

# Sm-Nd $T_{DM}$ Ages in Pegmatites from the Quixeramobim-Solonópole Pegmatitic District, Banabuiu Region, Northeastern Brazil

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## INTRODUCTION

The Quixeramobim-Solonópole Pegmatitic District (QSPD) is part of the Ceará Pegmatitic Subprovince, in the northeastern Brazil, which terrains compound a large geotectonic entity called Borborema Province (BP). This unity represents the far northeast of the South American Platform, characterized by an intense tectonic activity at the end of the Proterozoic as a reflex of the convergence and subsequent continental collision between the São Luiz-West African and São Francisco-Congo Cratons (Almeida et al, 1977). This event marks the end of the Brasiliano-Pan African Cycle in the BP - around 600-550 Ma.

## GEOLOGICAL FRAMEWORK

Five tectonic domains are recognized in the Ceará State, at the northernmost part of the BP: Northwestern Ceará Domain, also called Médio Coreau Domain (MCD) (E); Central Ceará Domain – CCD (D); Orós-Jaguaribe System – OJS (C); Granjeiro Domain – DG (B), and Piancó-Alto-Brígida Domain – PABD – (A) (Arthaud et al, 1998) (Figure 1).

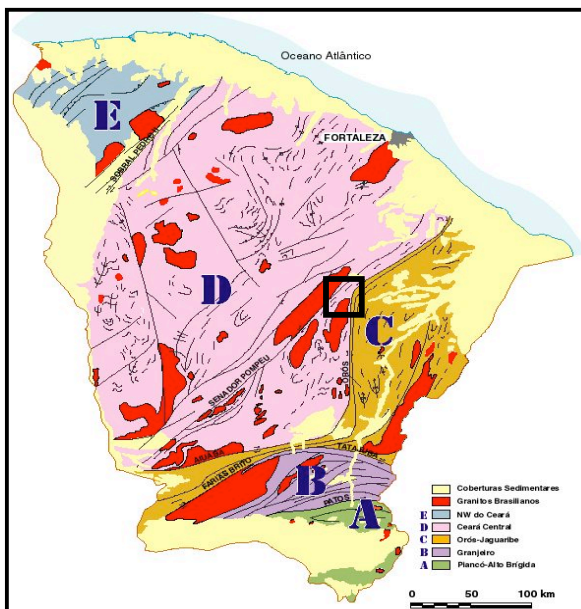


FIGURE 1. Precambrian Domains from Ceará Estate (Arthaud et al. 1998). Square representing the research region.

The Banabuiu region is placed in the limit between the CCD and OJD and can be divided, from the top to the base, in five units (Lima, 2006): i) Cenozoic eluvian/aluvian covers; ii) Probably Cambrian pegmatites (they intrude Neoproterozoic granites); iii) Neoproterozoic granites (around 590 Ma); iv) the Orós-

Jaguaribe Domain, composed of two subunits: the Jaguaritama Gneissic Complex – Paleoproterozoic - and the Orós Metavulcanosedimentary Belt – Paleoproterozoic - isotopic data from Sá (1991), sedimentation age = 1.8 Ga; and v) Banabuiu Gneissic Complex (CCD) – Paleoproterozoic.

The pegmatitic bodies from the Banabuiu region, which are part of the QSPD (Souza, 1985) crosscut granites, migmatites, and gneisses from the basement and exhibit intrusive contacts with all these rocks. These pegmatites are allochthon when compared to the granites and predominate in the basement gneisses rather than in the granites. The Senador Pompeu and Orós shear zones act as limits to the pegmatitic bodies and exert a strong influence in the regional structures, deforming not only the basement rocks, but also the plutonic set (Marques Jr et al, 1988; Marques Jr, 1992; Marques Jr & Nogueira Neto, 1992). A number of pegmatitic bodies crosscut the basement rocks in the N10E direction.

The pegmatitic bodies are related to granites and granodiorites that exhibit a milonitic foliation in the N15E direction associated to a less frequent subhorizontal stretching lineation (Marques Jr et al, 1988; Marques Jr & Nogueira Neto, 1992).

## $T_{DM}$ AGES

Table 1 (next page) shows the isotopic Sm/Nd data obtained from five samples, all from the QSPD. The pegmatitic samples were collected in homogeneous bodies intruded in the granites in the Banabuiu (PPG32) and Berilândia (CQ-593/A) towns, respectively. The granite samples were taken from the Banabuiu Batholith, both in the less deformed central part (MI184) and in the most deformed border (MI59A). The gneiss sample (PPG39) represents the CCD in the Banabuiu region.

On the basis of the model ages, three groups of lithotypes can be observed: i) pegmatites –  $T_{DM}$  between 1.02 and 1.48 Ga; ii) granites –  $T_{DM}$  between 2.19 and 2.50 Ga; and iii) gneiss –  $T_{DM}$  = 3.51 Ga.

## CONCLUSIONS

The results indicate strong crustal contribution in the source for the granites (S-type granites) -  $\epsilon_0$  between -22.65 and -22.69. The pegmatites show contrasting TDM ages, suggesting a distinct origin: one of them shows crustal contribution ( $\epsilon_0$  = -4.0), whilst the other one display a slightly positive value ( $\epsilon_0$  = 0.25), indicating weak crustal influence. The value obtained for the gneiss sample suggests strong crustal residence ( $\epsilon_0$  = -22.18).

TABLE 1. Isotopic Sm/Nd data obtained from five samples, all from the QSPD.

SAMPLES PARAMETERS	CQ-593/A	MI 184	MI 59A	PPG 32	PPG 39
Sm(ppm)	8.56	4.492	6.463	4.446	2.418
Nd(ppm)	42.11	24.881	41.409	15.442	10.046
<sup>147</sup> Sm/ <sup>144</sup> Nd	0.1229	0.1091	0.0943	0.1740	0.1455
<sup>143</sup> Nd/ <sup>144</sup> Nd ± 2SE	0.512433 +/- 10	0.511323 +/-7	0.511321 +/-7	0.512651 +/-8	0.511501 +/-6
E(σ)	-4.0	-25.65	-25.65	0.25	-22.18
T <sub>DM</sub> (Ga)	1.02	2.50	2.19	1.48	3.51
Rock	pegmatite	granite	granite	pegmatite	gneiss
Coordinates	491668 / 9398534	502686 / 9416714	504019 / 9421898	484984 / 9399238	500728 / 9395473

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