

KĪLAUEA CALDERA:
THE GEOLOGY AND STRATIGRAPHY OF THE WESTERN WALL*

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A reexamination of Kīlauea caldera is underway, focusing on the geology and stratigraphy of the western caldera wall extending from the Steaming Bluff on the north to the Outlet on the southwest. The wall has a maximum height of 135 m at a point below the Hawaiian Volcano Observatory at Uwēkahuna Bluff. Mapping of a stratigraphic section at the Uwēkahuna Bluff reveals at least 63 subaerial flows as well as two sections of ash. An angular unconformity separates the upper 53 units from the lower 10 units. No evidence has been found to indicate the presence of sills or laccoliths within this measured section. Large scale lithologic differences among subaerial flows have been observed in the olivine phenocryst content, vesicularity, and the position and attitude of flow units. These lithologic differences allow us to extend some mappable units laterally for up to 2 km northeast of the Uwēkahuna Bluff section.

Although no intrusive bodies have been found within the Uwēkahuna Bluff section, intrusives have been mapped on the western wall. These include the Uwēkahuna laccolith (Murata & Richter 1961) as well as 19 dikes which vary in width from several tens of centimeters up to 2 m. Many contain glassy chilled margins. Several dikes also contain small sill-like extensions indicating that the dikes were intruded under pressure. Other dike-like bodies appear to be drain-back features such as might be produced when a subaerial flow drains into an open fissure. In most cases, field relationships make it possible to distinguish between the various types of dikes.

Two ash formations are exposed in the Uwēkahuna section. The surficial Keanakākoi Ash has been studied in detail by Christiansen (1979), who concluded that the entire unit was emplaced during a phreatomagmatic eruption in 1790 A.D. The older Uwēkahuna Ash is exposed near the base of the northwest caldera wall from a point beneath the Hawaiian Volcano Observatory northeastward from roughly 1 km. The stratigraphy includes lithic, vitric, and crystal-rich layers which drape underlying lava flows. Preliminary field results suggest a source for the Uwēkahuna ash in the northern part of the present caldera.

LITERATURE CITED

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