belt (north of CSF) and the Umburanas greenstone belt (Mougeot *et al.* 1996, Bastos Leal *et al.* 1996), indicate that the Archaean magmatic processes occurred mainly between 3.4-3.0 Ga. As a consequence and extrapolating the area presently exposed, BG played the role of formation a huge continental mass *ca.* 3.0 Ga ago, with approximately 35,000 km^2, comparable in size with other Archaean continental segments (Pilbara and Yilgarn blocks in Australia and the Superior Province in Canada).

There is a strong evolutionary contrast in the paleogeography and evolution between BG and the Jequié Block (2.9 Ga),

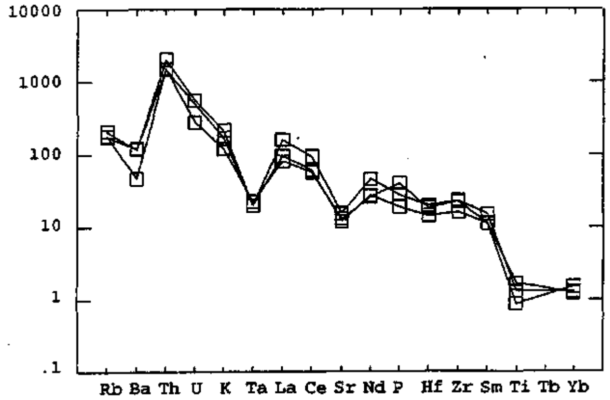

Figure 10 - REE distribution patterns for Lagoa Macambira (triangle) and Malhada de Pedras (square) granite. Chondritic values after Taylor & McLennan (1985).
Figura 10 - Curvas de ETR, normalizadas para condritos, dos granites de Lagoa da Macambira (triangulos) e de Malhada de Pedras (quadrados). Valores normalizados segundo Taylor & McLennan (1985).

showing that these two continental blocks might have had completely distinct geological histories during the Archaean. This interpretation is corroborated by the evolution diagram _Nd(t) *vs.* Time (Ga) of rocks from both domains (Fig. 13). The Sm-Nd model ages (T_{DM}) of the BG rocks vary between 3.2 and 3.7 Ga, with $\varepsilon_{Nd(0)}$ between -33 and -57. In the Jequie Block, TDM values vary between 2.8-3.2 Ga and εNd(0) between -23 and -28, denoting that these two continental crustal segments of the South-American platform evolved in different ways.

In the MesoArchaean, the intrusion of Malhada de Pedras and Serra dos Pombos granites took place at 2.9-2.8 Ga, followed by deformation and regional metamorphism in the amphibolite facies. The chemical and isotopic (Sr and Nd) data suggest that the Malhada de Pedras granite originated from partial fusion of the Archaean continental crust. Also at the end of the Archaean, BG was a target for subalkaline plutonism, represented by the Pe de Serra granites with ages around 2.6 Ga (Cordani *et al.* 1985, Marinho 1991).

Finally, during the Palaeoproterozoic, magmatic and tectono-metamorphic events affected BG, as exemplified by intensive granite intrusion and migmatization. On the other hand, the younger ages recorded in BG *(ca.* 1.0-0.45 Ga) represent the role played by tectono-metamorphic events that caused partial or total resetting of the Rb-Sr and K-Ar isotopic systems. In particular, K-Ar ages show the effect of younger regional cooling episodes, related to the geotectonic Brasiliano Cycle.

