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**Petrology and tectonic setting of mafic dykes in the  
Boisdale Hills, Cape Breton Island, Nova Scotia**

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Many mafic dykes occur throughout ca. 560 Ma granitoid plutons and their host rocks of the George River Metamorphic Suite in the Boisdale Hills of south-central Cape Breton Island. Based on the study of 86 samples from dykes throughout the area, the dykes are divided into four types: (1) clinopyroxene-bearing, generally the least altered and containing plagioclase, quartz with embayments, and secondary actinolite; (2) amphibole-bearing, with both hornblende and actinolite, and more altered, with only small amounts of relict pyroxene and quartz; (3) plagioclase-phyric, with sericitized plagioclase phenocrysts, quartz showing undulose extinction and amygdales filled with secondary chlorite and calcite; (4) intensely altered dykes that have undergone extensive sericitization covering about 80% of the samples and containing amygdales filled with secondary minerals. All four types contain secondary minerals including both Fe- and Mg-rich chlorite, epidote, calcite, sericite, and saussurite. Mineral analyses by electron microprobe in types 1–3 yielded plagioclase compositions in the range  $An_{17.45}$  and showed that the pyroxene is augite with about 2%  $TiO_2$ . In amphibole-bearing dykes (type 2) the amphibole is magnesio-hornblende and actinolite. Whole-rock chemical analyses show some scatter, especially in mobile elements as a result

of alteration, but most analyses suggest tholeiitic affinity and emplacement in a within-plate tectonic setting. The dykes are chemically similar to Middle Cambrian volcanic rocks of the adjacent fault-bounded Bourinot belt, and were likely related to that volcanic episode, indicating that the Bourinot belt is not allochthonous as has been previously suggested. However, the dykes are also chemically similar to Devonian volcanic rocks and related dykes of the Fisset Brook Formation elsewhere in the Bras d'Or terrane, and to mafic dykes in the Sporting Mountain area in Avalonia to the south. Lack of variation in the composition of these dykes suggests that they are not useful indicators of age and terrane affinity.