Evidence for continuous continental crust generation during the magmatic lull

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The Mineiro Belt in the southern São Francisco craton, Brazil represents a large crustal segment composed of multiple plutonic bodies and associated supracrustal sequences. The belt also contain one of the few occurrences of juvenile evolved crust within the magmatic lull. The plutonic rocks have ages varying from 2.47 to 2.10 Ga and represent a set of different arcs that collided against the Archaean nucleus of the craton during the Palaeoproterozoic. The oldest rocks in the belt are TTGs and there is an evolution to younger magmas with sanukitoid (high Ba-Sr) composition. This secular geochemical evolution, observed globally, is inferred to represent the onset of subduction-driven plate tectonics due to the opening of the mantle wedge angle and Earth cooling. A negligible Archaean contribution, testified by the absence of inherited zircon ages and chondritic to superchondritic whole-rock $\varepsilon Nd_{(t)}$ and zircon $\varepsilon Hf_{(t)}$, characterizes the earliest magmas. Oxygen isotope analyses in zircons from these early magmas have a narrow range of values consistent with a depleted mantle source. In progressively younger rocks, some crustal contamination is identified by a broader spectrum of $\delta^{18}O$ above mantle values and a concomitant decrease in $\varepsilon Hf_{(t)}$. Additionally, U-Pb ages from detrital zircons of the surrounding sedimentary rocks show that most of the sediments come from the Archaean blocks to the north of the belt. Thus, an extensive passive margin is inferred for the early stages of the Mineiro Belt tectonic setting, whereas underplating melt and/or contamination of the mantle wedge from a subduction zone explains the isotopic and geochemical signature of the younger magmas. Combined detrital and igneous zircon grains of this study depict a continuous evolution of the supracrustal reworking in Earth's magmatic system during the Palaeoproterozoic. Ultimately, the Mineiro Belt represents evidence of continental crust growth and a delayed magmatic transition shortly after the Archaean-Palaeoproterozoic boundary, compared with other cratons.

*Hugo Moreira acknowledges CNPq grant (234610/2014-0).
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