



Tracing granitoid sources along the Peruvian western Amazon margin: zircon U-Pb geochronology and Lu-Hf isotopic constraints

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The results of a coupled laser ablation (MC) ICPMS U-Pb and Lu-Hf isotopic study on zircons from the Eastern cordilleran intrusives of Peru reveal 1.15 Ga of magmatic activity along the western Amazonian margin, largely dominated by mid-Phanerozoic plutonism related to the assembly and break up of Pangea. The Hf isotope systematics of magmatic zircons are invariably characterized by a range in the initial $^{176}\text{Hf}/^{177}\text{Hf}$ compositions for a given intrusive event suggesting mixing of material derived from the Paleoproterozoic crustal substrate and variable Neoproterozoic to recent juvenile sources. The periods of well documented compressive tectonics correspond to the negative mean initial epsilon Hf values of -6.73, -2.43, -1.57 for the Ordovician Puna-Famatinian, Carboniferous-Permian and late Triassic respectively, suggesting the minimum crustal contribution between 74% and 45% by mass depending. The average initial Hf systematics from granitoids associated with intervals of regional extension such as the middle Neoproterozoic, Permian-Triassic and Cenozoic Andean back arc plutonism are consistently shifted toward the positive values (mean epsilon Hf = -0.7 to + 8.0) indicating systematically larger inputs of juvenile magma (22% to 49%). In the absence of a recognized phase of the collisional tectonics for over 800 Ma, the time integrated Hf record from the proto-Andean margin of western Amazonia suggests crustal recycling as the dominant process during episodes of arc magmatism and implies that most of continental growth took place vertically via crustal underplating of isotopically juvenile, mantle derived magma during intervals of crustal attenuation.