

Origin of the Coronel João Sá Pluton: Implications for the Tectonic Evolution of NE Brazil

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The northeastern portion of Brazil was last reworked during a collision of Pan African/Brasiliano age (700 to 550 Ma). This area is comprised of Archean and Paleoproterozoic cratonic blocks that are scattered within a network of Brasiliano-age metasedimentary fold belts. Fold belt material could have originated as island arcs and arc basins of oceanic affinity (allochthonous model), or as extensional continental sedimentary basins with little or no involvement of ocean crust (autochthonous model).

When the unfoliated Coronel João Sá granodiorite pluton of Brasiliano age intruded the Sergipano Fold Belt, in northeastern-most Bahia state, it inherited geochemical and isotopic characteristics from its magma source. Zircons provide a concordant U-Pb crystallization age of 627 ± 2 Ma, but data from zircons with inherited cores lie on discordia lines whose upper intercepts are 1760 Ma and 2240 Ma. This indicates that ancient continental sources of at least two different ages contributed to inheritance.

Initial whole-rock Sr and Nd isotopic compositions at 627 Ma are non-uniform, indicating that incomplete magma mixing had occurred. Calculations of trace element concentrations in hypothetical end members suggest that a primitive source (MORB or mantle) did not contribute to Coronel João Sá magma.

Values of Coronel João Sá ϵ_{Nd} at 627 Ma are similar to ϵ_{Nd} for associated Sergipano Fold Belt supracrustal rocks and basement, whose zircon U-Pb ages are approximately 1 Ga and 2.2 Ga. Inheritance of older crustal components by Coronel João Sá magma supports the autochthonous model of fold belt origin.