Volcanic Stratigraphy, Petrology and Tectonic Setting of the Eastern Margin of the Eocene Kamloops Group, South-Central British Columbia

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The Eocene Kamloops Group in southern British Columbia is situated midway along the Challis-Kamloops volcanic belt of the North American Cordillera. The volcanic stratigraphy of the eastern margin of the Kamloops Group consists of five lithofacies: a pre-volcanic coarse sedimentary facies, a mafic volcanic flow facies dominated by high-K, calc-alkaline basaltic andesite to trachy-andesite, a syn-volcanic lacustrine facies of non-volcanic and volcanogenic sediments, a felsic volcanic facies of porphyritic trachyte, dacite and rhyolite domes, flows and dykes, and an epiclastic facies characterized by massive to crudely-bedded volcaniclastic diamictite. The depositional environment is syn-extensional; the strata are in unconformable contact with footwall gneisses of the Shuswap metamorphic complex. The five lithofacies recognized in the study area form a representative stratigraphy of the regional volcanic field (Kamloops, Princeton and Penticton Groups). An upper constraint on volcanism at the Trinity Hills outlier is provided by a new $^{40}$Ar/$^{39}$Ar age of 48.2±0.5 Ma on biotite from its youngest volcanic unit.

The eastern Kamloops Group successions are high-K calc-alkaline, LILE (large ion lithophile element) enriched, and HFSE (high field strength element) depleted to slightly enriched lavas, relative to N-MORB. Geochemical analysis of new data from throughout the regional volcanic field indicates that some of the lavas derive from sources other than the depleted mantle wedge; the Princeton and western Kamloops Group lavas are adakites, and successions in the southeast part of the volcanic field have enriched mantle signatures.

Spatial analysis of geochemical data from throughout the Challis-Kamloops volcanic belt reveals that LILE enrichment does not vary significantly from north to south, but that HFSE are less depleted in the south part of the belt than in the north. The geochemical characteristics, distribution and style of emplacement of Challis-Kamloops magmatism is consistent with those of modern slab window environments. New geometric modelling of the Kula-Farallon slab window shows that this tectonic feature was situated beneath the southern part of the Challis-Kamloops belt in the Middle Eocene.