

---

**Employing contact metamorphism to assess the  
conditions of pluton emplacement in southwestern Kellys  
Mountain, Cape Breton Island, Nova Scotia**

---

NABIL A. SHAWWA, ROBERT P. RAESIDE, AND  
DAVID W.A. MCMULLIN

*Department of Earth and Environmental Science, Acadia University,  
Wolfville, Nova Scotia B4P 2R6, Canada  
<093408s@acadiau.ca>*

At Kellys Mountain, Cape Breton Island, Nova Scotia, the Precambrian meta-quartz wacke of the Glen Tosh formation (a low-grade component of the Barachois River Metamorphic Suite) has been intruded by diorite, granodiorite, and granite plutons, and hosts a narrow metamorphic contact aureole. In the contact aureole metasedimentary rocks are biotite- and cordierite-bearing, and have reached amphibolite-facies metamorphic grade. Minor actinolite-bearing meta-tuff and meta-andesite are also found throughout the unit. Outside the aureole, the metamorphic grade is at lower greenschist facies, but farther to the north the Barachois River Metamorphic Suite increases in grade into the sillimanite zone in the eastern Cape Breton Highlands.

The conditions of metamorphism in the aureole have been determined to result in the development of neoformed

biotite, muscovite, cordierite, ilmenite, garnet, andalusite, and sillimanite in the meta-quartz wacke, a mineral assemblage also found in the Kellys Mountain Gneiss as a result of low-pressure regional metamorphism. The mineral assemblages in the Precambrian meta-quartz wacke are sufficiently developed to determine the depths of intrusion of the plutons, which caused the contact metamorphic aureole. Understanding the level of intrusion allows consideration of questions involving the relationships among the plutons, and comparison of this contact aureole with other metamorphic rocks in the area (e.g., Kellys Mountain Gneiss and northern parts of the Barachois River Metamorphic Suite).

Petrographic and microprobe analysis have been performed in order to determine the temperature and pressure conditions of metamorphism of the meta-quartz wacke in the Glen Tosh formation. Conditions have been determined to be 2.5–5.2 kbar at 365–750°C, implying intrusion at depths of as much as 16 km, although earlier formed andalusite indicates that the rocks may have initially undergone a low-pressure regional metamorphic event prior to the deeper high-pressure contact metamorphic event.