

Observations on the nature of aplite-pegmatite sheets in the Peggy's Cove area, Halifax County, Nova Scotia

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The Peggy's Cove area is underlain by compositionally uniform, but texturally variable biotite monzogranite of the 370 Ma peraluminous South Mountain Batholith (SMB) of southern Nova Scotia. Extensive coastal outcrop provides an opportunity to examine the nature and origin of pegmatite-aplite sheets. In this study, an area north of Peggy's Cove southwards to East Dover was mapped at 1:2000 scale on expanded aerial photographs and all pegmatite-aplite occurrences were noted. In several cases, detailed mapping of pegmatite-aplite sheets was done as a basis for geochemical

studies. Observations of the coastal exposures reveal: (1) a generally uniform texture for the monzogranite, but with local variations in the size (± 10 -12 cm) and abundance (± 30 -40%) of K-feldspar megacrysts; (2) large variation in abundance, size and texture of xenoliths; (3) occurrence of K-feldspar - rich pegmatite zones about xenoliths; (4) local development of magmatic layering; and (5) a concentration of pegmatite-aplite sheets in zones subparallel to coast. Examination of the pegmatite-aplite sheets reveal: (1) extreme vertical and lateral variability in evolution of pegmatites and aplites; (2) welded

contacts versus structural contacts, but at one locality tourmaline fibres occur at the contact; (3) general zonation of line rock with contorted texture in the bottom half and coarsening of the leucocratic material and development of monomineralic K-feldspar layers in the upper part; (4) development of Qtz-ms-tourmaline - rich pockets on variable scales; (5) generally flat dips, which contrast with steep dips for fractures; (6) wedge-shaped terminations to sheets that define en echelon arrays on both a small and large scale. Geochemistry indicates the following: (1) aplites are silica rich (75-78 wt. % SiO_2) with $\text{K}_2\text{O}/\text{Na}_2\text{O} \geq 1$, Rb=180 to 260 ppm, Sr \leq 30 ppm, Nb \leq 5 ppm, Sn \leq 8 ppm; (2) bulk K-feldspar is Or₇₂₋₈₀ with 250-350 ppm Rb and 120-190 ppm Ba; (3)

perthitic feldspars consist of Or₈₆₋₉₅ with <0.5 wt. % P_2O_5 and Ab₉₆₋₁₀₀; (4) muscovite contains ca. 1-2 wt. % FeO and 0.4-1.0 wt. % MgO with F not detected; (5) tourmaline is Fe-rich with Fe:Mg of 2:1 to 5:1. These chemical indices indicate that the pegmatites are not extreme fractionates, but instead represent local segregations of the host monzogranites. We tentatively suggest that the pegmatite-aplite sheets formed due to infiltration of fluids derived from devolatilization of either the Meguma Group country rock or xenoliths. Stable isotope analysis and fluid inclusion work in progress will address the validity of this hypothesis.