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PRELIMINARY STUDIES ON DIVERSE THEMES

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PRELIMINARY STUDY ON THE GEOLOGICAL CONTEXT OF THE COMPLEX JUIZ DE FORA IN THE REGION OF SANTO ANTONIO DE PADUA (SF23-X-D-VI) - RJ.

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Abstract

In the period known as "Brazilian Orogeny" the margin of the Paleocontinent "São Francisco" was reworked in the western territory of the Ribeira Range. In the Juiz de Fora domain there is a tectonic intercalation between the rocks of the basement (called the Juiz de Fora Complex) and the metasediments of the Andrelândia Group. This Complex is constituted by norites and charnockites, being that the predominant lithologic types are denominated enderbitic and charnoenderbitic. In the area of this study there is a variety of charnockite that is denominated as "Wood Stone", with commercial value, with plots ranging from protomilonític to mylonitic, presenting quartz tapes forming defined planes. The calcium-alkali groups are compatible with tectonic environments of magmatic arches, and the acidic samples show characteristics of environments without a late collision. The basic rocks form a homogeneous set and have characteristics of arch basalts or basalts of oceanic bottom.

Keywords: orogeny; complex; Charnockite; River bank; Juiz de Fora

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I - Introduction

The so-called Western Terrain of the Ribeira Range corresponds to the margin of the paleocontinent São Francisco that was reworked in the Brazilian Orogenesis. In the Juiz de Fora Domain there is a tectonic intercalation between the rocks of the basement (Juiz de For a Complex) and the metasediments of the Andrelândia Group. This complex is constituted by norites to charnockites, and enderbitic and charnoendrite are the predominant lithologic types. In the area of this study there is a charnockite variety called "Wood Stone", with commercial value, with plots from protomilonític to mylonitic, with quartz tapes forming well defined planes. The geochemical data obtained in the literature indicate that felsic granulites comprise at least three groups of calcium-alkaline rocks, which are compatible with tectonic environments of magmatic arches, and the more acidic samples show geochemical characteristics for environments without a late collision. The basic rocks form a very homogeneous set and are part of the Toleitic series and have characteristics of arch basalts or basalts of oceanic bottom.

II – Study area.