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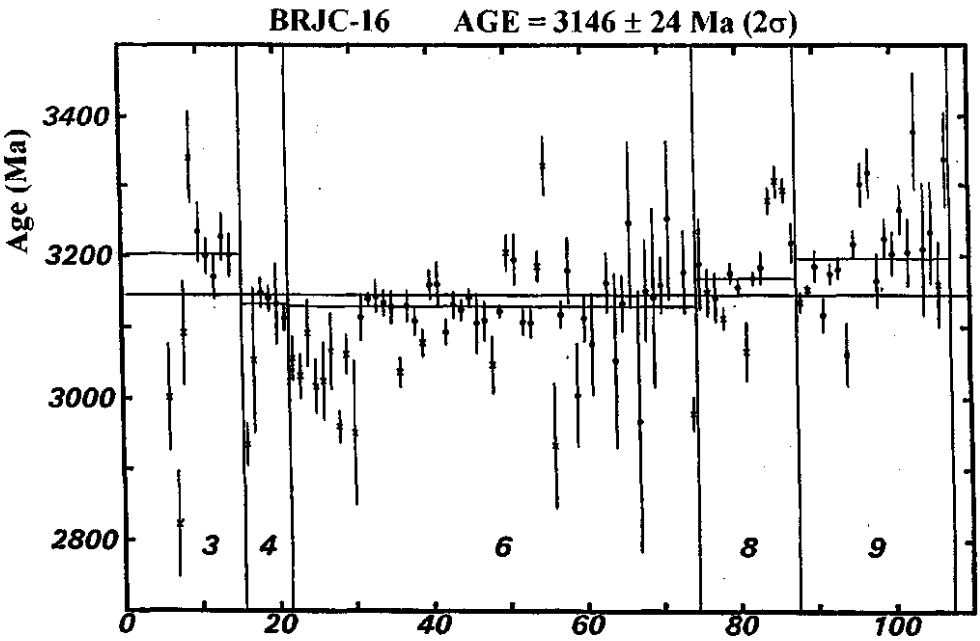

Figure 11 - Diagram age (Ma) vs. number of blocks for zircons of the Lagoa de Macambira granite. The bar marked with on "x" indicates eliminated blocks. The zircon numbers are indicated.
Figura 11 - Diagrama de Idade vs. Número de blocos de 6 razões $^{207}Pb/^{206}Pb$ para zircoes do granito da Lagoa da Macambira. A barra indicada pelo "x" mostra os blocos eliminados do calculo da idade. Os numeros dos zircoes analisados são indicados.

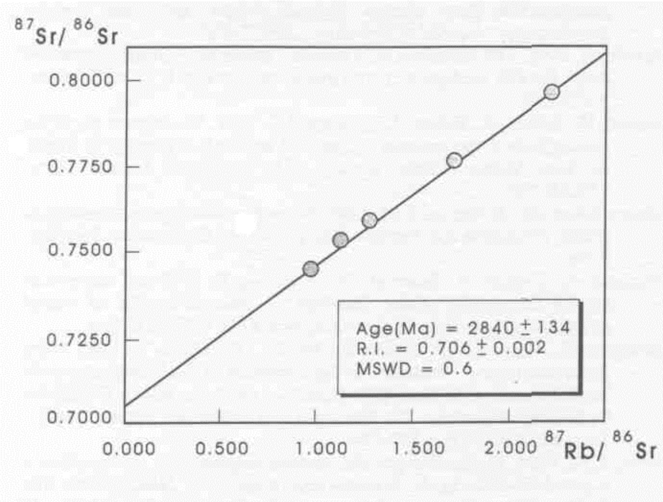

Figure 12 - Rb-Sr whole rock isochron of the Malhada de Pedras granite.
Figura 12 - Diagrama isocronico Rb-Sr em rocha total para o granodiorito de Malhada de Pedras.

