

GEOCHRONOLOGICAL (U-Pb) AND ISOTOPIC (Sr, Sm-Nd, Lu-Hf)
DATA OF THE JUIZ DE FORA COMPLEX IN SOUTHERN RIO DE JANEIRO STATE:
PETROGENETIC INSIGHTS ON THE PROTEROZOIC EVOLUTION

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The Juiz de Fora Complex (JFC) is one of the basement units of the Occidental Terrane in the Central Ribeira belt, regarded as part of the reworked border of the São Francisco paleoplate. The JFC comprises orthogranulites with varied geochemical compositions, deformational fabrics and ages, in Brasiliano granulite facies. This work presents new zircon U-Pb (SHRIMP) ages and Lu-Hf (LA-ICPMS) data, besides whole-rock Sr and Sm-Nd isotopic data from JFC orthogranulites from southwest Rio de Janeiro state in order to better constrain the Paleoproterozoic tectonic evolution of this unit. Six samples, chosen by their element compositions, were selected for U-Pb and Lu-Hf analysis. Zircon textures were mapped under cathodoluminescence systematics before analyses. Both the tholeiitic mafic granulites and the low-K calcalkaline enderbitites present ages of ca. 2.44 Ga. Three calcalkaline charno-enderbitic/charnockitic granulite samples yielded crystallization ages of ca. 2.2 Ga. One sample of the high-K leucocratic charnockitic group yielded a crystallization age of ca. 1.78 Ga. Metamorphic rims around the magmatic cores present ages from 600 to 580 Ma confirming the Neoproterozoic overprint. Few inherited zircon crystals between ca. 2.53 and 2.38 Ga were identified in two samples. The Nd and Sr isotopic data of 28 samples a peak of Nd TDM model ages in the Siderian-Rhyacian interval (2.48-2.18 Ga) with slightly negative to slightly positive (-4 a +2) ϵ Nd(t) values for arc rocks. Few samples indicate minor Archean contribution. On the other hand, the obtained Hf TDM model ages vary from Archean to Siderian (3.2-2.4 Ga), with negative to slightly positive ϵ Hf values (-13 to +2), contrasting with the whole-rock Nd signatures, suggesting recycling of Archean material. One single Statherian granulite sample presents Siderian Nd TDM model age and Hf TDM model ages from NeoArchean to Rhyacian (2.7-2.2 Ga), with strongly negative ϵ Nd(t) and ϵ Hf values. The envisaged geological evolution starts during the Siderian (ca. 2.44 Ga) with crystallization of the more primitive arc rocks (IAT and LKCA mafic to felsic rocks) marking the initial stage of arc development. The calc-alkaline charno-enderbitites are representative of a more evolved stage of the JFC arc rocks at ca. 2.20 Ga. A collisional episode at ca. 2.02 Ga is marked by zircon crystallization from partial melting. After the Rhyacian orogeny, a Statherian (1.78 Ga) episode of intra-plate magmatism was detected and correlates to the Borrachudos Suite in the Araçuaí orogen. During the Brasiliano orogeny, 600-580 Ma granulite facies metamorphism, coupled with deformation, is recorded in the studied samples. This study is important for paleogeographic reconstructions for the southern São Francisco Craton because of the discovery of more Siderian rocks in the JFC. Finally, the previous interpretation that the JFC was totally an intraoceanic arc during the Rhyacian seems to be incomplete, and a more feasible interpretation could include a scenario with intervening microcontinents, such as that described in the Itabuna-Salvador-Curaçá belt in Bahia state. Anyway, the decoupling between the Lu-Hf and Sm-Nd systems, also detected in other investigations elsewhere, is a key point for future studies of the high-grade reworked units of the basement within the Ribeira belt.

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