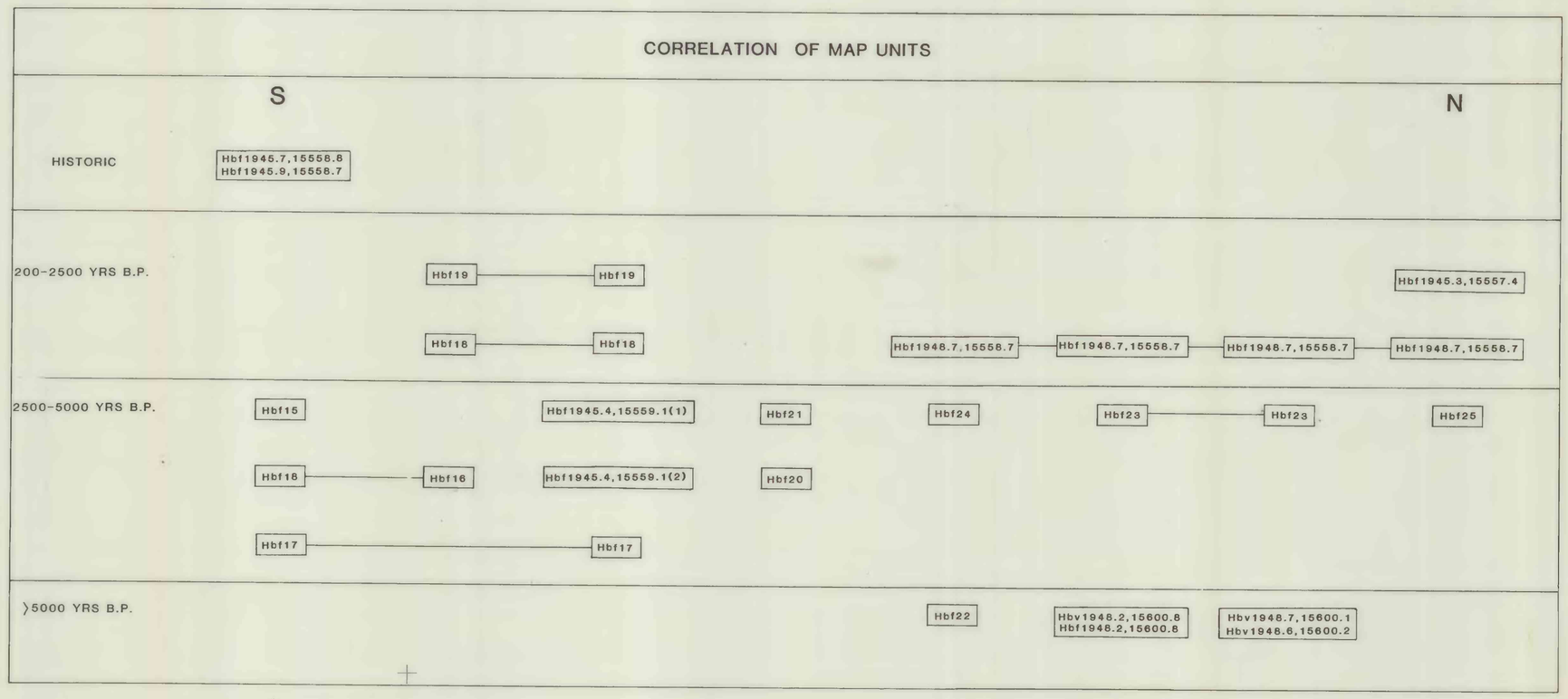
DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

OPEN FILE REPORT
85-595

CORRELATION OF MAP UNITS



All known stratigraphic sequences for Makalawena Quadrangle are presented vertically in the Correlation of Map Units. Flow ages increase as shown. Age relations among flows presented in different columns are unknown. For example, the age relation between Hbf22 and Hbf23 or Hbf23 and Hbf25 is unknown. Age relations have been inferred for flows in different age groups. Several flows are represented in more than one sequence; for emphasis, horizontal lines connect flows which are the same.

