

Petrographic and portable X-ray fluorescence geochemical analysis of variably altered granitic rocks associated with the North Zone Sn-Zn-Cu and W-Mo-Bi deposits, Mount Pleasant, New Brunswick

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The Mount Pleasant deposits are associated with a late Devonian caldera complex containing sedimentary and bimodal volcanic rocks intruded by subvolcanic felsic plutonic rocks. Mount Pleasant is divided into two zones, the North Zone and the Fire Tower Zone, hosting numerous Sn-Cu-Zn-In (North Zone) and several W-Mo-Bi (Fire Tower Zone & North Zone) deposits. This study focuses on ascertaining the primary compositional affinity of the variably altered granitic rocks (chloritized, sericitized, sulfidized, and locally biotitized) associated with mineralization exposed in the North Zone; 35 samples were taken for petrographic and geochemical analysis. Field gamma-ray spectrometry at the sample sites indicate that the highest eTh is 45 ppm, eU is 19 ppm, and K is 6.60 wt.%. In terms of elements potentially able to discriminate between granitic rock types, immobile elements were selected, i.e., Ti, Zr, Th, Y, Nb, and P, for analysis by pXRF. The Th/Ti ratio shows the best separation between the samples, with three distinct groupings ranging from 0.00225–0.00833, 0.01194–0.0119, and 0.0847–0.198; this ratio was compared to the abundances and ratios of other immobile elements Nb, Zr, and Y to characterize the sampled granites. Results indicate that at least 3 variably altered granitic intrusions occur in the North Zone. The pXRF results also show Sn up to 3830 ppm, Cu up to 839 ppm, Zn up to 19737 ppm, W up to 835 ppm, and Mo up to 5224 ppm, associated with high Fe and low to moderate K contents, i.e., high Fe/K.