

Magma Fertility in the Guichon Creek and Nicola Batholiths

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The Guichon Creek Batholith (GCB) is an Upper Triassic calc-alkaline batholith located approximately 54 km 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. The magma fertility (based on oxidation and hydration state) of the GCB has been assessed and compared to that of the Upper Triassic Nicola Batholith (NB) located approximately 20 km to the east and to other arc-related plutons of the Intermontane Terrane. The relative fractionation of hornblende and titanomagnetite versus plagioclase was used as a proxy for the oxidation and hydration state of the magmas. Plots of Sr/Y, Al₂O₃/TiO₂ and V/Sc versus SiO₂ wt% are consistent with the fractionation of hornblende and titanomagnetite from highly oxidized and hydrous magmas in both the GCB and NB relative to other, infertile granitoid plutons of the Intermontane Terrane that host no significant porphyry style mineralization. La/Sm_{cn} ratios gradually increase with decreasing relative age peaking with the emplacement of the Bethsaida facies and aplite dykes. Gd/Yb_{cn} ratios are unchanged prior to the first mineralizing event and then show a gradual decrease through the emplacement of the crowded quartz feldspar porphyry to aplite dykes. This change cannot be linked to a concurrent change in La/Sm_{cn} ratios and is likely due to fractionation of the MREEs into hornblende.

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