

## THE ESPINHAÇO STATHERIAN RIFT: FIRST Lu-Hf, $\delta^{18}\text{O}$ AND TRACE ELEMENTS FROM ZIRCONS OF THE MAFIC AND FELSIC MAGMATISM IN THE GUANHÃES BLOCK

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Statherian taphrogenic processes are known from the central to eastern Brazil, culminating with the opening of the Espinhaço and correlated continental rift basins. The voluminous felsic magmatism related to the Southern Espinhaço rift is represented in the Guanhões Block by metamorphosed anorogenic granites and rhyolites. The mafic magmatism is relatively restricted, being represented by metamorphosed basalts to gabbros, with subordinated meta-ultramafic rocks. The mafic rocks are composed of varying proportions of hornblende, plagioclase and quartz. The amphiboles show calcic composition with phases varying from Mg-hornblende to tschermakite and the zoned crystals are consistent with growth under prograde metamorphism. The meta-ultramafic rocks are characterized by tremolite-talc schist and tremolite-anthophyllite-talc schist. The porphyritic meta-rhyolites show fine-grained matrix composed by microcline, quartz, plagioclase and biotite. Their plutonic equivalents are biotite granites and hornblende-biotite granites, related to the Borrachudos Suite. The felsic rocks have geochemical characteristics of A2-type granites, suggesting genesis in extensional environments. The  $\epsilon\text{Hf}(t)$  data for the meta-rhyolite zircons are highly negative, varying from -12.32 to -17.58, indicating crustal sources for the felsic magma. The same is revealed by the highly positive  $\delta^{18}\text{O}$  values (7.02 to 7.98) and the REE patterns of the same zircon grains. The Hf  $T_{\text{DM}}$  ages argue against a simple magmatic differentiation model, suggesting the generation of the felsic magmas from the melting of an ancient continental crust. The mafic rocks are tholeiitic in composition and exhibit overall moderate enrichments in most incompatible trace elements, resembling continental intraplate basaltic magmatism, associated with an enriched lithospheric source generated from moderate to high melting rates of a differentiated mantle material. The negative values of  $\epsilon\text{Hf}(t)$  between -4.05 to -8.25 for the meta-basalt zircons indicate that processes of crustal contamination were involved in the generation of this mafic magmatism, which is consistent with the REE patterns of the same zircon grains. The high  $\delta^{18}\text{O}$  data obtained for the meta-basalts (5.56 to 7.87) characterizes a shifted magmatic  $\delta^{18}\text{O}$  values by crustal assimilation. The LA-ICPMS zircon U–Pb ages indicate that the studied mafic and felsic volcanic rocks were erupted at  $1725 \pm 4$  and  $1748 \pm 3$  Ma, respectively. Contrasting with the mafic magmatism, which seems to be restricted to the Southern Espinhaço range and Guanhões Block, the felsic rocks characterize a widespread Statherian (ca. 1750 Ma) magmatic event recorded throughout the whole Espinhaço rift system. The characteristics of the Statherian mafic magmatism in the Guanhões Block suggest petrogenetic processes distinct from those related to mantle plumes. The generation of this magmatism seems to be associated with decompression of the lithospheric mantle.