

CURRENT STUDIES OF KĪ-LAU-EA AND MAUNA KEA VOLCANOES
BY THE HAWAIIAN VOLCANO OBSERVATORY
OF THE U.S. GEOLOGICAL SURVEY*

P. W. Lipman, L. A. Anderson,
R. Y. Koyanagi, and J. P. Lockwood
Hawaiian Volcano Observatory
U.S. Geological Survey
Volcano, Hawaii 96718

The prime responsibility of the Hawaiian Volcano Observatory (HVO) of the U.S. Geological Survey is to advise the State and County of Hawaii and the National Park Service of potential volcanic and other natural hazards on the Island of Hawai'i. HVO, with a permanent staff of 17 scientists and technicians, also carries on a diversified program of basic scientific research on seismicity, eruptive processes, and cooling and crystallization of basalt. Over the last 25 years, attention has focused on Kī-lau-ea Volcano, but since its reawakening in 1974, Mauna Loa Volcano has occupied an increasing proportion of HVO's efforts. In addition to volcanic hazards, the 1975 Kala-pana M=7.2 earthquake and related tsunami and catastrophic ground movements provided a recent reminder of other natural hazards of recurrent concern.

Readiness of a Hawaiian volcano to erupt is evaluated primarily on the basis of seismic activity and changes in shape (inflation) of the volcano. Kī-lau-ea and Mauna Loa inflate gradually prior to an eruption, as magma accumulates in shallow reservoirs within the volcanoes; abrupt deflation accompanies and follows many eruptions, especially flank activity. Primary monitoring efforts include a 37-station island-wide seismic net to study patterns of earthquakes related to volcanism, a trilateration net of several hundred lines to detect horizontal-distance changes, more than 100 km of level lines to measure changes in elevation, approximately 70 tilt stations to detect changes in slope, and electrical surveys to detect conductivity changes caused by the subsurface movement of magma within the volcano.

As of early June, 1976, Kī-lau-ea is relatively quiet at a low degree of inflation; it is only beginning to reestablish a stable pattern of inflation after the large deflation and collapse associated with the November, 1975, earthquake. No Kī-lau-ea eruption seems likely in the immediate future. In contrast, Mauna Loa has been inflating steadily since the July, 1975, summit eruption--the first eruption of this volcano in 25 years. This pattern of deformation and the historic pattern of Mauna Loa eruptions, in which a flank outbreak typically follows a summit eruption within about

3 years, suggest that Mauna Loa will likely erupt again within a few years. The seismic and deformation data indicate that this eruption may occur along the northeast rift zone, from which lava flows can threaten Hilo, the principal population center on the island.