

they formed in a within-plate tectonic setting. In contrast, the dioritic dykes have higher SiO₂ and chemical characteristics suggesting that they are calc-alkalic and formed in a volcanic-arc setting. The lamprophyric dykes have compositions indicating that they are genetically unrelated to the other dykes.

Petrology and tectonic implications of mafic to intermediate dykes in the Kellys Mountain area, Cape Breton Island, Nova Scotia

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The Kellys Mountain area is located in east-central Cape Breton Island in the Bras d'Or terrane. The area is underlain by Proterozoic metamorphic rocks (Bras d'Or Gneiss and George River Metamorphic Suite), and Late Proterozoic and Late Cambrian dioritic and granitic plutons, all intruded by abundant mafic to intermediate dykes. Carboniferous sedimentary rocks of the Horton and Windsor groups unconformably overlie all of these units, constraining the age of emplacement of the dykes to between Late Cambrian and Late Devonian.

Petrographic examination of samples from 40 dykes in the area indicates that they are of five main types: clinopyroxene-bearing gabbroic dykes, amphibole-bearing dioritic dykes, gabbroic dykes containing both clinopyroxene and amphibole, plagioclase-rich gabbroic to dioritic dykes, and rare lamprophyric dykes with phlogopite phenocrysts. All of the dykes contain abundant secondary minerals such as chlorite, epidote, calcite, quartz, sericite, actinolite, serpentine, and prehnite. Pseudomorphs of olivine are evident in the lamprophyric dykes and some of the dykes containing clinopyroxene. Most of the dykes are fine-grained and a few are amygdaloidal, indicative of shallow emplacement. Mineral analyses by electron microprobe show that clinopyroxene compositions vary from augite to diopside. Amphibole in the dioritic dykes is magnesiohornblende, but in other dykes it tends to be secondary actinolitic hornblende. Plagioclase compositions in the dykes show a wide range from calcic (bytownite) to sodic (albite). Whole-rock chemical analyses of 21 samples show loss-on-ignition values up to 11.5% but mainly between 2 and 7%. Silica contents recalculated volatile-free, range from 46% to 62%. Oxides TiO₂, Fe₂O₃^t, MgO, MnO, and CaO show negative correlation with SiO₂, whereas Na₂O, Al₂O₃, and K₂O show scatter but generally positive correlation with SiO₂. Trace element data also show wide scatter, although some show weak correlation trends with SiO₂. The dykes classified as gabbroic on the basis of mineralogy generally have volatile-free SiO₂ contents less than 52% and are mainly tholeiitic, transitional to alkalic, with the relatively immobile high-field strength elements indicating that