

**Contrasting greisens and associated granitoid rocks of the Davis Lake Pluton:
implications for the origin of the East Kemptville tin deposit, Nova Scotia**

A.K. Chatterjee and M.A. MacDonald

Nova Scotia Department of Mines and Energy, P.O. Box 1087, Halifax, Nova Scotia B3J 2X1, Canada

Muscovite-rich ($K_2O=3.21-4.33$ wt. %) polymetallic quartz-topaz greisens (0.16-1.78% Sn) at the East Kemptville tin deposit and other greisen veins hosted within the leucogranites of the Davis Lake Pluton (DLP) are characterized by low K/Rb (<50), high Rb/Sr (>84) and high average concentrations of F (1.6%), Li (830 ppm) and Rb (1060 ppm). Published analyses of the greisens together with the present data define two distinct U-enrichment trends in the U-Th-Y ternary system. The two trends are essentially due to different Th/U and Th/Y ratios with similar but changing U/Y ratio. The concentration of 14 REE's and $(La/Yb)_N$ ratios for the greisens and associated granitoids also show two distinct groupings for each rock type. Two distinct trends are also recognized for greisen, leucogranite and leucomonzogranite in the $^{206}Pb/^{204}Pb$ vs $^{208}Pb/^{204}Pb$ diagram. However, linear variations in $^{208}Pb/^{204}Pb$ vs $^{232}Th/^{204}Pb$ and $^{238}U/^{204}Pb$ vs $^{206}Pb/^{204}Pb$ diagrams imply immobility of U, Th and Pb since the time of crystallization and greisenization.

The most significant feature of the data set is the remarkable collinearity in the $^{206}Pb/^{204}Pb$ vs $^{207}Pb/^{204}Pb$ diagram for the greisens and associated leucogranitoids. Greisens from both trends define a slope of 0.053872 (S.D. 0.000065) and a corresponding age of 365.7 ± 2.7 Ma (MSWD 1.95, 2 sigma). The combination of leucogranite and greisen together defines a slope of 0.053879 (S.D. 0.000066) corresponding to an age of 366.0 ± 5.6 Ma (MSWD 1.79, 2 sigma). We conclude that greisen and leucogranite are of similar ages and are not 40 Ma younger than the remainder of the South Mountain Batholith as previously suggested. We argue that separate greisen fluids were probably derived from two distinct peraluminous magmas derived from an heterogeneous source, and that the East Kemptville tin deposit probably owes its origin to mixing of these fluids under post-magmatic conditions. The heterogeneous source for the DLP magma(s) was probably characterized by a significantly higher $^{238}U/^{204}Pb$ ratio than the average orogene.