

Archean crustal growth in Southeastern Guyana Shield

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Records of Archean crust in the Guyana Shield are located in Venezuela (Imataca terrane, Northeastern Guyana Shield) and north of Brazil (Amapá Block, Southeastern Guyana Shield), both reworked by the Transamazonian orogeny during Rhyacian. The Archean Amapá Block is a large continental landmass oriented WNW-ESE, approximately 200 km wide and at least 400 km long. It consists mainly of Mesoarchean TTG-like and granitic orthogneisses, granulites and Neoproterozoic granites. It also includes greenstone sequences and granitoids that form a Rhyacian orogenic association. U-Pb and Pb-Pb zircon dating evidences two main magmatic episodes in the Mesoarchean (~3.19 Ga and ~2.85 Ga) and one in the Neoproterozoic (~2.69-2.65 Ga). Sporadic U-Pb and Pb-Pb zircon ages around 3.32 Ga and 3.49 Ga reveal the existence of some Paleoproterozoic crustal remnants. Hf isotopic data in zircon crystals from Archean magmatic rocks furnished predominant subchondritic ϵ_{Hf} values (-14.0 to -0.1; 89%) and Hf- T_{DM}^{C} ages that argue for at least two episodes of continental crust generation in the Eoarchean (~ 4.0 Ga) and in the Mesoarchean (around 3.0-3.1 Ga). In addition, Hf isotopic signatures suggest that the current architecture of the Amapá Block resulted from the aggregation of two Archean crustal segments geographically distinct, respectively in the SW and NE of the Block. Sm-Nd whole-rock dating furnished Nd- T_{DM} ages ranging from 3.51 Ga to 3.29 Ga ($-3.3 < \epsilon_{\text{Nd}(t)} < -5.6$) and from 3.11 Ga to 2.83 Ga ($-3.1 < \epsilon_{\text{Nd}(t)} < -0.2$) that point to a Paleoproterozoic and a Mesoarchean episodes of crustal growth, respectively. Combined Sm-Nd, U-Pb and Lu-Hf isotopic data indicated that crustal generation in this part of the Amazonian craton started early in the Eoarchean with a major period of crustal growth during Mesoarchean, while Neoproterozoic is dominated by crustal reworking.