Bedrock of German Bank, southwestern Scotian Shelf: offshore continuation of the Meguma terrane

C. W. Mccall[1], G. Pe-Piper[1], and B.J. Todd[2]
1. Department of Geology, St. Mary's University, Halifax, NS B3H 3C3, Canada <c_mccall@smu.ca> ¶ 2. Geological Survey of Canada (Atlantic), Bedford Institute of Oceanography, Dartmouth, NS B2Y 4A2, Canada <brian.todd@nrcan.gc.ca>

Petrographical, geochemical, and mineralogical studies carried out on fifteen igneous clasts from German Bank, offshore southwestern Nova Scotia, indicate an offshore Meguma terrane provenance. Representative crystals of iron-titanium oxides (primarily ilmenite and magnetite) in nine granite samples were analyzed by electron microprobe accompanied by backscattered electron images. Of these nine samples, eight show a strong affinity to the magnetite-bearing granitoid rocks from three short drill cores obtained in 1976 from German Bank. Using variations in Rb, Nb, and Y, the eight granite samples were classified. Four of the samples classify as volcanic arc granites (VAG), three as within plate granites (WPG), and one on the field boundary that separates syn-collision granites (SYN-COLG) and VAG. Variations in Ta, Rb, and Hf resulted in two samples within VAG, two in WPG, two in late and post-collision granites (pCIII), and two on field boundaries: the VAG and WPG field boundary and the other on WPG and pCIII field boundary. The remaining sample, an ilmenite granite, shows mineralogical and geochemical characteristics of 'Meguma granites' (similar to granitoid rocks of the South Mountain Batholith) as the sample contains primary muscovite and biotite along with the Fe-Ti oxide ilmenite.

The gabbro sample showed similar variation in trace elements and rare-earth-elements as Triassic alkaline rocks of Nova Scotia, although both its chemistry and petrography are also consistent with a source from the White Rock Formation alkaline basalts which thus cannot be precluded. Of the remaining four samples, two are meta-igneous with no conclusive provenance, and the final two samples, granite and rhyolite, respectively show chemical affinities to Avalon-type WPG and porphyritic rhyolite of WPG affinity. These latter two samples are probably erratic blocks.