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A hafnium isotopic record of magmatic arcs and continental growth in the Iapetus Ocean: the contrasting evolution of Ganderia and the peri-Laurentian margin

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KEYWORDS

Zircon, hafnium, Ganderia, Gondwana, Neoproterozoic, Laurentia

ABSTRACT

We test the sensitivity of combined U-Pb-Hf isotopic analyses of detrital and magmatic zircon to document complex processes in accretionary orogens, using Ganderia from the Canadian Appalachian orogen as an example. Ganderia hosted a long-lived magmatic arc that began at least by 650 Ma and continued until 450 Ma, during which time it drifted northward from the Amazonian margin. Its isotopic record suggests arc activity began earlier, possibly at ~750 Ma (proto-Ganderia) within an oceanic domain. The U-Pb-Hf zircon isotopic array suggests that Ganderia formed on a sliver of Paleoproterozoic-Mesoproterozoic basement (TDMc = 2.2-1.1 Ga). A transition toward more evolved Hf isotopic compositions between 650-600 Ma is interpreted to coincide with its accretion to the Amazonian margin of