
**Field relations, petrology, and tectonic setting
of the Ordovician West Barneys River Plutonic Suite,
southern Antigonish Highlands, Nova Scotia**

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The Antigonish Highlands in northern mainland Nova Scotia are part of Avalonia. Plutonic rocks occur throughout the highlands and recent studies have shown that they are of predominantly two ages: ca. 610 Ma (Late Neoproterozoic) and ca. 470–460 Ma (mid-Ordovician). The older suites are mafic through felsic rocks with typical calc-alkalic “I-type” characteristics. In contrast, the Ordovician plutons, which occur mainly in the southern highlands, are of gabbroic to syenitic and granitic compositions. Mapping in the summer of 2010 showed that the Ordovician intrusions are widespread, covering an area of approximately 100 km² and they have been named the West Barneys River Plutonic Suite. Gabbroic rocks comprise approximately 40% of the area whereas granitic and syenitic rocks represent about 55%. The remaining 5% of the area consists of metasedimentary and volcanic rocks which occur as xenoliths and roof pendants in the plutonic suite. The plutonic suite intruded Neoproterozoic sedimentary and volcanic rocks of the Georgeville Group, which is the probable source of the xenolithic and roof pendant material. The West Barneys River Plutonic Suite displays magma mixing and mingling textures indicative of a co-genetic relationship between the felsic and mafic lithologies. Younger mafic dykes cross-cut all lithologies. This study focuses on the petrography and geochemistry of the gabbroic rocks in the suite. Earlier studies had shown that the granitic and syenitic rocks contain aegirine, riebeckite, and in some samples fayalite, indicative of peralkaline compositions. Petrological indicators suggest that they formed in a within-plate extensional setting. Preliminary petrographic study of the gabbroic rocks shows that they consist mainly of plagioclase, clinopyroxene, amphibole, and rarely olivine or quartz, together with apatite, biotite, and a number of opaque phases including ilmenite, magnetite, and pyrite. Many samples are extensively chloritized, sericitized, and/or saussuritized. Textures are ophitic to sub-ophitic with some samples showing porphyritic textures. Preliminary chemical data indicate that the gabbroic rocks have compositions characteristic of continental within-plate tholeiite.