SHRIMP U-Pb ZIRCON GEOCHRONOLOGY AND Rb-Sr AND Sm-Nd ISOTOPE GEOCHEMISTRY OF CHARNOCKITES AND ASSOCIATED GRANITOIDS OF RIBEIRA BELT

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ABSTRACT

Charnockites are closely associated with granitoids and aplite veins along the coast of SE, Brazil. Its intrusive into high-grade metamorphic Costeiro Complex, in central part of Neoproterozoic Ribeira Belt. Charnockites include both magmatic charnockite (plutonic, sometimes pegmatitic) intrusive bodies and metamorphic charnockites (ranging from massive types to local "arrested charnockites") that are typically associated with aplite dikes within orthogneisses/granitoids; granite–charnockite boundaries are often subtle, reflecting the gradational nature of the contact. Charnockite mineralogy is similar to that of their associated granitoid rocks, except for ubiquitous orthopyroxene ± clinopyroxene ± garnet which seem to have resulted from dehydration melting of primary biotite + amphibole bearing granite/granodioritic assemblages at peak metamorphic conditions. The Sr initial ratios and Nd isotopic compositions for both granite and charnockite, suggest a derivation by anatexis of upper crust materials

The whole of U-Pb zircon dates converge to a weighted mean age = 572 Ma ± 9 Ma (2σ), suggesting that very high-grade metamorphism, lower/middle crust partial melting and related charnockite development were contemporaneous over large areas within the Ribeira and Araçuaí fold belts. After the thermal peak at ~570 Ma) Ribeira-Araçuaí rocks were sustained at high temperatures (≥ 650-700 °C) for more than 50 Ma. These conditions were likely to promote (late) H_2O-undersaturated middle/lower crustal recrystallization/melting leading to widespread charnockite development, coeval with regional aplitic intrusions.