

Petrology and Tectonic Setting of the Carboniferous Wedgeport Pluton, Southwestern Nova Scotia¹

N. J. MacLean², S. M. Barr² and C. E. White

The Wedgeport Pluton, located southeast of Yarmouth in southwestern Nova Scotia, intruded Cambrian metasedimentary rocks of the Goldenville Formation. The pluton is of particular interest because of its previously reported U-Pb age of ca. 316 Ma, which suggests that it may be the youngest granitoid pluton in the Meguma terrane. Also, east-trending fractures and shear zones in the pluton typically contain tin mineralization, and hence the pluton has been a focus for mineral exploration. Recent 1:10 000-scale bedrock mapping related to the Southwest Nova Mapping Project of the Nova Scotia Department of Natural Resources better defined contact relations and extent of the pluton. This honours thesis project is a follow-up study to better document petrography, mineral chemistry, and chemical composition of the pluton, and hence interpret its magmatic affinity and tectonic setting.

The Wedgeport Pluton consists mainly of medium- to coarse-grained equigranular monzogranite. Major minerals are quartz, plagioclase (albite-oligoclase composition), perthitic microcline, and Fe-rich biotite, with variably abundant garnet (Mn-rich grossular-almandine), titanite, zircon, magnetite, and epidote. Enclaves of biotite-rich granodiorite and coarse-grained granitic porphyry occur locally, as well as convolute compositional banding possibly related to magmatic flow near contacts with the country rock. Aplitic, pegmatitic, and mafic dykes are present locally. A narrow contact metamorphic aureole of garnet-bearing hornfels occurs on the exposed western margin of the pluton; the location of the eastern margin of the pluton is inferred by the presence of small granitic dykes, presumably related to the pluton, in the Goldenville Formation.

Eighteen representative samples from the granite vary in SiO₂ content between about 73 and over 77%. No systematic variation is apparent in CaO, Na₂O, or K₂O content, but TiO₂, Al₂O₃, Fe₂O₃, and P₂O₅ decrease with increasing SiO₂. Trace element data suggest that the pluton is a within-plate A-type granite, with elevated Zr, Nb, Y, and Rb contents. Nb, Y, and Ga ratio indicates derivation from melting of continental crust. Variations in Sr, Ba, and Rb show features typical of specialized granite.

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