

STRUCTURAL CONTROL OF GOLD-BEARING QUARTZ VEIN EMPLACEMENT
DURING PLUTONISM IN THE MEGUMA GROUP, NOVA SCOTIA

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The eastern part of the Meguma Group (Nova Scotia) is known for its numerous occurrences of gold-bearing quartz veins, mined for more than one hundred years. Mines are all situated in the hinges of large anticlines of Acadian age. Gold occurrences also seem to be spatially linked to the post-Acadian granitoid of Middle-to Late-Devonian age.

Collected samples from mines of eastern Nova Scotia (Caribou, Fifteen Mile Stream, Goldenville, Harrigan Cove, Lake Catcha, Mooseland, Tangier) indicate a systematic shear deformation of the rocks, emphasized by a strong stretching lineation affecting the metamorphic porphyroblasts.

During field work close to the Musquodoboit Batholith, steeply dipping shear zones affecting

the sediments were discovered. The sense of movement shows that the pluton moved up relative to the sediments.

At Mooseland Mine, rocks were also affected by the shear movement and, it is possible to refine the relative timing between granite emplacement, veining and deformation. In this area the contact metamorphism has produced biotite porphyroblasts which in certain places overprint the shearing and in other places are deformed by the shearing. This shows that shearing was syn-metamorphic. Spatially related to the veins, porphyroblasts of arsenopyrite developed in equilibrium with the biotite porphyroblasts showing that part of the veining, at least, was syn-metamorphic as well. Some veins are sheared, some are not, demonstrating that veining and shearing, both syn-metamorphic, were

probably contemporaneous at least in Mooseland.

The pluton emplacement induced the development of biotite, andalusite and cordierite in chlorite-muscovite-bearing slates. These transformations have been quantified in order to estimate the amounts of silica and fluids available to form quartz veins.

A simple model is proposed to account for the quartz veins, the metamorphic transformations and their association with shear zones. The pluton rising in chlorite-muscovite-rich slates, provoked the release of abundant fluids and quartz. These fluids moved upwards using the shear zone planes induced by the rising pluton. The fluids were then trapped in anticlinal hinges. Whether the gold contained in the veins came from the slates or from the pluton remains unanswered at present.