Quaternary alkaline and calc-alkaline basalts in southern British Columbia: mixed signals from mantle sources above the southern edge of the Juan de Fuca–Pacific slab window

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Subaerial lava flows of the Quaternary valley lavas mark the end of Chilcotin Group intraplate volcanism in southern British Columbia. Two geographically defined units are recognized: the Quilchena and Lambly Creek lavas. Erupting intermittently from discrete centres, lava flowed into existing paleodrainages from 1.5 Ma (Lambly Creek) to 780–100 ka (Quilchena). Subsequent erosion removed most of the estimated 8.8–21.1 km$^3$ of lava. Internal features are well preserved, some indicative of flow inflation and transport direction. The lavas are alkaline to calc-alkaline basalts, trachy-basalts, basaltic andesites and trachy-basaltic andesites, with trace element characteristics similar to ocean island basalt and Nd values from 8.0-8.4. The lavas resulted from partial melting of garnetiferous asthenosphere that welled up through the subducted Nootka Fault and thermally eroded Explorer and northern Juan de Fuca plates south of a slab window. Geochemical modelling indicates that the mantle source was heterogeneous, composed of variably enriched peridotite.