



Possible arc migration and metallogenetic zoning in the South portion of the Amazonian craton, North of Brazil

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In the center-south portion of the Amazonian craton, North of Brazil, near the São Félix do Xingu city, extensive Paleoproterozoic volcano-plutonism have resulted in the 1.88 Ga Sobreiro and 1.87 Ga Santa Rosa formations. These formations, exceptionally well-preserved by subsequent geologic events, have been correlated to the Uatumã Supergroup, which represents a magmatic event that covers approximately 1,500,000 km² and is recorded in several areas of the Amazonian craton. These volcanic rocks cover the Paleoproterozoic Parauari Granite and the Archean basement in the Itacaiúnas Shear Belt and South Pará Granite-Greenstone terrains. Later tin-bearing 1.86 Ga A-type granitoid massifs of the Velho Guilherme Intrusive Suite intrude the above units. The Sobreiro Formation comprises massive and flow-bedded andesitic to rhyodacitic flows and volcaniclastic facies that are high-K and metaluminous rocks, geochemically similar to calc-alkaline granitoids of volcanic arcs. Fractional crystallization of magnetite + augite + magnesiohastingsite (up to 20 vol. %) and zircon + plagioclase in most evolved rocks, under oxidizing conditions, controls the evolution of this unit. The upper fissure-controlled Santa Rosa Formation has: 1) massive, bedded, and foliated rhyolitic lava flows, and large dikes of banded rhyolite and ignimbrite; 2) felsic ignimbrite associated with thin unwelded ash-fall tuff; 3) felsic crystal tuff, lapilli-tuff, and breccia; and 4) stocks and dikes of granitic porphyry, and subordinate equigranular granitic intrusions. This unit has A-type intraplate geochemical affinity, peraluminous composition, and transitional subalkaline to alkaline characteristics. The magmatic evolution is predominantly controlled by fractional crystallization of zircon + apatite + Fe-Ti oxides + feldspars (up to 30 vol. %) with subordinate biotite, probably under intermediate oxidizing conditions. Nd model ages (3.0 – 2.49 Ga) for the Sobreiro Formation strongly suggest its generation by mixing of mantle-derived and anatexic melts of Archean rocks beneath the volcanic sequences in São Félix do Xingu region. The Santa Rosa Formation could have been originated from several Archean crustal sources (TDM 3.12 – 2.56 Ga), involving assimilation/contribution of juvenile mantle components. The integrated data point to a narrow transition from Andean-type subduction to a dominantly extensional tectonic setting for the volcano-plutonism of the São Félix do Xingu region. A Paleoproterozoic ocean-continent orogenesis with flattening in the subduction angle, developed in the south-western portion of the Amazonian craton, might explain the ~ 2.0 – 1.88 Ga geochronological and metallogenetic zoning and arc migration recently proposed to this tectonic unit.