

STRIPPED PAHOEHOE LAVA-FLOW SURFACES AS TSUNAMI DEPOSITS, HAWAII

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ABSTRACT

Glassy surfaces of pahoehoe lava-flows along the coastline at Apua Point, Hawaii, were stripped off and redeposited into depressions by large waves. Individual fragments of these flow surfaces are platy, polygonal with four to six sides, angular, average between a few centimeters to 15 centimeters in width, and are approximately 3 – 6 cm thick. Accumulations are poorly-sorted with respect to size, imbricated with flat sides parallel to the ground, in mixed orientations with surfaces lying both up and down. Upper surfaces of slabs are distinctively glassy and smooth showing the characteristic ropy texture of pahoehoe flows. Lower surfaces are irregular and jagged, marking a subsurface zone of high vesicularity commonly seen in pahoehoe flows where these slabs can be easily detached (such as with a swift kick of a boot). Polygonal shapes are inherited from textures formed during cooling of the flow. Deposit thicknesses vary from a single slab to six or more slabs. At Apua Point and nearby Keauhou Landing, additional deposits are of stripped pahoehoe surfaces mixed with angular boulders derived from erosion of the lower more-massive portions of the pahoehoe flow, and with rounded lava boulders from the coastline. Maximum elevation of both types of deposits is about 200 feet inland roughly along the +20 foot contour line just west of Apua Point. At Keauhou Landing the mixed-boulder deposit extends further inland, perhaps as far as 400 feet (estimated from photographs); orientation of boulder trains at both sites are parallel to the coastline. It seems clear that these deposits represent the inland wash of large waves. Stripped pahoehoe surfaces are from the 1973 lava flow. Thus this high-energy event is presumed to be the 1975 Kalapana/Halape tsunami. We identify a special type of tsunami deposit not reported before that may be important for discerning and interpreting high-energy events on volcanic landscapes.