

Grenvillian Inlier in the Appalachian Orogen: U-Pb ages from the Blair River Complex, northern Cape Breton Island, Nova Scotia

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The Blair River Complex (BRC) forms the surficial expression of the southeastern part of a promontory on the proto-Atlantic continental margin. In the northern Appalachian Orogen this margin, represented by the Humber Zone, is characterized by Grenvillian basement overlain by a Cambro-Ordovician, passive-margin sedimentary sequence. The BRC lacks these sedimentary rocks, but has granulite-facies gneiss, syenite, anorthosite, and granitoid orthogneiss, rock types suggestive of Grenvillian basement.

U-Pb dating of zircons from the BRC suggest that the igneous protolith of the Sailor Brook gneiss is no younger than 1217 Ma, and that metamorphism of this unit occurred at 1035 +12/-10 Ma. Zircon from the Lowland Brook Syenite indicates an igneous age of 1080 +5/-3 Ma. Zircon from a compositionally layered unit of the Red River Anorthosite Complex indicates metamorphism, perhaps accompanied by

injection of minor foreign melt, at 996 +6/-5 Ma. The biotite-rich, garnet-bearing, granitoid Otter Brook orthogneiss yielded an igneous age of 978 +6/-5 Ma. Comparable ages occur throughout the North American Grenville Province.

The effect of a major thermal overprint on the BRC is demonstrated by titanite from seven widely distributed samples, which gave metamorphic ages of ca. 425 Ma. Rutile from the anorthosite complex yielded an age of 410 +2/-3 Ma and likely represents post-metamorphic cooling through 430 to 380°C.

Comparisons of rock types and ages best support a Grenvillian origin for the BRC, and the intense, widespread Silurian metamorphism indicates significant involvement in Appalachian orogenesis. These data support inclusion of the BRC in the Humber Zone.