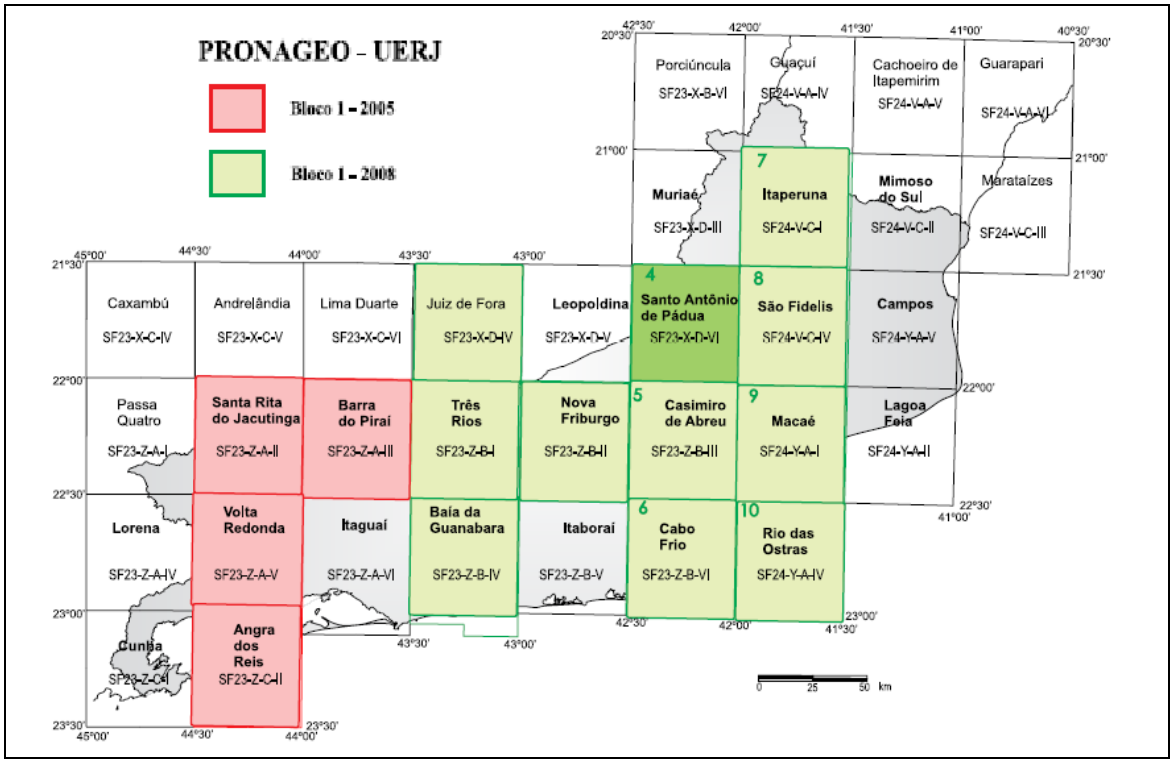

Figure 1: Location of the Santo Antônio de Pádua leaf in the context of the UERJ-CPRM-PRONAGEO PHASE 2 agreement (Folha Santo Antônio de Pádua 1: 100,000, SF23-X-D-VI)).

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III – Discussion about the geology of the area.

In the area of this study (figure 1), the Juiz de Fora complex presents its rocks in outcrops in the form of blocks, slabs in streams, and in road cuts. There are also extensive slabs of untempered rock in the main drainage channels such as the Paraíba do Sul river and the Pomba river.

The outcrops studied present alterations at different intensities. The rocks of the Complex Juiz de Fora, when not weathered have greenish or light brown color and massive structure. As these rocks become milonites they assume white and pink coloration with enclaves and lenses of dark rocks that range in size from centimeter to meter.

The lithologic types (figure 2) vary in their composition from north to charnockite by enderbíto and charnoenderbíto. These are predominant enderbites that occur interspersed with granulites of composition charnoenderbitic to charnockítica.

