Distribution of intermediate volcanic rocks on the Pajarito Plateau, Jemez Mountains, New Mexico

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Boreholes drilled for groundwater characterization at Los Alamos National Laboratory encountered at least three petrographically and chemically distinct intermediate lavas in the west-central Pajarito Plateau. These lavas represent a narrow time interval (2.3-3.6 Ma) during which both the Jemez Mountains volcanic field and Cerros del Rio volcanic field were active.

Boreholes in the northern part of the Laboratory encountered fine-grained dacitic lava with 2-5% phenocrysts (5-35% plagioclase, 61-86% pyroxene, absent or minor amphibole) and relatively low SiO2 (~63.5%). Boreholes in the southwest part of the Laboratory encountered coarsely porphyritic lavas with 22% phenocrysts (59% plagioclase, 13% pyroxene, 25% amphibole) and 64.9-66.3% SiO2. Glomerophyric, sieved plagioclase grains are abundant in these samples. Boreholes in the central part of the Laboratory encountered fine-grained lavas with 22% phenocrystal abundance (59% plagioclase, 13% pyroxene, and 1% relict amphibole) and relatively high SiO2 (67.4%).

Although the relationship between the northern intermediate lavas and the adjacent volcanic fields is unclear, dacites in the central part of the Laboratory overlie late Pliocene basalts that thin to the west, suggesting a link with the Cerros del Rio volcanic field. The southwestern lavas resemble adjacent Sierra de los Valles Tschicoma Formation lavas, particularly Pajarito Mountain and Cerro Grande, which have an average of 23% phenocryst content (70% plagioclase, 10% pyroxene, and 17% amphibole), and range in SiO2 composition from 63.77-68.9%. Pajarito Plateau intermediate lavas, erupted near the active western margin of the Española basin, represent an important link between coeval volcanism in the Cerros del Rio and Jemez volcanic fields.

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