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Mesoproterozoic anorogenic magmatism in SW Amazonian Craton using Lu-Hf isotopes in granites: Paleocontinent reconstruction insights based on mantle correlation

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Amazonia craton has been proposed as part of a Mesoproterozoic paleocontinents. Recent tectonic, paleomagnetic, geochemical and isotopic data provide temporal and spatial correlations between tectonic events (accretionary belts and continental magmatism) that affected Amazonia, Laurentia and Baltica, allowing plate tectonic reconstruction of a Mesoproterozoic supercontinent [1].

The SW Amazonian Craton have been divided in three major provinces: the Rio Negro-Juruena (1.79 Ga to 1.52 Ga) comprising two orogenic cycles (1.79-1.74 Ga Alto Jauru and the 1.58-1.52 Ga Cachoeirinha orogens); the Rondonian-San Ignácio encompassing the 1.51-1.48 Ga Rio Alegre orogen, the 1.45-1.42 Ga Santa Helena orogen and the 1.41-1.32 Ga San Ignácio orogen. Finally, the youngest Sunsás comprises metasedimentary sequences (1.1 Nova Brasilândia and 1.0 Aguapeí orogens); and granitoids (1.0 Ga Sunsás orogen).

Moreover, the accretionary events in SW Amazonian craton and correspondent instigated bimodal anorogenic rapakivi magmatism [2] may suggest the presence of a large and immature (recently accretionated) crust of the SW Amazonian craton had constant conditions from 1.8 to 1.0 Ga. In this way tools as Hf isotopes may be applied based on the assumption that material from different source terranes carry distinct provenance signatures [3].

The Mesoproterozoic widespread felsic anorogenic granites in SW Amazonia (Figure 1) record mantle and crust signatures formed in stable tectonics environment, as supported by Hf model ages. These A-type rocks do not show decreasing ϵ_{Hf} values in zircons with time as expected in crustal reworking at internal orogen.

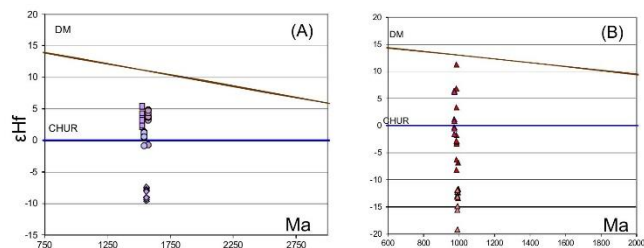


Figure 1: Hf isotopes (zircon) results in rapakivi granites from Rondonia, SW Amazonian craton. Samples from (A) Serra da Providencia Intrusive Suite which U-Pb ages are ca. 1.56 Ga; (B) from Rondonia Intrusive Suites (Massangana, São Carlos and Caritianas), with U-Pb ages are ca. 1.08 Ga.

Based on tectonic correlations and Hf isotopes, the mid-proterozoic supercontinent encompassed Baltica, Laurentia, Amazônia and several other continental blocks were place for important anorogenic magmatism [4]. The source for such magmatism was a mixture of crustal and mantle components and

may envisage a continuun evolving paleogeographic continental commom margin[5], at the begining of the Mesoproterozoic times.

References:

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- [3] Condie et al. (2009) Gondwana Research 15:228-242
- [4] Bickford et al. (2015) Precambrian Research 265:285-312
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