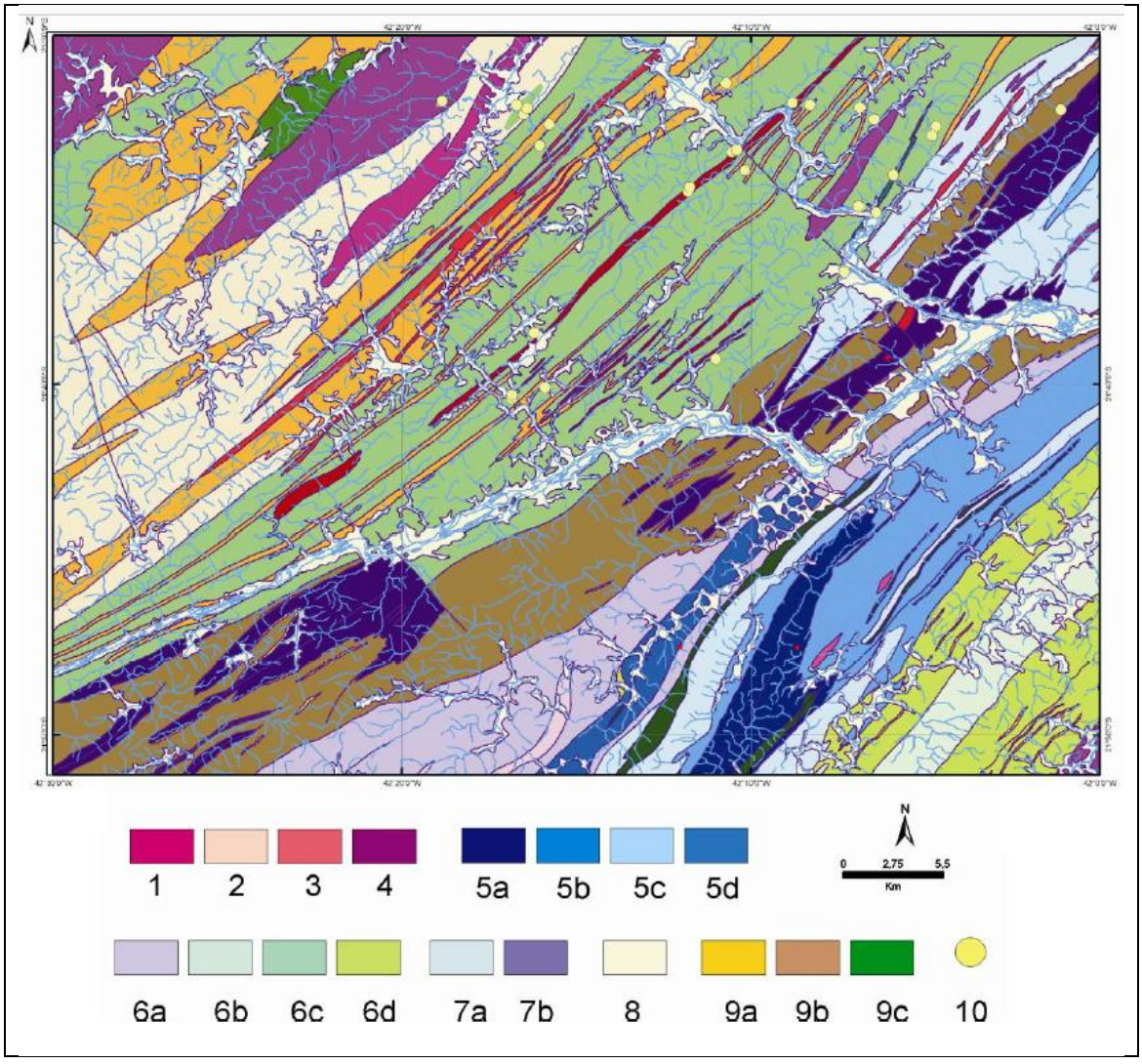

Figure 2: Geological map of the Folha Santo Antônio de Pádua (scale 1: 100,000, SF23-X-D-VI)).

Legend: 1 - with emphasis on the units of the Tectonic Domain Juiz de Fora: 1 to 3 - Neoproterozoic Granitoids, 4 - Charnockite Granulite (Wood stone); Eastern Ground, 5a to 5d - Units of the Italva Group, 6a - Rio Negro Complex, 6b to 6d - units of the São Fidelis Group,

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7a- Bom Jesus do Iatabapoana Group, 7b- Serra da Bolivia Complex; 8-Land Paraíba do Sul: Quirino Complex; Western land / Juiz de Fora domain: 9a-Pelitic gneisses and 9b- gneisses with quartzites from the Andrelândia Group, and 9c- orthogranulites from the CJF (dark green basic granulites). 10-points with litogeochemical sampling.

Noritic rocks appear as lenticular bands associated with enderbito and charnoendrite and charnockites. The mineralogy of granulites presents: orthopyroxene, clinopyroxene, plagioclase, K-feldspar, quartz, hornblende, biotite, zircon, allanite and opaque minerals, including sulfides (pyrite) as accessories. The felsic minerals possess mainly orthopyroxene, while the basic two pyroxenes. The mineral garnet occurs locally, and in the gabbro presents a coronary texture. In mafic minerals its mineralogical composition is given by plagioclase, clinopyroxene, hornblende, orthopyroxene and traces of opaque mineral (magnetite, ilmenite and pyrite), garnet, quartz, biotite, apatite, titanite and zircon. Secondary minerals such as sericite and carbonate occur locally. In ultramafic minerals they present clinopyroxene, orthopyroxene, hornblende, plagioclase, ilmenite and quartz. The textures of the granulites are varied, being frequent to the granoblastic varieties, mainly next to the contact with metasedimentary rocks of the Andrelândia Group. In acidic to intermediate rocks, biotite and hornblende appear, as well as pomegranate and hornblende, in the basic lithologic types, where they occur in the edges of minerals such as pyroxenes, plagioclase and orthoclase and in the fine matrix of the rock, oriented along the milonite foliation of Brasilian age.

