

An Initial Report of Research Into the Identification of Lava Flows at the Broken Top and North Crater Cinder Cones in the Craters of the Moon Lava Field by Their Chemical and Petrographic Composition (the Great Rift of Idaho, Snake River Plain)

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Abstract

Craters of the Moon lava field was formed during the Great Rift of Idaho volcanic activity for more than 15 Ka. There are still unsolved questions about chemical and petrographic compositions of lava flows inside the Craters of the Moon lava field, their relative and absolute ages, and depths of their magma generation chambers. The research undertaken by the author is based on results of field work, petrographic and microprobe analysis of lava samples, and published materials on the Great Rift and adjacent territories. The chemical and petrographic composition of North Crater and Broken Top cinder cones and lava flows, and the South Highway and Blue Dragon lava flows was analyzed. The North Crater lava flow and cinder cone mainly consist of trachybasalts and basaltic trachyandesite. The South Highway lava flow can be divided into three groups of flow and cinder, which are 1) dacite-trachydacite-trachyte; 2) basalt-trachybasalt, and 3) andesite-trachyandesite. The main lava flow of Broken Top is composed of trachybasalt and basaltic trachyandesite. The cinder cone of Broken Top consists of basaltic andesite and basaltic trachyandesite. It is shown that the chemical composition of glass, olivine and the spinel group minerals is unique in each lava flow or cinder cone, which serves as a tool to identify each lava flow. Depths of magma generation were estimated for North Crater, South Highway, Broken Top and Blue Dragon lava flows. It was determined that during the evolution of volcanic activity of the Great Rift the depth of magma generation has decreased. This is explained by the decompression which took place as the Great Rift stretched, allowing the magma chamber to rise closer to the surface. This can be observed in the eruptive and non-eruptive fissures that run parallel to the rift.

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