



Glacier-volcano interactions provide insight on glacial history and geomorphic evolution, Ft. Selkirk, Yukon Territory, Canada

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Multidisciplinary studies of volcano glacier interactions over the last 30 years in the Ft. Selkirk area Yukon Territory have refined the history of the Northern Cordilleran Ice Sheet and given insight into paleoclimate and geomorphic evolution of the region. Neogene volcanism in the Fort Selkirk area began with eruptions in the Wolverine Creek basin ca. 4.3 Ma and persisted to ca. 3.0 Ma, filling the ancestral Yukon River valley with at least 40 m of lava flows. Hyaloclastic tuff was erupted between ca. 3.21 and 3.05 Ma. This eruption caused or was coincident with damming of Yukon River. The Ne Ch'e Ddhäwa subglacial mound was erupted beneath at least 300 m of glacial ice (Ne Ch'e Ddhäwa Glaciation), representing the first demonstrable incursion of a Cordilleran ice sheet into the Fort Selkirk area ca. 2.1 Ma. The eruption of the Fort Selkirk center occurred between the last eruption of Ne Ch'e Ddhäwa and Fort Selkirk Glaciation (ca. 2.1+/-1.5 Ma). Till and outwash from Fort Selkirk Glaciation are conformably overlain by nonglacial sediments that contain the Fort Selkirk tephra (fission track dated at ca. 1.5 Ma) and a short magnetic reversal (reversed to normal polarity) identified as the Gilsá polarity excursion. This constrains Fort Selkirk Glaciation to Marine Isotope Stage 54. Rapid and extensive eruption of the Pelly eruptive center filled the Yukon River valley with 70 m of lava, which preserved these glacial and nonglacial sediments while also damming Yukon River. Local striations and erratic pebbles occur on the last of these lava flows. They document a subsequent incursion of glacial ice (Forks Glaciation) during the last 500 ka of the Matuyama Chron. At 1.33 Ma, an eruption of pahoehoe flows dammed a lake at least 40 m deep, 65 m above the level of the confluence of the Yukon and Pelly rivers. The last major eruption of mafic lava occurred in the middle Pleistocene; lava dammed Yukon River in the area of the Black Creek confluence. This eruption predated the middle Pleistocene Reid Glaciation which deposited outwash on this flow.