DESCRIPTION OF MAP UNITS

Map unit labels are interpreted as follows: The first entry, H, describes the Hualalai Volcanic Series of Hualalai Volcano (MacDonald, 1949). The second entry describes the type of lava; b is alkalic basalt unless otherwise noted in the map unit description, and t is trachyte. The third entry is a morphologic description; f indicates a flow whereas v indicates vent deposits. The final entry is an identification number. Each flow not associated with a vent is described with a unique number. Flows associated with vents are described with the approximate latitude-longitude of the associated vent. Vent entries also include the approximate latitude-longitude of the vent. For example, Hbf1945.9,15558.7 describes a flow of alkalic basalt from Hualalai Volcano that issued from a vent at 19° 45.9' and 155° 58.7'.

Age assignments for all prehistoric map units are based upon surface morphology, presence of soil, and coastal expression. Younger flows usually form coastal deltas while erosion of older flows creates inlets. Note that map patterns distinguish age groups.

QUATERNARY ALLUVIUM

Qal — Qal consists of beach sand and carbonate cobble deposits, or swampy areas.

HISTORIC UNITS

Hbf1945.7,15558.6 — Historic 1801 HueHue lava flow located adjacent to and north of Hbf1945.4,15559.1(2), Puu Io flow. Phenocryst mineralogy is 1-3% olivine and 0-2% plagioclase. Chiefly pahoehoe.

Hbf1945.9,15558.7 — Historic 1801 HueHue lava flow located adjacent to and south of Hbf1946.7,15558.7, Puu Nahaha flow. Phenocryst mineralogy varies depending upon location. Distal flow phenocryst mineralogy is 4-8% olivine, 0-1% plagioclase, and 0-1% clinopyroxene. Vent deposits and proximal flow have 0-2% olivine phenocrysts. Flow is chiefly pahoehoe. Chemical analyses of this flow are presented in Clague et. al. (1980).

YOUNGEST PREHISTORIC UNITS (200-2500 YRS B.P.)

Hbf18 — Lava flow located adjacent to Hbf1945.4,15559.1(2),Puu Io flow and south of the historic 1801 HueHue lava flows. Phenocryst mineralogy is 1-2% olivine, 0-1% plagioclase, and 0-1% clinopyroxene. Small dunite xenoliths are rare. Chiefly aa.

Hbf19 — Lava flow located at eastern boundary of quadrangle south of historic 1801 HueHue lava flows. Phenocryst mineralogy is 2-8% olivine. Chiefly aa. Hbf19 is younger than all surrounding units.

Hbf1946.7,15558.7 — Lava flow, from Puu Nahaha (Hbv1946.7,15558.7), located north of and adjacent to the historic 1801 HueHue lava flow. Phenocryst mineralogy is variable 0-3% olivine. Dunite xenoliths are rare. Includes pahoehoe, spiney pahoehoe, and aa.

Hbf1946.3,15557.4 — Lava flow, from unnamed vent (Hbv1945.3,15557.4), located at eastern boundary of quadrangle north of Hbv1948.7,15600.1 and Hbv1948.6,15600.2 cinder cones. Phenocryst mineralogy is variable 6-15% olivine, 0-2% plagioclase, and 0-1% clinopyroxene. Includes pahoehoe and aa.

INTERMEDIATE PREHISTORIC UNITS (2500-5000 YRS B.P.)

Hbf15 — Lava flow located at southern boundary of quadrangle. Phenocryst mineralogy is 1-2% olivine, 0-1% plagioclase, and 0-1% clinopyroxene. Olivine-plagioclase-clinopyroxene crystal clots as well as small dunite and gabbro xenoliths are common. Chiefly aa.

Hbf16 — Lava flow located adjacent to Hbf15 and south of the historic 1801 HueHue lava flows. Phenocryst mineralogy is variable 3-10% olivine, 0-1% plagioclase, and 2-6% clinopyroxene. Plagioclase-clinopyroxene crystal clots are rare. Includes pahoehoe and aa.

