INTRODUCTION

The Nd isotopic systematic has been used in the Eastern portion of the Transversal Zone (Borborema Province) to recognize and distinguish patterns in limit of the Alto Moxotó and Alto Pajeú domains.

This work presents new Sm-Nd and U-Pb (LA-ICPMS) data focusing lithotypes from São Caetano Complex in the boundary of Alto Pajeú and Alto Moxotó domains placed among Logradouro-Boa Vista/PB and Gurjão/PB cities.

GEOLOGICAL SETTING

According to Santos et al. (2010) the Alto Pajeú terrane comprises three main lithotectonic assemblages. The oldest assemblage is present as 2.1-2.2 Ga cratonic basement which may be present as more or less continuous lower crust underlying the terrane. The second assemblage formed between about 1000 and 920 Ma and consists of metasedimentary, metavolcanic, and metaplutonic rocks formed during the Cariris Velhos event. The third assemblage formed between 650 and 520 Ma during various stages of Brasiliano Orogeny includes several calc-alkaline and K-calc-alkaline granitic suites and a distinctive belt of syenitic plutons. In the central and northeastern parts of this region are dominated by a metasedimentary and metavolcanoclastic sequences collectively referred to as the São Caetano Complex. This sequence has a felsic to intermediate compounds (Santos et al., 2002). The protholits for the paragneisses, quartzites, (garnet)-muscovite-biotite-gneisses and micaschists that compose this complex are respectively pelites/psammites, greywackes, and metavolcanoclastic rocks (Santos, 1995).

In the studied area, São Caetano Complex was subdivided in three main lithodemic associations (Figure 1): Typical São Caetano sequence - NP1scax includes biotite-muscovite paragneiss (metagreywackes) within little porphyroclasts of plagioclase and tourmaline and two generations of muscovite, micaceous quartzite, paragneiss, micaschists and calcitic marbles; Gneissic unit - NP1sca predominates homogeneous (garnet)-biotite gneisses and Migmatite unit - NP1scam shows stromatic migmatite with granitic or amphibolitic composition. Sillimanite was found in both units and staurolite is present in NP1sca. Rare acid volcanics/microgranites, ortoderived amphibolites, magnetite philies (metavolcanoclastic rock?) occurs mainly on NP1scex.

São Joãozinho orthogneiss proposed here, previously described as Recanto/Riacho do Forno Suit (= Tonian Cariris Velhos metagranitoids ) (Santos et al., 2002; Angelim et al., 2010).
2004) exhibits a biotite-amphibole augen orthogneiss with sienogranitic to granite composition and a high-K calc-alkaline character, metaluminous.

Figure 1 - Geological sketch map of a portion of the east part of Alto Pajeú Domain.

RESULTS AND DISCUSSION

U-Pb and Sm-Nd analyses of the São Caetano Complex rocks are summarized on Table 1.

Table 1 – New U-Pb and Sm-Nd isotopic data for the São Caetano Complex and related São Joãozinho metaplutonic unit. The t age used is equals to 950Ma except for sample GL-479.

<table>
<thead>
<tr>
<th>Sample</th>
<th>Lithotype</th>
<th>Crystallization Age</th>
<th>T_Mo (Ga)</th>
<th>εNd (0)</th>
<th>Sm(ppm)</th>
<th>Nd (ppm)</th>
<th>εNd(t)</th>
<th>Sm/147Nd</th>
<th>144Nd/21</th>
<th>εNd (0)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supracrustal unit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GL-082</td>
<td>biotite muscovite paragneiss</td>
<td>(metagreywacke)</td>
<td>2.11</td>
<td>-18,62</td>
<td>4.467</td>
<td>23,218</td>
<td>0.1163</td>
<td>0.511683</td>
<td>-8,88</td>
<td></td>
</tr>
<tr>
<td>GL-087</td>
<td>garnet gneiss with spinel</td>
<td></td>
<td>2.15</td>
<td>-19,36</td>
<td>21,918</td>
<td>115,044</td>
<td>0.1152</td>
<td>0.511645</td>
<td>-9,48</td>
<td></td>
</tr>
<tr>
<td>GL-324A</td>
<td>garnet paragneiss</td>
<td></td>
<td>1.9</td>
<td>-11,72</td>
<td>8,6885</td>
<td>39,283</td>
<td>0.1337</td>
<td>0.512037</td>
<td>-4,07</td>
<td></td>
</tr>
<tr>
<td>GL-324J</td>
<td>biotite schist (pelite)</td>
<td></td>
<td>1.84</td>
<td>-12,65</td>
<td>3,8676</td>
<td>18,371</td>
<td>0.1273</td>
<td>0.511989</td>
<td>-4,23</td>
<td></td>
</tr>
<tr>
<td>GL-543</td>
<td>garnet biotite paragneiss</td>
<td></td>
<td>1.79</td>
<td>-12,94</td>
<td>7,3955</td>
<td>36,05</td>
<td>0.1234</td>
<td>0.511975</td>
<td>-4,03</td>
<td></td>
</tr>
<tr>
<td>GL-545</td>
<td>garnet banded gneiss</td>
<td></td>
<td>2.72</td>
<td>-29,82</td>
<td>10,514</td>
<td>60,276</td>
<td>0.1064</td>
<td>0.511109</td>
<td>-18,77</td>
<td></td>
</tr>
<tr>
<td>Igneous unit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GL-455</td>
<td>acid volcanic/microgranite</td>
<td></td>
<td>2.23</td>
<td>-14,14</td>
<td>3,2356</td>
<td>14,262</td>
<td>0.1371</td>
<td>0.511913</td>
<td>-6,84</td>
<td></td>
</tr>
<tr>
<td>GL-479</td>
<td>São Joãozinho amphibole</td>
<td></td>
<td>2109 ± 15 Ma</td>
<td>3.03</td>
<td>10,5137</td>
<td>55,921</td>
<td>0.1136</td>
<td>0.511059</td>
<td>-8,43</td>
<td></td>
</tr>
</tbody>
</table>

