

# Characterization of Cambrian sandstones on both sides of the modern Atlantic: implications for peri-Gondwanan terrane affinities in the Appalachian-Caledonide Orogen

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The Appalachians of Atlantic Canada, and the Caledonides of Britain and Ireland, include terranes attributed to both Laurentian and Gondwanan sources, separated along the Silurian Solway Line in Britain, and the Ordovician Red Indian Line in Canada. Gondwanan elements to the south and east have been variably assigned to the domains Ganderia, East and West Avalonia, and Megumia, based on their Cambrian sedimentary histories, their provenance, and their isotopic characteristics. A sample of Red Callavia Sandstone from uppermost Cambrian Stage 3 of the Midland Platform, attributed to East Avalonia, yields a U–Pb age spectrum dominated by Neoproterozoic and Paleoproterozoic sources, resembling those in the Welsh Basin, the Meguma Terrane of Nova Scotia, and northwestern Africa. Initial  $\epsilon\text{Hf}$  values suggest that the Neoproterozoic zircon component was derived mainly from crustal sources <2 Ga and imply that the more evolved Paleoproterozoic grains were transported into the basin from an older source terrane, probably the Eburnean orogen of western Africa. A sample from Cambrian Stage 4 in the Bray Group of the Leinster-Lakesman terrane shows, in contrast, a distribution of both U–Pb ages and  $\epsilon\text{Hf}$  values closely similar to those of the Gander terrane in Newfoundland and other terranes attributed to Ganderia, interpreted to be derived from the margin of Amazonia. East Avalonia is clearly distinct from Ganderia, but shows evidence for older crustal components not present in West Avalonia of Newfoundland. Comparison of these results with previous work suggests that Ganderia, Avalonia, and Megumia came from distinct locations on or close to the margin of Gondwana in the early Paleozoic, and that East and West Avalonia may have had different Neoproterozoic histories.