

### **Variations in LIL elements, HFS elements and REES within the Davis Lake Pluton, southwestern Nova Scotia**

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The Davis Lake Pluton (DLP) is a large (816 km<sup>2</sup>), tilted mushroom-shaped intrusion occupying the southwestern end of the South Mountain Batholith. Coarse-grained monzogranite is the dominant lithology of the DLP with minor fine- to medium-grained leucomonzogranite (2-6% mafic minerals) and leucogranite (<2% mafic minerals) exposed in the westernmost lobe of the DLP along the contact with Lower Paleozoic metasedimentary rocks of the Meguma Group.

The DLP displays pronounced continuous and discontinuous cryptic chemical zonation. For example, the K/Rb ratio shows continuous variation from >200 to <50. Present day

measured whole-rock uranogenic lead isotopic ratios and  $\Sigma$ REE's show similar variation with the least evolved rocks of the DLP (K/Rb from 204 to 244) having  $\Sigma$ REE's ranging from 143 to 212 and  $^{206}\text{Pb}/^{204}\text{Pb}$  ratios between 18.627 and 18.884 and the most evolved rocks (K/Rb ratios <50) having  $\Sigma$ REE's ranging from 22 to 48 and  $^{206}\text{Pb}/^{204}\text{Pb}$  ratios ranging from 27.742 to 51.945. Elemental pairs such as Zr-Ta, Ti-Zr and K/Rb-Rb/Sr ratios show continuous co-variation. Marked discontinuity is shown by other elements such as Y, Th and Nb, and also  $^{208}\text{Pb}/^{204}\text{Pb}$  isotopic ratios. Spatial discontinuities occur in a zone which is characterized by granitoid rocks with a K/Rb ratio between 50-100.

Distinctive geochemical trends are recognized in some of the data such that two groupings are made: group 1 is characterized by  $\Sigma\text{REE}$ 's from 66 to 152 ppm ( $x=111$ ) and  $(\text{La/Yb})_N$  ratios from 1.71 to 2.74 ppm ( $x=2.23$ ); group 2 is characterized by  $\Sigma\text{REE}$ 's from 40 to 75 ppm ( $x=55$ ) and  $(\text{La/Yb})_N$  ratios from 4.00 to 8.08 ( $x=5.28$ ).

The regional chemical and isotopic variations within the

DLP cannot be explained by assimilation/fractional crystallization of a single magma or subsequent deformation and attending hydrothermal alteration of the pre-existing rocks. The most plausible explanation for the observed variation is the presence of two distinct peraluminous magmas derived from a heterogeneous source region.