Near the tectonic contacts, or next to the shear zones, they assume planar milonite foliation, where they lose the greenish coloration, and they present metamorfic parageneses of lower temperature (retrogression), become together banded characterized by a succession of white and black bands. They also show the presence of bands and lenses of basic rocks interspersed with lithotonic types, both enderbitic and charnockitic.

On the Santo Antônio de Padua sheet there is associated with this unit a rock extracted for coating (trade name "Wood stone"). It is a charnockitic milonitic band embedded by enderbitic rocks where in the geological map it is individualized as a unit of mapping (Marangatu Unit).

The charnockitic that originates the "Stone Wood" is a rock that varies from leucocratic to hololeucocrátic where the coloration that varies in diverse tones from the green, pink, white and yellow (given by the process of weathering). The texture shows a variation from protomyllonitic weave, with 1 to 2 cm feldspar porphyroclasts and quartz tapes, passing to milonitic, with 0.5 cm porphiroclasts of feldspar and abundant quartz tapes, until reaching an ultramilonític charnockite without Porphyroclasts and with quartz tapes forming well defined planes.

Bento dos Santos et al. (2009) obtained the age U-Pb of ca. 620 Ma, interpreted as the crystallization age of the protolite, which makes this unit younger than the other lithologic types of the complex.

IV - Conclusions

The geological data for the orthogranulites present in the. Complex (at scale 1: 100.000, SF23 - XD - VI), present lateral continuity in this unit of the basement Pre - 1,7 Ga of the Central Ribeira Range To the northwestern region of Rio de Janeiro, becoming a unit for correlation with the southern segment of the Araçuaí Range.

Although it extends for approximately 300 km, from the region near the border of the State of São Paulo to the NW segment of Rio de Janeiro, the geological data according to Heilbron et al. (2010) indicate that, although very varied in composition, the orthogranulites of the Juiz de

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Fora Complex are representative of paleoproterozoic magmatic arches with great lateral extension.

