

Presentation

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Paper No. 33-6

Presentation Time: 9:00 AM-6:00 PM

PETROLOGY AND GEOCHEMISTRY OF BASALTIC PILLOW LAVAS IN TETON CANYON, IDAHO, U.S.A

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Basalt pillow lavas are well exposed near the mouth of Teton Canyon, Idaho, U.S.A. The basalt outcrops occur on the south canyon wall and consist of three successive columnar-jointed flows, each of which has a zone of pillow lavas at its base. The pillows are as large as 0.5 m in diameter, and the total basalt section is ~25 m thick. Many of the pillows have outer surfaces of palagonite and some have glassy rinds. The flows originated from one of several shield volcanoes on the Rexburg Bench, south of Newdale, Idaho on the southeast margin of the Snake River Plain. The unique nature of these flows is that the three flow layers with pillows at their base indicate a three-level damming of the river. Dating is currently in process, but given that the flows lay stratigraphically on top of Huckleberry Ridge Tuff, their age is less than 2.1 Ma. The two most common phenocrysts in the flows are plagioclase and olivine. The oldest flow contains many large phenocrysts of plagioclase whereas the overlying flows contain progressively smaller ones. The olivines are euhedral and volumetrically make up ~10% of the youngest flow, whereas in the oldest and middle flows they are subhedral and volumetrically make up only ~7% of the flows. Geochemically the rocks are compositionally indistinguishable from other basalts of the Yellowstone Snake River Plain volcanic system. Compositions vary as follows: MgO from 5.31 to 6.54 weight percent (normalized to anhydrous); Ba from 467 to 588 ppm; La from 50.70 to 65.80 ppm; Ce from 85.20 to 112.45 ppm; Pb from 8.10 to 9.90 ppm; Sr from 274.40 to 281.10 ppm; Nd from 28.90 to 36.25 ppm; Zr from 397.20 to 530.30 ppm; and Y from 53.70 to 67.15 ppm. Assuming fractional crystallization was significant in controlling magma compositions, the petrography and trace element compositions indicate that the source magmas became less evolved through time (i.e., the lowest flow is the most differentiated), likely indicating that as the eruption proceeded magma that had spent less time in the crust was progressively erupted.

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[top](#)



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