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**Geochemistry and Sm-Nd isotopic signature of the  
0.76 ga Burin Group: a compositional equivalent  
of the basement for late Neoproterozoic  
Avalonian magmatism?**

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The ca. 760 Ma Burin Group occurs in a 60 km long northeasterly-trending belt on the Burin Peninsula of southeastern Newfoundland and consists of low grade massive and pillowed basalts, abundant dykes and sills, with minor mafic pyroclastic rocks and limestone. The Burin Group preserves the oldest known magmatic event in the Avalon terrane, but its tectonic evolution and its relationship to the voluminous 635–570 Ma arc-related magmatism that typifies Avalonia is uncertain. Geochemical analyses confirm that the basalts are predominantly low-K tholeiites. They are characterized by high LIL/HFS, and display depletion to slight enrichment in LREE. Sm-Nd isotopic data reveal that most basalts have juvenile compositions, with  $\epsilon\text{Nd}$  values similar to contemporaneous depleted mantle, indicating that high LIL/HFS was probably due to coeval subduction which contaminated the mantle source. Other basalts have lower  $\epsilon\text{Nd}$  values, and the negative correlation of  $\epsilon\text{Nd}$  with La/Sm, together with a positive correlation of  $\epsilon\text{Nd}$  with  $^{147}\text{Sm}/^{144}\text{Nd}$  suggest that their isotopic signatures have been modified by a Mesoproterozoic or older crust or sub-continental lithospheric mantle into which Burin Group mafic volcanics were emplaced. The isotopic signature of the Burin mafic rocks is similar to that inferred for the source of the main phase of Avalonian magmatism. These data, together with paleocontinental reconstructions for ca. 760 Ma, suggest that the Burin Group is a local representative of an ensimatic arcs within the peri-Rodinian ocean, possibly as a far-field response to the breakup of Rodinia. Vestiges of these arcs were accreted to the northern Gondwanan margin at about 650 Ma, and then recycled by subduction beneath that margin during the main ca. 635–570 Ma Avalonian event. Although its low metamorphic grade precludes it being the basement from which Avalonian magmas were extracted, the Burin Group may be representative of the geochemical and isotopic composition of that basement.