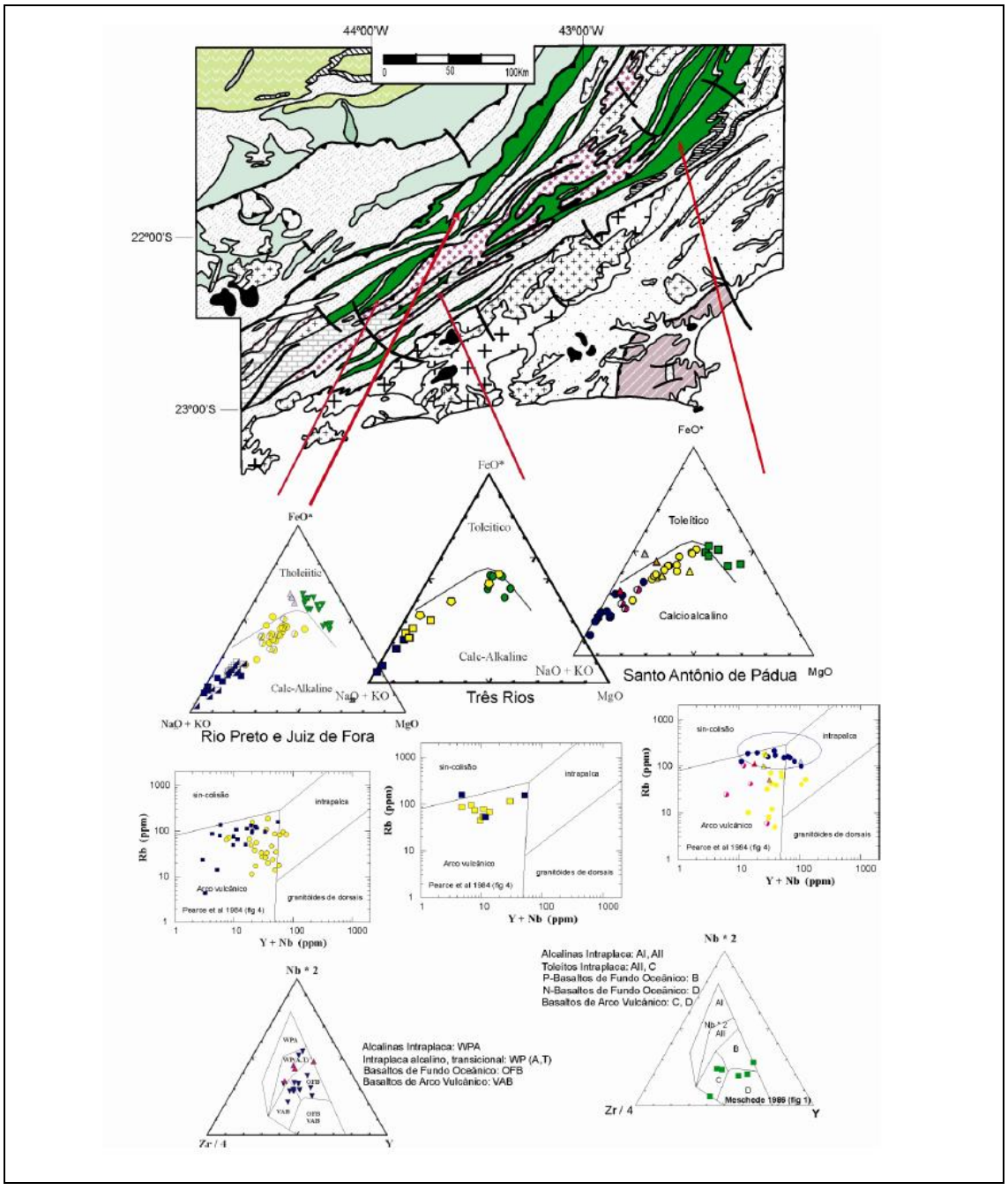

Figure 3: Comparison between the geochemical data of the Juiz de Fora complex in the regions of Rio Preto - Valença - Juiz de Fora (Heilbron, 1993, Duarte 1998, Heilbron et al., 1987), Três Rios André, et al., 2009) and the data obtained in the work. Symbols - Rio Preto Juiz de Fora and Três Rios region: blue - high K series, yellow - rocks of the middle K series calcioalcalinas, green triangles - basic rocks of the toleitic series, lilac - rocks of the alkaline series.

In this paper, we compare the data with the litogeochemical data previously published in the literature (Figure 3), covering the region between Rio Preto (MG), Nossa Senhora do Amparo (RJ), Três Rios (RJ) and Juiz de Fora), Already mentioned by Heilbron et al. (1988); Oliveira (1982); André (2009), it is verified that in all the study areas two groups of calcioalcalinas rocks

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(magmatic arches, ca 2.1 to 2.07 Ga), two groups of basic rocks (oceanic and intraplate, ca 2.4 and ca. 1.7 Ga), according to Heilbron et al. (2010) and, more rarely, rocks with an alkaline tendency, as pointed out in the present work and in the Três Rios region by André et al. (2009).

In all studied areas, the intermediate composition types of the medium K series are more abundant, while in the Rio Preto - Conservatória region and in Santo Antônio de Pádua there are abundant types of basic toleitic rocks.

The largest difference found in this region is the occurrence of a third group of calcium - alkaline rocks, represented by ultra - sonic milonite granites ("wood stone"), which are abundant in the Santo Antônio de Pádua sheet. These have a contrasting signature for symmetrical granitoids.

Therefore, there are indications that this association may represent granitoids of Brazilian age, intrusive in the paleoproterozoic granulites of the Juiz de Fora Complex, as recently indicated by the U / Pb age of ca. 610 Ma with metamorphic reworking of ca. 572-562 Ma (Bento dos Santos, 2009).

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