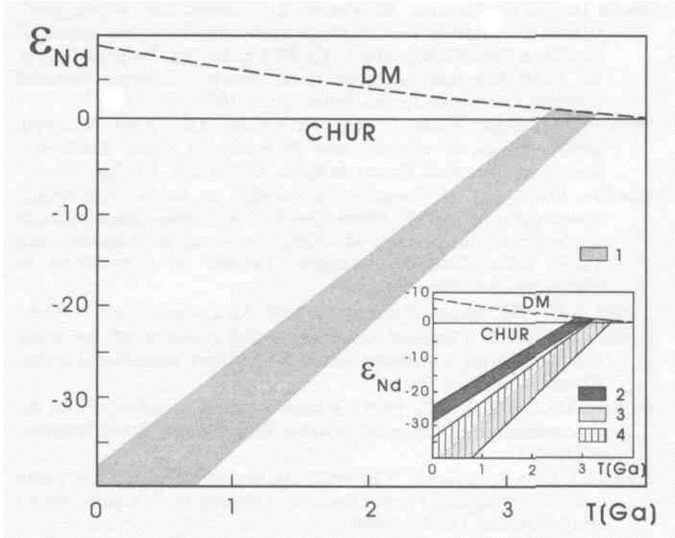

Figure 13 - Nd isotopic composition of the Gavido and Jequié blocks: (1) This work, (2) Wilson et al (1988), (3) Marinho (1991), (4) Santos-Pinto (1996).
Figura 13 - Composifao isotopica dos Blocos Gavião e Jequié: (1) Este trabalho, (2) Wilson *et al.* (1988), (3) Marinho (1991), (4) Santos-Pinto (1996).

Table 6 - Major Archaean magmatic and tectonothermal activity in the Gavião Block.
Tabela 6 - Principais eventos magmaticos e tectonotermais arqueanos do Bloco do Gavião.

Event	Age (Ma)	Methodology	References
Intrusion of the tonalitic-trondhjemitic protoliths of Sete Voltas Massif	3400-3390	U-Pb (Shrimp), ^{207}Pb-^{206}Pb, Rb-Sr	1, 4, 6
Formation of Boa Vista/Mata Verde gneissic domes	3380-3350	U-Pb (Shrimp), ^{207}Pb-^{206}Pb, Rb-Sr	2, 5, 6
Intrusion of the Bernarda and Brumado tonalitic and granitic gneisses	3330-3300	^{207}Pb-^{206}Pb	9, 11, 12
Intrusion of trondhjemites, monzogranites and granodiorites of Mariana, Aracatu and Sete Voltas	3250-3240	^{207}Pb-^{206}Pb	5, 9
Formation of komatiitic and basaltic flows of the lower unit of the Contendas-Mirante and Umburanas greenstone belts	3250-3150	Sm-Nd (T_{DM})	5, 7, 11
Formation of detrital and chemical sediments of the lower unit of the Contendas-Mirante and Umburanas greenstone belts	3250-3150	U-Pb (Shrimp), ^{207}Pb-^{206}Pb	5, 8
Intrusion of granite-gneisses of Rio do Antônio, Piripá and Lagoa do Morro/Anagé granitoids	3200-3180	U-Pb (Shrimp), ^{207}Pb-^{206}Pb, Rb-Sr	5, 6, 10, 12
Intrusion of Serra do Eixo, Lagoa da Macambira granitoids and young gneisses of Sete Voltas massif	3160-3140	^{207}Pb-^{206}Pb, Rb-Sr	4, 8, 9, 11, 12
Intrusion of Serra dos Pombos and Malhada de Pedras granites, accompanied by migmatization, deformation and metamorfism of amphibolite facies	2900-2800	U-Pb (Shrimp), ^{207}Pb-^{206}Pb, Rb-Sr	6, 8, 11, 12
Felsic volcanism of Umburanas greenstone belt	2750+15	^{207}Pb-^{206}Pb	7, 11
Deformation and metamorfism of amphibolite facies	2700-2650	Rb-Sr	1, 3
Intrusion of Pé de Serra subalkaline granites	2559±110	Pb-Pb (whole rock)	5
Felsic volcanism of Contendas-Mirante greenstone belt	2550-2450	Pb-Pb (whole rock), Rb-Sr	5

1- Cordani et al. (1985) 2- Wilson et al. (1988) 3- Mascarenhas & Garcia (1989) 4- Martin et al. (1991) 5- Marinho (1991) 6- Nutman & Cordani (1993) 7- Cunha et al. (1996) 8- Bastos Leal et al. (1996) 9-Santos-Pinto et al. (1996) 10- Cordani et al. (1997) 11 - Bastos Leal et al. (1997) 12- This work

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