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Depositional evolution of Southwest Gondwana Neoproterozoic paleobasins based on Sr, C and O isotopic compositions of carbonatic rocks from the Sul-Riograndense Shield, Brazil



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The unification of Gondwana Supercontinent was a major event whose records are composed of metamorphosed and deformed juxtaposed paleobasins. These records also constitute great part of the Brazilian shields, as the Sul-Riograndense Shield. This shield is located in the southernmost state of Brazil and holds information from the Brasiliano Cycle, during which a subduction zone was formed and a magmatic arc was developed associated to it. The records of this magmatic arc constitute the São Gabriel Terrane, in the west border of the shield. Further, this magmatic arc was juxtaposed to a volcanosedimentary fold and thrust belt in the east - Porongos Metamorphic Complex – in Tijucas Terrane and the collision was responsible for a regional metamorphic event. Along these terranes it was identified carbonatic records of three Neoproterozoic paleobasins: Palma Group (marble) and Passo Feio Fm. (dolomite) in São Gabriel Terrane and Porongos Metamorphic Complex (marble) in Tijucas Terrane. Nowadays all of them are geographically disconnected.

Concerning to carbonatic rocks and their depositional time, many authors have demonstrated that it is possible to recognize depositional events through Sr, C and O isotopic investigation of carbonatic rocks undergone to post depositional processes [1]. So that it was possible to reconstruct part of the Sul-Riograndense Shield Neoproterozoic paleobasins evolution based on the isotopic compositions of its carbonatic rocks. A total of 27 marbles and dolomites were collected. The geochemical analysis comprised major, minor and trace elements, RRE and Sr, C and O isotopic compositions.

In São Gabriel Terrane, it was identified two distinct depositional intervals: one at 870 - 800 Ma recorded by Palma Group and other at 770 to 730 Ma, recorded by Passo Feio Formation and Cambaí Complex [2]. The interval of at least 30 Ma between the deposition events of Palma Group and Passo Feio Formation paleobasins corroborates the assumption that the Palma region was formed during the Passinho Event, dated of 880 Ma, and later was accreted to Vila Nova arc. Concerning to Tijucas Terrane, the Porongos Metamorphic Complex paleobasin fragments of Candiota region presented a depositional event record at 770 Ma.

Based on that, it is possible to identify two different phases of development and closing of the paleobasins: the first one at the Tonian period, the deposition of the extreme west paleobasins related to Palma Group in São Gabriel terrane, associated to the development of the Passinho Oceanic arc and, and the second one, at the Cryogenian, the deposition of the paleobasins records found in Candiota region (Porongos Metamorphic Complex) and in Vila Nova region (Cambaí Complex). Both Cryogenian basins had their deposition around 770 Ma and were associated to the existence of São Gabriel Ocean [3], between Encantadas microcontinent, and the Vila Nova arc, in the west. So, the identification of

paleobasins depositional events along Neoproterozoic era brings contributions to the understanding of oceans and oceanic paleobasins tectonic evolution, which culminated in the amalgamation of the west sector of the Gondwana Supercontinent.

References:

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- [3] Saalman et al. (2011) *International Journal of Earth Sciences* 100: 355 - 378

