

THE ECTASIAN GUAPORÉ SUTURE IN THE SW AMAZON CRATON: GEOTECTONIC IMPLICATIONS

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Abstract: New U-Pb zircon (SHRIMP) and isotopic geochemistry data document the existence of a previously unrecognized Ectasian suture zone, herein termed the Guaporé suture zone, which has implications for Proterozoic tectonic reconstructions of Amazonia predating the formation of the supercontinent Rodinia. The suture has been identified by the presence of mafic granulites and a large volume of mafic-ultramafic rocks (ophiolitic fragments) that are associated with strong contrasts in magnetic signatures between two crustal blocks. The Guaporé suture zone is defined by the ESE–WNW trending mafic-ultramafic belt formed during a Mesoproterozoic (ca. 1.47–1.43 Ga) extensional accretionary event. A collision event developed under conditions upper amphibolite to granulite facies was overprinted in the time between 1350–1330 Ma. This structure marks the suturing of the proto-Amazon craton and Paraguá Block in the Ectasian.

The identification of a fossil ophiolite-decorated suture zone in the southwestern Amazon craton enables us to constrain the timing of pre-subduction extension and crystallization (ca. 1470 Ma), and subduction (ca. 1430 Ma), followed by collision and metamorphism (ca. 1330 Ma). It would be good to mention what minerals were dated so that crystallization ages (zircon) can be distinguished from cooling ages (titanite). A mafic granulite (1468±24 Ma) associated with and banded mafic granulite (1447±12 Ma), yields the oldest zircon ages for the plutonic part of the ophiolite. A banded amphibolite (1435±6 Ma) and a fine-grained amphibolite (metabasalt; 1435±9 Ma) yielded the younger zircon ages for the volcanic part of the ophiolitic sequence. The ophiolites were intruded by tonalitic-plagiogranitic syntectonic plutons. The ages of tonalite-thronthjemite gneiss (1433±2 Ma) and tonalitic gneiss (1435±2 Ma) constrain the age of crystallization of the intermediary sequence.

Mafic-ultramafic rocks of the Trinchira ophiolites display moderate to highly positive initial ϵ_{Nd} values of +2.6 to +8.8 and very low values for the initial $^{87}Sr/^{86}Sr$ ratio (0.7013 - 0.7033). It is suggested that these magmas originated from a depleted mantle source, which experienced low degree of contamination by variable subduction components.

Syn to late collisional granites with crystallization ages between 1350 and 1330 Ma marked the timing of the final docking between proto-Amazon craton and Paraguá Block.

This study contributes significantly to our understanding of the operation of Mesoproterozoic plate tectonics in the southwestern Amazon craton, here inferred to involve accretionary orogen involving the subduction of oceanic lithosphere.

Keywords: SUTURE ZONE, AMAZONIA, MESOPROTEROZOIC