

Basement Blocks in Southwestern Cape Breton Island and Adjacent Mainland Nova Scotia, Canada, and their Relationship to the Avalon Terrane¹

C. E. White, S. M. Barr², J. W. F Ketchum³ and P. H. Reynolds⁴

Metamorphic and igneous “basement” rocks are exposed in the Creignish Hills, North Mountain, Sporting Mountain, Cape Porcupine, and Petit-de-Grat areas in southwestern Cape Breton Island and adjacent mainland Nova Scotia. The Creignish Hills and North Mountain blocks consist of low-grade metasedimentary and metavolcanic rocks (Blues Brook and Malagawatch formations), low-pressure amphibolite-facies gneiss and migmatite (Skye Mountain gneiss and Lime Hill gneissic complexes), and ca. 555 Ma dioritic to granitic plutons with calc-alkalic, continental-margin arc affinity. These rocks represent the southernmost exposed part of the peri-Gondwanan but non-Avalonian Bras d’Or terrane.

The Sporting Mountain block consists of volcanic and sedimentary rocks intruded by the granodioritic Sporting Mountain Pluton. Lithological similarities and a U-Pb zircon crystallization age of 619 +/- 2 Ma for a rhyolitic flow confirms that Sporting Mountain block is part of the Mira (= Avalon) terrane of southeastern Cape Breton Island.

The Cape Porcupine block on mainland Nova Scotia consists of relatively undeformed ca. 610 Ma granite and syenite thrust over mylonitic metasilstone which yielded ⁴⁰Ar/³⁹Ar whole-rock ages of ca. 365 Ma. The metasilstone is in faulted contact with mylonitic metavolcanic and granitoid rocks, the latter with an Early Ordovician U-Pb zircon crystallization age of ca. 480 Ma. The relationship of the Cape Porcupine block to other basement blocks is uncertain.

The Petit-de-Grat block consists of slivers of varied “basement” rocks, including mylonitic granite, amphibolite, and sillimanite-garnet schist, as well as conglomerate and minor basalt intruded by granite, all in faulted contact with younger Carboniferous sedimentary rocks. A U-Pb zircon age of ca. 373 Ma for the undeformed granite, and the presence of a contact aureole in adjacent conglomerate, are consistent with the interpretation that the conglomerate and basalt are part of the mid-Devonian Guysborough Group of mainland Nova Scotia. The similarity of the metamorphic rocks to basement exposures elsewhere associated with the Avalon - Meguma terrane boundary suggests that the Petit-de-Grat area may be part of the Meguma terrane.

¹Presentation at the Northeastern Section, Geological Society of America 38th Annual Meeting, March 27-29, 2003; *in* Geological Society of America, 2003 Abstracts with Programs, v. 34, p. 17-18

²Department of Geology, Acadia University, Wolfville, Nova Scotia B0P 1X0

³Royal Ontario Museum, 100 Queen’s Park, Toronto, Ontario M5S 2C6

⁴Department of Earth Sciences, Dalhousie University, Halifax, Nova Scotia B3H 4J1