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PRECAMBRIAN TERRANES OF THE EASTERNMOST PART OF THE BORBOREMA PROVINCE AND THEIR GEOCHRONOLOGICAL DATA

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Introduction

The sum and the essence of geological works carried out in the easternmost part of the Borborema Province (northeastern portion of the South-American Platform) in the last three decades and the geochronological research projects recently concluded allow the recognition of a series of "terranes" in the so-called "Eastern Salient" (Saliente Oriental") of this continent (area east of meridian 36°00'00" W).

These terranes of the "Eastern Salient", which will be briefly discriminated and reported, fit relatively well in Howell's (1995) "tectonostratigraphic terranes" conception, but bear some peculiarities to be discussed here.

These terranes are separated by important regional ductile-brittle shear zones generated in the Brasiliano Cycle, that show continuity to the continental margin and that show evidence of having been polycyclically affected. Many of these lithospheric weakness zones were reactivated in the (Paleozoic and) Meso-Cenozoic, generating tectonic "highs" (horsts) and "lows" (grabens), playing an important rule in the formation and delimitation of (Cambro-Ordovician to Tertiary) sedimentary basins and in the associated basic magmatism.

From north to south, the various tectonic elements lying along the "saliente oriental", easternmost part of the Borborema province (that is, east of the meridian 36°00') are discriminated and briefly described.

Rio Grande do Norte Terrane (RGN). This unit is located immediately north of the Patos Lineament and proceeds through the central portion of Ceará State up to the coastal zone, at the Paraíba/Rio Grande do Norte border. Its easternmost part was named "São José do Campestre Massif" (JC, Fig. 1)), using a terminology that best describes its geomorphic-geotectonic character, i.e. area with good exposures –shield area- of the Archean and Proterozoic basement.

In the basement of this terrane lie the nuclei-seeds of the continent's oldest rocks, surrounded by Paleoproterozoic high-grade lithologic assemblies (TTG and alike), with U-Pb ages pointing predominantly out the 2.15 to 2.2 Ga range. This work ratifies previous determinations of Dantas *et al.* (1998). Tdm ages for these terranes are all Archean, even for some Neoproterozoic (ca. 550 Ma) granitic bodies of alkaline affinity that intrude these terranes present Archean Tdm ages (ca. 2.7-2.5 Ga).

The RGN herein considered (Dantas *et al.* 1998) encompasses –from west to east - the basement of the Jaguaribeano Fold Belt (in Ceará), the "Rio Piranhas Massif" (west of Seridó Belt), the basement of the Seridó belt itself and the "São José do Campestre Massif" (JC, the an easternmost exposition area of RGN. In JC some sparse remnants of Neoproterozoic sedimentary/volcanic "schist belts" occur due to local tectonic conditions such as transtractive depressions and allochthonous "slices" that saved them from multiple and drastic Phanerozoic erosive actions.

RGN as a whole is a mega-fragment of the Middle Paleoproterozoic orogenic collage (that is sometimes called "Transamazonian"), or a fraction of Rogers' (1996) Atlantica Supercontinent. Its original extension must have exceeded 100,000 km^2, not considering the possibility of this extension being twice as much, considering the African homologues.

Patos Lineament (LP). This classic linear shear zone of the Broborema Province (over 700 km long) is well marked in the area, from Soledade to Mataraca (from west to east/northeast), reaching widths of more than a dozen kilometers. It is arranged as "feather faults" articulated along its

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easternmost termination, where the Neoproterozoic "schist belts" and alkaline granitic rocks appear. It is a sudden limit of terranes (RGN to the north, TAP to the south), according to an important series of structural, geologic and isotopic data. To the west, traces of this lineament are projected under the Parnaíba Basin.

Alto Pajeú Terrane (TAP). The easternmost branch of the Pajeú-Paraíba Fold System is characterized by a Eo-Neoproterozoic supracrustal belt of the Cariris Velhos Orogeny (Grenvillian collage). Several syn-tectonic (syn-collisional) bodies of granitic and syenogranitic orthogneisses present U-Pb ages between 930 and 960 Ma, coherent with a list of dozens of Rb/Sr determinations in the same age range. Therefore, despite the intense reworking by the Brasiliano Cycle events - both on the supracrustal and plutonic rocks in this belt (as well as on its basement), the characteristic of a context that precedes the Brasiliano Cycle is still preserved and will be focused on.
The Cariris Velhos orthogneisses present Tdm values between 1900 and 1400 Ma with ε_{Nd} values between - 4 and zero, leading to think of a certain contribution of juvenile materials in the formation of these gneisses.
This terrane is limited to the north (by LP) and to the south by important fault lines that separates it of the segments of the Paleoproterozoic collage, respectively RGN+JC (to the north) and TAM (to the south). This fraction – TAP - of mobile belt is interpreted as part of the ample Grenvillian collage and consequently a fragment of the Rodinia Supercontinent, justifying the designation by Santos and Medeiros (1999) of Alto Pajeú Terrane.

