

Lithogeochemistry and Petrography of the Guichon Creek Batholith, Southcentral British Columbia

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Abstract

The Guichon Creek Batholith is an Upper Triassic calc-alkaline batholith located approximately 54km southwest of Kamloops, British Columbia within the Intermontane Terrane. The batholith is host to the Highland Valley Copper deposits and is being studied in order to characterise the unaltered signature of the host rocks. Preliminary petrologic and geochemical analysis has been completed on four of the six main concentrically zoned intrusive facies that comprise the batholith. The intrusive rocks of the batholith are, from the core outwards, Bethsaida, Skeena, Bethlehem, Guichon, Chataway and Border facies. The Bethsaida facies is the least mafic (1 to 5% mafic minerals) with biotite/hornblende ratios of 2.0 to 3.0 and contains numerous coarse-grained amoeboid quartz eyes and biotite phenocrysts in a feldspar groundmass. The Bethlehem facies contains a higher mafic mineral content (7 to 12%) with biotite/hornblende ratios of 0.286 to 0.300, lacks amoeboid quartz eyes and has coarse-grained hornblende phenocrysts that poikilitically enclose fine-grained laths of euhedral plagioclase. The Skeena facies has textures and mineralogy intermediate to the adjacent Bethsaida and Bethlehem facies. Skeena rocks are characterised by finer-grained amoeboid quartz and hornblende phenocrysts than those observed in the Bethsaida and Bethlehem facies, mafic mineral contents from 5 to 10% and biotite/hornblende ratios of 0.40 to 0.75. The Chataway facies has the most mafic minerals (13 to 15%) and they are evenly distributed. Geochemical trends on bivariate diagrams indicate that fractional crystallization may account for the geochemical differences between the phases. The alkali saturation index suggests that the batholith evolved from metaluminous to peralkaline chemistry over time. Trace element geochemistry indicates an enrichment in light rare earth elements and strong negative Nb anomalies consistent with magmas derived from mantle wedge source typical of continental arcs.

“CMIC-NSERC Exploration Footprints Network Contribution 022.”