

Significance of U-Pb Detrital Zircon Ages in Quartzite from peri-Gondwanan Terranes, New Brunswick and Nova Scotia, Canada¹

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Detrital ages have been determined for zircon grains from quartzite clasts in Neoproterozoic conglomerate units in the Avalonian Mira and Caledonia terranes and from quartzite units in both Avalon terrane (Gamble Brook Formation) and the adjacent Brookville-Bras d'Or terrane (Green Head Group). These data are compared to published detrital zircon data from other sedimentary units in the Avalon and Brookville-Bras d'Or terranes, and from paragneissic units in the latter terrane. The aim of this study was to determine the source of the clasts and the general provenance of metasedimentary rocks in these terranes, data that could help to interpret whether the terranes were assembled by the Neoproterozoic or later during the Paleozoic.

Studied quartzite units in the Avalon terrane show no ages younger than about 1000 Ma, in contrast to stratigraphically younger conglomerate units, which contain a high proportion of detrital ages around 600 Ma, the peak of igneous activity in Avalon terrane. Quartzite from the Brookville terrane and quartzite clasts from the Mira and Caledonia (Avalon) terranes have no ages younger than about 1200 Ma. Detrital zircon ages from these units are concentrated in the range 2000-1200 Ma, and most samples also show some Late Archean ages. Paragneissic units in Brookville-Bras d'Or terrane show age peaks at ca. 700-650 Ma that slightly pre-date the main pulse of Avalon magmatism, and contain Mesoproterozoic zircon grains younger than those in the quartzite samples.

The broad range of Mesoproterozoic to Late Archean ages and general similarity of the age distributions suggest that Brookville-Bras d'Or terrane and Avalon terrane *sensu stricto* developed near the same or similar large continental landmasses, possibly over an extended period of time. On the other hand, the differences between the terranes, together with lithological and metamorphic contrasts, suggest that quartzite and paragneiss in the Brookville-Bras d'Or terrane are not directly related to each other or to sandstone/quartzite units in the Avalon terrane *sensu stricto*. Some components of their detrital age signatures point toward Amazonia as the associated landmass, but if so, Trans-Amazonian (2300-2070 Ma) rocks constituted only a very minor proportion of the source area. Baltica may be a more suitable source to explain the data. Quartzite clasts in the Mira and Caledonia terranes (Avalon terrane *sensu stricto*) show somewhat unique features, such as a concentration of ages around 2000 Ma and the presence of detrital metamorphic zircon at around 680 Ma. This metamorphic zircon may have been derived from a unit such as the Hammondville metamorphic suite in New Brunswick, which has been interpreted to represent the remains of a subduction complex in the Avalon terrane.

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