PETROLOGY OF GRANITOID ROCKS OF THE BOISDALE PENINSULA,
CENTRAL CAPE BRETON ISLAND, NOVA SCOTIA

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ABSTRACT

Mapping and petrological studies of granitoid rocks in the Boisdale Hills have identified twelve lithologic units which range from diorite to leucogranite. These units are probably comagmatic and, on the basis of previously published radiometric age data, of late Hadrynian to early Cambrian age. They intruded metasedimentary and metavolcanic rocks of the Hadrynian George River Group and late Hadrynian fourchu Group following the Avalonian Orogeny and appear to be nonconformably overlain by Middle Cambrian to Ordovician sedimentary and volcanic rocks. Devonian and Carboniferous sedimentary sequences nonconformably overlie all of these older rock units.

The largest granitoid units consist of biotite or biotite hornblende granodiorite. Most evolved are texturally distinctive bodies of syenogranite and leucogranite. The intrusive sequence is interpreted to be from mafic to felsic, although relations among the various intermediate lithologies are not completely clear. The rocks display the typical petrological features ascribed to I-type, calc-alkaline granitoids and hence the parent magmas are inferred to have been derived from a primitive deep crustal or mantle source. The bodies were emplaced at relatively shallow crustal levels, especially the syenogranite at the northeastern end of the plutonic complex. Major and trace element compositions of the rocks are consistent with those of other granitoid plutons of similar age in southern Cape Breton Island, although intermediate lithologies (granodiorites) are apparently more abundant in the Boisdale Hills than elsewhere.

The southeasternmost unit (Spruce Brook Pluton) is petrologically similar to the Cockheath Pluton, which is located outside the map area to the southeast of the Boisdale Hills. An especially distinctive feature of both plutons is a compositional range from diorite to granite within a small body. Because of these similarities, the Spruce Brook Pluton may be of particular interest as an exploration target since the Cockheath Pluton and associated volcanic rocks contain significant Cu-Mo mineralization.

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