

NEOPROTEROZOIC METAMORPHISM AND ANATEXIS IN THE EMBU COMPLEX, RIBEIRA BELT (BRAZIL): EVIDENCE FOR TWO MAJOR EVENTS

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ABSTRACT: The Embu Complex is one of the geotectonic units with the greatest expression and the most lacking geological knowledge of the Ribeira Belt, being a key piece in the understanding of the geotectonic evolution of this belt, with implications for the reconstruction of Gondwana and Rodinia supercontinents. The Embu Complex is dominated by an amphibolite facies metasedimentary rock assemblage composed of micaschist and migmatitic paragneiss with intercalations of quartzite and calc-silicate, metaultramafic and metamafic rocks. The objectives of this work consist in constrain the P-T-t conditions to the peak of the main regional metamorphic event recorded in the Embu Complex and assess the regional implications of these data in the context of available geochronological and petrological data and large-scale tectonic processes. We present new petrological and zircon U–Pb SHRIMP and LA-MC-ICP-MS data obtained in key samples of migmatitic paragneiss and associated quartzite from the Embu Complex. Detailed petrological and thermodynamic modelling data indicate that the climax of the main regional metamorphic event recorded in the Embu Complex is represented by the migmatitic paragneiss constituted by sillimanite + garnet + biotite + quartz + plagioclase ± muscovite residual assemblage, which reached a high-grade metamorphism (c. 650-690°C at 3.7-6.9 kbar). Quartz-feldspathic layers that occur in the area are interpreted as granitic neosomes formed during the anatexis. Metamorphic zircon overgrowths yielded oldest Concordia ages of 825 ± 14 , 792 ± 5 and 788.9 ± 8.5 Ma, interpreted as the time of near peak metamorphism and regional anatexis, which indicate that the main regional metamorphism recorded in the westernmost portion of the Embu Complex occurred in the Tonian. Available geochronological and petrological data and the existence of coeval 810-780 Ma granitic plutons with S-type collisional affinities strongly support the existence of a major Tonian accretionary-to-collisional event in the southern and central Ribeira Belt, which was probably responsible for accretion of Mesoproterozoic exotic terranes to the margin of the Paranapanema Craton. Metamorphic zircon overgrowths with Concordia ages of 566.7 ± 3.7 Ma and 615.2 ± 5.8 Ma were heterogeneously developed, in high-grade and low-grade samples, corroborating the existence of an Ediacaran to Cryogenian metamorphism described for the Ribeira Belt and indicating a complex multiphase metamorphic history for the Embu Complex.

KEYWORDS: HIGH-GRADE METAMORPHISM; ZIRCON U-PB GEOCHRONOLOGY; PHASE EQUILIBRIA MODELLING