

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Geologic map of Mauna Loa Volcano - Kulani quadrangle, Hawaii (preliminary)

By

John P. Lockwood ¹

Open-File Report
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This map is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards and stratigraphic nomenclature.

¹ U.S. Geological Survey
Hawaiian Volcano Observatory
Hawaii Volcanoes National Park, P.O., Hawaii 96718

Kulani Quadrangle, Hawaii

PRELIMINARY MAP LEGEND

Unit	Associated radiocarbon dates ¹	
	Within the Kulani quadrangle	From other areas
<p>1942</p> <p>Dense, medium-gray a'a erupted in April-May, 1942</p>	Historic	
<p>1852</p> <p>Dense, olivine-rich a'a erupted in February, 1852</p>	Historic	
<p>Kkk</p> <p>"Keamoku flow of Kipuka Kekake"³ Dense, dark gray aphanitic a'a</p>		<p>W-3871, 230+60 W-4360, 300+60</p>
<p>Kle</p> <p>"Lower Keamoku flow"³ - eastern unit. A'a and pahoehoe characterized by abundant fine plagioclase</p>	<p>W-4341, 330+60</p>	<p>W-3879, 830+60² W-3880, 530+60² W-4367, 570+70² W-4845, 640+70²</p>
<p>kp</p> <p>Olivine-rich of the Kulani Project. Mostly a'a - no megascopic plagioclase</p>	<p>W-3790, 420+70 W-3793, 450+60</p>	
<p>ha</p> <p>Olivine- and plagioclase-rich a'a of Pu'u Ha'a</p>		
<p>bs</p> <p>Olivine- and plagioclase-bearing a'a of the Mauna Loa Boys' School. Characterized by commonly intergrown olivine and plagioclase</p>		<p>W-4576, 480+60</p>

kw

W-4338, 590+50

Olivine-bearing a'a of Keawewai Camp

kr

W-4345, 760+70

Olivine-rich pahoehoe of Keauhou Ranch

ou

W-4794, 880+60
W-4813, 1,380+60²

Plagioclase-rich a'a of Ola'a Uka Forest Reserve

3.6

Unnamed, dense aphanitic a'a at western edge of quadrangle

ku

W-4237, 1,320+50 W-4343, 1,280+70
W-4340, 1,400+70 W-4631, 1,110+60
W-4357, 1,490+50

Aphanitic pahoehoe of Kulaloea Road. Characterized by well-sorted, spherical vesicles and fresh glassy surface where undisturbed

3.2

Unnamed, vesicular, olivine-rich a'a

3.0_a

Small kipuka of plagioclase-rich pahoehoe in SW corner of quadrangle

3.0_b

Highly vesicular, olivine-rich a'a and pahoehoe in SE corner of quadrangle

3.0_c

Dense, plagioclase-rich a'a with minor olivine in NW corner of quadrangle

unnamed flows of similar age

2.6

Nearly aphanitic, dense, pink-weathering a'a in SW corner of Quadrangle

au

W-3856, 1,040+70
W-4837, 1,480+60

Uwekahuna Ash. Weakly consolidated lithic and vitric ash, derived from Kilauea volcano

uw

W-4344, 1,690+70

Plagioclase-bearing a'a of Upper Waiakea Forest Reserve. Correlation between the several different lobes is tentative

sw

W-4356, <200²
W-4807, 620+70²
W-4810, 2,550+80

Aphanitic pahoehoe of Solomon's Waterhole

2.2a

Olivine-rich pahoehoe and a'a north of Keawewai Camp. Olivine 3-8 percent, minor plagioclase in sugary aggregates

2.2b

Plagioclase-rich a'a in NW corner of quadrangle. Plagioclase very fine, to 5 percent

pf

W-4174, 2,890+70

Olivine- and plagioclase-rich pahoehoe of Panaewa Forest Reserve. Characterized by common micro-gabbroic xenoliths

Unnamed flows of similar age

pu

W-4358, 4,070+70
W-4995, 1,760+60²

W-3803, 4,050+50
W-4574, 3,700+70
W-4621, 3,140+70
W-4624, 3,380+80
W-4629, 3,360+80

Aphanitic basalt pahoehoe of Punahoa Ahupua'a. Characterized by poorly sorted, subrounded vesicles; contains many large lava tubes

pk

W-4991, 7,960+110

Picrite of Palakea Flat. Weathered pahoehoe characterized by 25-30 percent coarse, fresh olivine

kc

Plagioclase-rich basalt spatter of Kulani Cone, characterized by 10-12 percent coarse, subhedral plagioclase

2.0a

Dense, fine-grained a'a with abundant very fine plagioclase in SW part of quadrangle

2.0b

Mixed a'a and pahoehoe with 3-7 percent olivine and minor plagioclase north and south of Kulani Cone