Despite the intense Brasiliano reworking superposed to Neoproterozoic supracrustal and plutonic rocks, the characteristics of the Eo-Neoproterozoic collage can be recovered and reach diagonally the coastline, and so doing, its continuity having to be pursued in Cameroon.

Galante-Serra Redonda-Mari System of Shear Zones. It is the easternmost part of a complex net of shear zones starts north of the town of Floresta (the "Afogados de Ingazeira Shear Zone"), in central-western Pernambuco, and that reaches the coastline, after displaying presenting several branches (feather faults) with conspicuous dextral displacements (and associated transpression), mainly in the Late Neoproterozoic.

Alto Moxotó Terrane (TAM). It is constituted by a fraction of the Paleoproterozoic basement, with nuclei and evidence of Archean protoliths. It crops out from southwest (Floresta-PE) to east (vicinity of João Pessoa-PB), along the Pajeú-Paraíba Fold System (SPP), reaching the coastal zone, where it was previously named as "Caldas Brandão Massif". It is a group of varied types of Paleoproterozoic orthogneisses of more than one generation, of calc-alkaline affiliation, and migmatites, strongly tectonized in the Brasiliano Cycle, and intruded by a few granitoids of this cycle.
The picture of Rb/Sr determinations for this terrane is of a wide dispersion of data, between 2.2 Ga and 0.55 Ga, so expressing the polycyclism that affected it -events of Paleoproterozoic, Upper Mesoproterozoic and Neoproterozoic/Brasiliano.
U/Pb determinations in zircon of high-grade rocks (gray gneisses) in four distinct localities present discordia diagrams with Paleoproterozoic ages (between 2160 and 2300 Ma), very similar to the age values obtained for RGN. SHRIMP data for some samples of high-grade (a granodioritic gneiss) and supracrustal rocks (sillimanite-garnet gneisses, two samples) totally confirmed the Paleoproterozoic age of this "basement inlier" that limits TAP supracrustal and granitic belt to the south.
Sm-Nd determinations for these rocks are highly consistent, with Tdm values varying from Lower Paleoproterozoic and Archean and εNd(today) values strongly negative and εNd (t) slightly negative and even close to zero - considering t = 2000Ma, thus confirming the possibility of juvenile formation of (high-grade) rocks in the Paleoproterozoic.
The interpretation sustained here is that TAM is a fragment ("terrane") derived from the same supercontinental context of RGN - that is, Atlantica - with its compositional and tectonic peculiarities, placed south of TAP. The strong overprint of the tectonic - magmatic processes of the Brasiliano Cycle were not able to hide these original characteristics

Congo/Cruzeiro do Nordeste Lineament (LC). This shear system originates in the Pernambuco Lineament located further west (in the vicinity of

Ibimirim-PE), develops in the WNW-ESSE direction, separating TAM (constituting its southern limit) of the Rio Capibaribe Terrane (RC), as this last one was defined by Santos And medeiros (1999).

Rio Capibaribe Terrane (RC). This unit is constituted by schistose and graywacky supracrustals with several calc-silicatic and carbonatic intercalations and was preliminarily considered a southern branch of the Pajeú-Paraíba System, also including younger Neoproterozoic supracrustals. This terrane is not further analyzed in this work.

Pernambuco-Alagoas Massif/Terrane. This is, above all, a complex assemblage of gneissic-migmatitic-granitic rock types, with some Paleoproterozoic nuclei, that separates the terranes of the transversal zone from those of the fold systems of the Borborema southern domain (Brito Neves *et al.* 2000), constituting a target for a previous extensive bibliographic collection. For this reason, this unit will not be further analyzed here.

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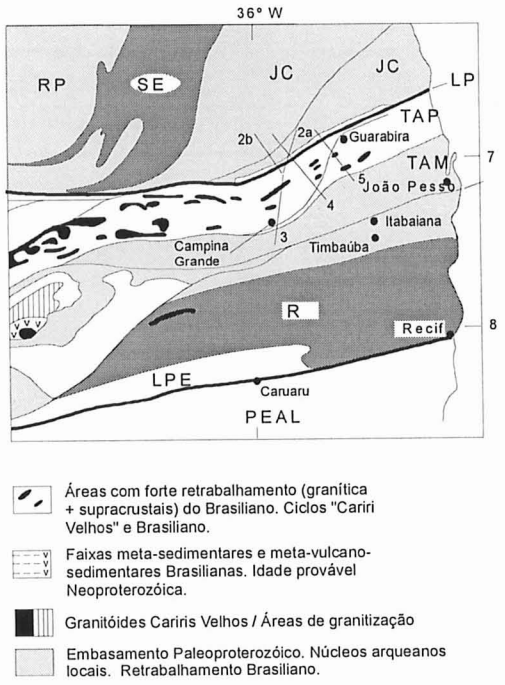

Fig. 1 - A sketch map of the "Saliente Oriental", Borborema Province, Northeast of Brazil, with the main terranes and shear zones.