A sample (GL-479) from São Joãozinho orthogneiss placed on central part of a antiform structure, was investigated by LA-ICPMS to determine the crystallization age. Zircon grains are yellowish to colourless, and present well preserved prismatic habit and faces. Twenty spots yielded a homogeneous apparent paleoproterozoic age with the upper intercept age of

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2109±15 Ma, which is interpreted as the crystallization age. The Sm-Nd data of this sample reveals Model age of 3.03 Ga and $\varepsilon_{Nd}$ calculated for 2.1 Ga of -8.43, which suggest derivation from reworked Archean crust.

Three sedimentary rocks from NP1scax had their Sm-Nd composition studied. The sample GL-324J is a biotite schist (pelite) interbedded with calcitic marble defining a S₀ surface and their wall rock represented by paragneiss (sample GL-324). A possible metagreywacke was collected as sample GL-543. All analysed samples presented similar results, with values of $^{147}\text{Sm} / ^{144}\text{Nd}$ varying from 0.12 to 0.13, and TDM model ages are between 1.79 and 1.9 Ga. The $\varepsilon_{Nd}$ values calculated range from -4.07 to -4.03. These data suggest certain homogeneity of sedimentary pile.

The samples collected from NP1sca unit (samples GL-082; GL-087; GL-479 and GL-545) have $^{147}\text{Sm} / ^{144}\text{Nd}$ values for the metasedimentary rocks and metaplutonic rocks ranging from 0.10 to 0.11, and TDM model ages are between 2.11 and 3.03 Ga. The very high negative $\varepsilon_{Nd}$ values range from -8.43 to -18.77 calculated to t=1.0 Ga and t=2.1 for GL-479.

Rodrigues & Brito Neves (2008) grouping new Sm-Nd data and from another authors (figure 2) in limit of the Alto Moxotó/Alto Pajeú domains recognize: a) Group I: Formed by granitic orthogneisses and supracrustals rocks is the Alto Pajeú domain that exhibits an isotopic signature with TDM values between 2.28 and 1.37 Ga, high negative values for $\varepsilon_{Nd(0)}$ (<-20) and $^{147}\text{Sm} / ^{144}\text{Nd} > 0.12$, that indicates a possible isotopic fractioning; b) Group II: Composed mostly by orthogneisses similar to Floresta Complex and supracrustals rocks from Sertânia Complex, represented by the Alto Moxotó domain that exhibits an isotopic signature with TDM values between 3.0 and 2.0 Ga, values for $\varepsilon_{Nd(0)}$, between -20 and -35, and Sm/Nd ratios between 0.12 and 0.08.

According to Santos et al. (2010) TDM ages for the majority of Cariris Velhos rocks (equals to Group I), both supracrustal rocks and metagranitoids, the TDM ages are concentrated in the range 1.8-1.4 Ga, with a total range between 1.98 and 1.04 Ga. Most of for $\varepsilon_{Nd(t)}$ values calculated for t=1.0 Ga range between +1.1 and -1.9 (Kozuch, 2003). There are some samples with positive values, +2.2 up to +5.1, as well as some samples with negative values, between -4.0 and -9.0 (Santos et al., 2010).

The results obtained was plotted in Figure 2 and compared with previous groups defined by Rodrigues & Brito Neves (2008). The NP1scax are similar with the intervals found in rocks included in the Group I, while NP1sca plot within Group II. An acid metavolcanic/microgranite (sample GL-455) interlayered in NP1sca rocks plot in the interface on Group I.

CONCLUSIONS

The new U-Pb and Sm-Nd isotopic data exposed in this study associated to geological background allow present some relevant conclusions regarding the nature and evolution of the Paleo/Neoproterozoic continental crust in NE Brazil:

a) The lithological association of detritic, chemical and volcaniclastic rocks suggests a marine depositional environment, next to an emergent active margin;

b) These rocks were submitted to a minimum amphibolites facies metamorphism;

c) The U-Pb crystallization study performed on a sample from the antiform structure identifies a Archean reworked source for the basement (São Joãozinho orthogneiss). Chemical data for this basement plot in geotectonic diagrams such as granites of active continental margin;

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d) The Sm-Nd isotopic data for both supracrustal and metaplutonic rocks of the NP1scax and NP1sca units (typical São Caetano sequence) suggest a provenance from a different sediment source area. The NP1sca unit has Sm-Nd pattern similar to that observed in rocks from Alto Pajeú domain (Cariris Velhos Metagranitoids and São Caetano Complex). The NP1scax unit next to São Joãozinho orthogneiss including it, have Sm-Nd pattern similar to that observed in Alto Moxotó domain (Floresta and Sertania Complex) reflecting a contribution from this domain or from São Joãozinho orthogneiss as source for the sediments.

**Figure 2** – Graph $^{147}$Sm/$^{144}$Nd x $^{143}$Nd/$^{144}$Nd showing new and available Sm-Nd data from east part of Alto Pajeú/Alto Moxotó domains, Sertania Complex and this study. TAP=Alto Pajeú terrane; TAM=Alto Moxotó terrane. Modified after Rodrigues & Brito Neves (2008).

**REFERENCES**


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