2.0c

Plagioclase-rich a'a and pahoehoe at NW corner of quadrangle

2.0u

Old, poorly exposed a'a flow remnants central parts of Quadrangle. Mostly aphanitic, probably include two or more flows

Unnamed flows of similar age

1.8a

Highly vesicular pahoehoe SW of Kulani Cone. Characterized by 2-4 percent euhedral plagioclase and minor olivine

Unnamed flows of similar age

1.8b

Dense, near aphanitic a'a with sparse olivine NE of Kulani Cone

1.6

Old, deeply-weathered, nearly aphanitic pahoehoe in SW corner of quadrangle. Some fine plagioclase.

ho

W-4975, 9,020+130

Olivine-rich pahoehoe of Pu'u Hoakalei. Characterized by coarse, fresh olivine phenocrysts in deeply weathered matrix

pl

W-4995, 10,400+150

Old, ash-covered pahoehoe near Pu'u Lalaau. Contains 5-8 percent sugary olivine and minor fine plagioclase.

ap

Associated lava flows have ¹⁴C of ages from 12,000 to 30,000 years

Pahala Ash. Well-consolidated vitric ash, probably derived from numerous eruptions of both Kilauea and Mauna Kea volcanoes

1.4

Very old, ash-covered, deeply-weathered pahoehoe with 30-35 percent clear olivine

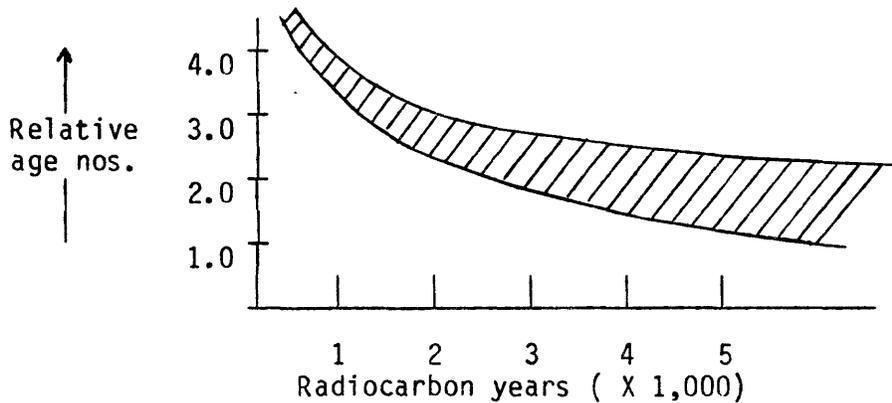
Age relations not known

1.4s

Poorly exposed, deeply weathered spatter formed by several different eruptions

UNDATED, UNNAMED FLOWS
(2.0_b, 1.8_a etc.)

The numbers refer to relative age, based on subjective evaluation of weathering characteristics. The figure below gives an estimation of their radiocarbon age equivalence:

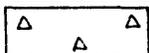


LITHOLOGIC CHARACTERISTICS

Average phenocryst abundances:

(O1)	Olivine >5%
O1	Olivine >15%
(Pc)	Plagioclase >2%
Pc	Plagioclase >5%

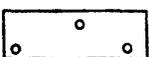
Flow morphology:



A'a

No overprint indicates pahoehoe

Pyroclastic characteristics:



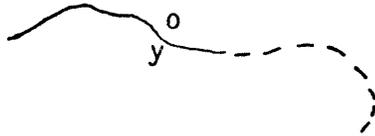
Ash and/or reticulite



Spatter and cinder.
Includes some
shelly pahoehoe

MAP SYMBOLS

Geologic contacts:



Contact between map units, dashed where approximate or inferred. Shorter dashes indicate greater uncertainty. Age relations shown where not obvious: y = younger, o = older

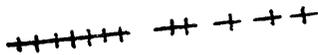


Contact, concealed.

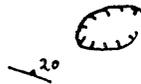


Contact between a'a and pahoehoe facies of the same unit.

Eruptive vents:



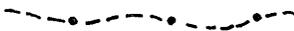
Eruptive vent, dashed where concealed or inferred.



Crater rim.

Strike and dip of layering in spatter cones.

Lava conduits:

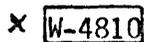


Inferred location of large lava tubes. Dark areas indicate known windows.



Large lava channel.

Radiocarbon sample localities:



Dated radiocarbon sample locality, showing USGS Radiocarbon Laboratory Lab. No.¹

¹ Ages by M. Rubin, in radiocarbon years b.p. (before 1950)

² Suspected erroneous ages due to sample contamination.

³ Peterson, D. W., 1967, Geologic Map of the Kilauea Crater Quadrangle, Hawaii: U. S. Geol. Survey Geol. Quadrangle Map GQ-667.

KULANI QUADRANGLE, HAWAII

CORRELATION OF MAP UNITS

