Petrology and Geochemistry of the Jeffers Brook Dioritic Complex

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The Jeffers Brook dioritic complex occurs just north of the Cobequid fault. It outcrops in the upper portion of the main branch of Jeffers Brook, in a small section on Henry Brook and on scattered woods roads in between. It consists of gabbro, hornblende diorite (locally pegmatitic), quartz dioritic, tonalite and granodiorite, all cut by late-stage felsic pegmatites and aplites. A well-developed thermal aureole with biotite and amphibole surrounds the complex.

The more felsic phases of the pluton, and in particular the granodiorite, are very rich in mafic enclaves. The enclaves may represent either the solid residue from the source mantle or early crystallized phases, or alternatively they come from mingling of a mafic and a felsic magma. On the basis of their textural and petrographical characteristics, the two magma hypothesis is preferred.

The mafic rocks of the plutonic complex show chemical characteristics transitional between tholeiitic and alkali basalts and they are similar to the late dykes associated spatially with the volcanic centres of the Jeffers Group. The felsic rocks show many chemical characteristics ascribed to I-type granites and to volcanic-arc granites.