Elemental and Sr-Nd isotope geochemistry: implications on sources and processes for granulite formation of central Ribeira Fold Belt

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New elemental and Sr-Nd isotope geochemistry data on migmatites, granulites and orthogneisses obtained from the central segment of Ribeira Fold Belt (SE Brazil) indicate that they are LILE-enriched weakly peraluminous granodiorites. Harker correlation trends for TiO_2, Al_2O_3, $Fe_2O_3^t$, MgO, P_2O_5, Sr, Zr, Hf, Th, U, REE^t, LREE/HREE and La/Lu, as well as incompatible element trends of Th-Hf-La suggest that these rocks represent a co-genetic sequence. Similar REE patterns and juxtaposed isotopic values of ε_{Nd}^{575} = -5.4 to -7.3 and $^{87}Sr/^{86}Sr_{575}$ = 0.706 to 0.711 for granulites, orthogneisses and migmatites is consistent with hypothesis that these rocks evolved from a relatively homogeneous and enriched common crustal (meta-sedimentary) protolith. Results suggest that partial melting of meta-sediments formed migmatites and associated granitoid bodies, whereas long-term crustal slow cooling promoted further dehydration (re-melting) that led to development of widespread granulites.

Sm-Nd T_{DM} ages span from 2.0 to 1.5 Ga is consistent with Paleo- and Mesoproterozoic contributions to the sedimentary pile that was metamorphosed during the assembly of Gondwana. T_{DM} ages and paleogeographic proximity suggest that the São Francisco and West Congo Cratons are the most probable sources for these protoliths. Sm-Nd model ages and inherited zircon SHRIMP dating (Valladares et al., in press) concordance reveals that the protoliths were part of a juvenile crust formed 2.0 to 1.5 Ga ago, whereas the absence of Pan-African T_{DM} ages suggests zircon sedimentary reworking with U-Pb isotopic homogenization of older zircons. This means that during Pan-African times no significant new crust was added, which, combined with the new geochemical model for granulite formation in the studied area, contradicts poli-orogenic scenarios formerly proposed for the evolution of Ribeira Fold Belt.

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Valladares, C.S., Machado, N., Heilbron, M., Duarte, B.P., Gauthier, G., in press. Sedimentary provenance in the central Ribeira belt based on laser-ablation ICPMS $^{207}Pb/^{206}Pb$ zircon ages. *Gond. Res.*