

Meta Incognita microcontinent revisited: insights from U-Pb geochronology and Nd isotopes

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The Meta Incognita microcontinent on Baffin Island, eastern Trans-Hudson Orogen (THO), was first recognized a decade ago and proposed to have formed, together with its attendant shelf succession (Lake Harbour Group), by rifting from an established continental margin. It forms an important building block of NE Laurentia, but its early crustal history remains elusive mainly owing to voluminous syn- to post-accretion magmatism. New geochronological data provide evidence for a protracted Neoarchean to Paleoproterozoic history for the Meta Incognita microcontinent and highlight significant differences with adjacent Archean basement crustal blocks. U-Pb ages from sparse basement exposures, combined with xenocrystic ages from plutonic rocks of variable age, indicate important crust-forming events at ca. 2.68, 2.63-2.60, 2.40, 2.34-2.31, 2.15, and 1.95 Ga with only minor contributions from older Mesoarchean crust (ca. 3.00 and 2.85 Ga). This is in stark contrast to the Rae craton to the north, the recently defined Sugluk block to the southwest, and the Hall Peninsula block to the northeast, all of which are dominated by ca. 2.70 Ga or older crust. The detrital zircon populations in rift-related supracrustal rocks of the ca. 2.099 Ga Schooner Harbour sequence show major age peaks at ca. 2.69, 2.62, 2.41, and 2.31 Ga. These results imply that the Schooner Harbour sequence, now preserved in a folded thrust sheet on the Sugluk block, originated along the margin of the Meta Incognita microcontinent. Clastic and carbonate strata from the <2.01 >1.90 Ga Lake Harbour Group overlie rocks from both the Meta Incognita microcontinent and the Sugluk block. The dominantly Neoarchean to Paleoproterozoic detrital zircon grains (2.74-1.92 Ga) from these strata were also largely sourced from the Meta Incognita microcontinent. Spatial and temporal variations of Nd model ages from Archean to Paleoproterozoic plutonic rocks and the Lake Harbour Group suggest that the Sugluk block accreted to the Meta Incognita microcontinent sometime between 1.95 Ga and 1.90 Ga. We suggest that the boundary fault between these two blocks extends from the well-defined fault along the northeastern edge of Big Island to Foxe Peninsula where it coincides with a strong aeromagnetic lineament. Given the new evidence for the highly contrasting nature of crustal blocks beneath the Lake Harbour Group, we propose to restrict the definition of the Meta Incognita microcontinent to the Neoarchean-Paleoproterozoic basement block that represents the dominant source of the Lake Harbour Group.

At a broader scale, the distinct pre-accretionary history of the Meta Incognita microcontinent is broadly similar to that documented for the Sask Craton of the western THO. Based on geophysical data and lithological associations, the Meta Incognita microcontinent has also been correlated with the Core Zone of the southeastern THO. If correct, these correlations suggest that the Meta Incognita microcontinent may have once formed part of a ribbon-shaped microcontinent within the Manikewan Ocean realm.