

Proterozoic geological evolution of the central-eastern part of the Rondônia tin province (Brazil), inferred from U-Pb and Sm-Nd isotopic data.

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The central-eastern part of the Rondônia tin province includes Proterozoic metamorphic basement rocks and undeformed rapakivi granite suites. The basement rocks is subdivided into six units: (1) metasedimentary gneisses showing 1.9-1.7 Ga detrital zircons and 2.1 Ga T_{DM} model ages; (2) 1.75-1.73 Ga tonalitic gneisses showing 2.1-2.2 T_{DM} model ages; (3) 1.57-1.56 Ga charnockitic and granitic orthogneisses; (4) 1.54 Ga gabbro and granites and related gneisses; (5) 1.53 Ga mangerites and granites and related gneisses; (6) 1.43 Ga granitic gneisses. U-Pb monazite age and Sm-Nd garnet-whole rock age suggest a high-grade metamorphism at 1.33-1.31 Ga. The 1.08-1.07 Ga and 1.00-0.97 Ga rapakivi granites are mainly derived from crustal sources. We interpret the above data as following: (1) the sedimentary protolith of the paragneisses were accumulated in a basin settled during the Rio Negro-Juruena orogen; (2) the tonalitic gneisses represent the calc-alkaline magmatism of the Rio Negro-Juruena orogen developed over the Ventuari-Tapajós craton; (3) 1.57-1.53 Ga igneous and metaigneous rocks (1.84-1.88 Ga T_{DM} ages) are derived from a mixture of crustal and mantle sources and correlated to the Serra da Providência bimodal rapakivi magmatism; (4) 1.43 Ga magmatism and 1.33 Ga high-grade metamorphism are related to the Rondonian-San Ignacio orogen; and (5) the undeformed rapakivi granites may represent the distal magmatic effect of the Sunsás-Aguapei orogen over the Rondonian-San Ignacio craton.