

THE TUMIRITINGA FORMATION AND THE GUARATAIA PLUTON; A GEOCHRONOLOGICAL (U-Pb and Lu-Hf) AND STRUCTURAL (AMS) ANALYSIS IN THE WESTERN DOMAIN OF THE ARAÇUAÍ BELT

Angelo, T.V.¹; Egydio-Silva, M.¹.

¹ Geosciences Institute - University of São Paulo

ABSTRACT: The present study is being conducted in the Itambacuri region, located on the eastern portion of the state of Minas Gerais – Brazil. The area comprises metasedimentary rocks intruded by a series of granitoid suites in the western domain of the Neoproterozoic Araçuaí Belt. The emphasis is given to the metasediments of the Tumiritinga Formation attributed to the base of the Rio Doce Group and the Guarataia Pluton, described as a pre-collisional unit in relation to the Brasiliano orogenic network, consolidated during the amalgamation of Western Gondwana by the end of the Ediacaran Period. Petrographic studies indicate that the Tumiritinga Formation is characterized by biotite-quartz schist to gneiss with cordierite, garnet, sillimanite, muscovite, quartz and biotite. The texture is mainly lepidogranoblastic. Calc-silicate rocks, quartzite, marble and metavolcanoclastic rocks are also found intercalated. The metavolcanoclastic rocks found south of the study area presented a maximum depositional age of 585 ± 4 Ma (detrital zircon U-Pb LA-ICP-MS). The Tumiritinga Formation is interpreted to be part of a basin sequence associated with the Rio Doce Magmatic Arc. The Guarataia Pluton, hosted by the metasedimentary rocks of the Tumiritinga Formation, is divided into fine-grained and porphyritic facies comprising rocks that vary from granite to granodiorite in composition. The obtained crystallization age for the pluton was 576 ± 9 Ma (zircon U-Pb SHRIMP). Earlier geochronological studies discuss a problem relating the older ages of the plutonic bodies intruded in the younger inferior sequences of the Rio Doce Group, as well as the difficulty in mapping foliation and stretching lineation structures related to the flow of rocks in orogenic areas since the absence of macroscopically visible planar and/or linear structures impede kinematic analyses. Age and provenance data, together with structural analysis can shed light to the problem by understanding the metavolcanosedimentary unit and its relationship with the Rio Doce Group and associated intruded plutonic rocks. Detrital zircon geochronology studies conducted by the combination of U-Pb and Lu-Hf methods through LA-ICP-MS are evaluated in order to better constrain the ages of the zircons deposited within the metasediments of the Tumiritinga Formation and the source of the material that formed the zircons, distinguishing grains generated from a juvenile magma from those formed during remelting of ancient continental crust. Moreover, the structural analysis through Anisotropy of Magnetic Susceptibility (AMS) on the Guarataia pluton and the Tumiritinga Formation permits the elaboration of a deformation ellipsoid, which can be correlated to the planar and linear structures of both rock units. This study presents new detrital zircon U-Pb ages and Lu-Hf isotopes from the Tumiritinga formation and AMS measurements of both metasediments and Guarataia Pluton in order to better evaluate: (i) maximum depositional ages of the metavolcanosedimentary rocks; (ii) detrital zircon age distributions; (iii) potential sediment source areas; and (iv) mineral preferred orientation fabrics. The data provide a significant contribution to the western domain of the Araçuaí Belt and its reflections associated with the assembly of West Gondwana.

KEYWORDS: ARAÇUAÍ BELT, GEOCHRONOLOGY U-Pb AND Lu-Hf, ANISOTROPY OF MAGNETIC SUSCEPTIBILITY.