

area southwest of the City of Moncton. The complex is not known to crop out at surface, but was intersected in a petroleum exploration well drilled in the area in 1919. Subsequent drilling, mainly by Noranda Mining and Exploration Inc., intersected gabbroic rocks at depths of 100–200 m below Carboniferous sedimentary rocks. For the present study, approximately 3700 m of core from the gabbro-anorthosite body were examined and sampled in five Noranda drill holes. Additional samples had been obtained previously from cuttings in older wells. Geochemical data reported in previous studies were combined with additional analyses of samples collected in the present study.

As revealed by the drill core, the complex consists of interlayered coarse-grained anorthosite and gabbro, both intruded by abundant finer grained gabbroic dykes. Much of the core shows extensive alteration but microprobe analyses of fresh samples revealed that the plagioclase in both anorthositic and gabbroic rocks has a fairly uniform andesine composition. In contrast, later diabase dykes contain labradorite. Relict igneous pyroxene of hypersthene composition was observed in rare gabbroic samples, whereas the later diabase dykes contain augite. Ilmenite and apatite are abundant accessory phases, and associated with high Ti, V, and P values in whole-rock analyses.

The deepest drill hole encountered highly altered coarse-grained quartz monzodiorite at a depth of 1196 m. These homogeneous rocks continue to the bottom of the hole at 1206 m. The quartz monzodiorite is mineralogically and chemically similar to rocks in the Gaytons quarry located 20 km east of Lower Coverdale. U-Pb zircon ages of ca. 390 Ma (Middle Devonian) have been obtained for both the quartz monzodiorite in the core and from the Gaytons quarry. Rare felsic dykes in the complex appear to be related to the quartz monzodiorite based on mineralogy and texture. We speculate that the extreme alteration in the gabbro-anorthosite may have been related to intrusion of this H₂O- and F-rich granite.

The Lower Coverdale complex is located in the Brookville terrane of southern New Brunswick. Although the gabbro-anorthosite has not been directly dated, similar rocks in the Stewarton Complex west of Sussex are Silurian or younger based on an intrusive contact with Silurian host rocks. Combined with the ca. 390 Ma from the closely associated Gaytons granite, a Devonian age is suggested for the Lower Coverdale complex.

Petrology and age of the Lower Coverdale high-Ti, -P, and -V gabbro-anorthosite complex and associated granite, Moncton area, New Brunswick

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The Lower Coverdale gabbro-anorthosite complex is the apparent cause of a large positive aeromagnetic anomaly that covers an area of approximately 35 km² in the Lower Coverdale