Hbf17 — Lava flow located adjacent to and south of the historic 1801 HueHue lava flows. Tumuli are common. Phenocryst mineralogy is 0-1% olivine and 0-1% plagioclase. Chiefly pahoehoe.

Hbf20 — Lava flow located in the historic 1801 HueHue lava flow. Phenocryst mineralogy is 5-8% olivine. Includes slabby pahoehoe and aa.

Hbf21 — Lava flow located in the historic 1801 HueHue lava flow adjacent to Hbf20. Phenocryst mineralogy is 1-2% olivine. Chiefly aa.

Hbf23 — Lava flow located adjacent to Kuili cone (Hbv1948.2,15600.8). Phenocryst mineralogy is 6-9% olivine and 0-1% plagioclase. Chiefly slabby pahoehoe.

Hbf24 — Kipukas located at eastern boundary of quadrangle in Hbf1946.7,15558.7, Puu Nahaha flow. Tumuli are rare. Phenocryst mineralogy is 1-4% olivine. Chiefly pahoehoe. Hbf24 is older than Hbf1946.7,15558.7, Puu Nahaha flow.

Hbf25 — Lava flow located north of Hbv1948.6,15600.2 and Hbv1948.7,15600.1 cinder cones. Phenocryst mineralogy is 1-5% olivine. Chiefly pahoehoe.

Hbf1945.4,15559.1(1) — Lava flow, from Puu Io (Hbv1945.4,15559.1), located at eastern boundary of quadrangle north of and adjacent to Hbf19. Phenocryst mineralogy is 5-11% olivine, 0-1% plagioclase, and 1-3% clinopyroxene. Small dunite and gabbro xenoliths are rare. Chiefly pahoehoe. Hbf1945.4,15559.1(1) is younger than Hbf1945.4,15559.1(2) but older than Hbf19.

Hbf1945.4,15559.1(2) — Lava flow, from Puu Io (Hbv1945.4,15559.1), located adjacent to and south of the historic 1801 HueHue lava flows. Phenocryst mineralogy is 1-2% olivine and 2-4% plagioclase. Chiefly aa.

OLDEST PREHISTORIC UNITS (> 5000 YRS B.P.)

Hbf22 — Kipuka located in Hbf1946.7,15558.7, Puu Nahaha flow. Phenocryst mineralogy is 1-4% olivine, 1-2% plagioclase, and 4-5% clinopyroxene. Includes pahoehoe and aa.

Hbv1948.2,15600.8 — Spatter deposits and bombs of Kuili Cone located adjacent to Hbf23. Phenocryst mineralogy is 2-3% olivine, 1-2% plagioclase, and 0-1% clinopyroxene.

Hbf1948.2,15600.8 — Lava flow, from Kuili Cone (Hbv1948.2,15600.8), located adjacent to Hbf23. Phenocryst mineralogy is 2-3% olivine, 1-2% plagioclase, and 0-1% clinopyroxene. Chiefly aa.

Hbv1948.7,15600.1 — Cinder deposits and bombs from unnamed cone located in Hbf1946.7,15558.7, Puu Nahaha flow. Phenocryst mineralogy is 2-3% olivine, 5-7% plagioclase, and 1-2% clinopyroxene. Hbv1948.7,15600.1 and Hbv1948.6,15600.2 may have been erupted simultaneously.

Hbv1948.6,15600.2 — Cinder deposits and bombs from unnamed cone located adjacent to Hbf1946.7,15558.7, Puu Nahaha flow, and south of Hbv1948.7,15600.1. Phenocryst mineralogy is 1-4% olivine, 2-5% plagioclase, 0-2% clinopyroxene. Hbv1948.6,15600.2 and Hbv1948.7,15600.1 may have been erupted simultaneously. Hbv1948.6,15600.2 is older than all surrounding flows.

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

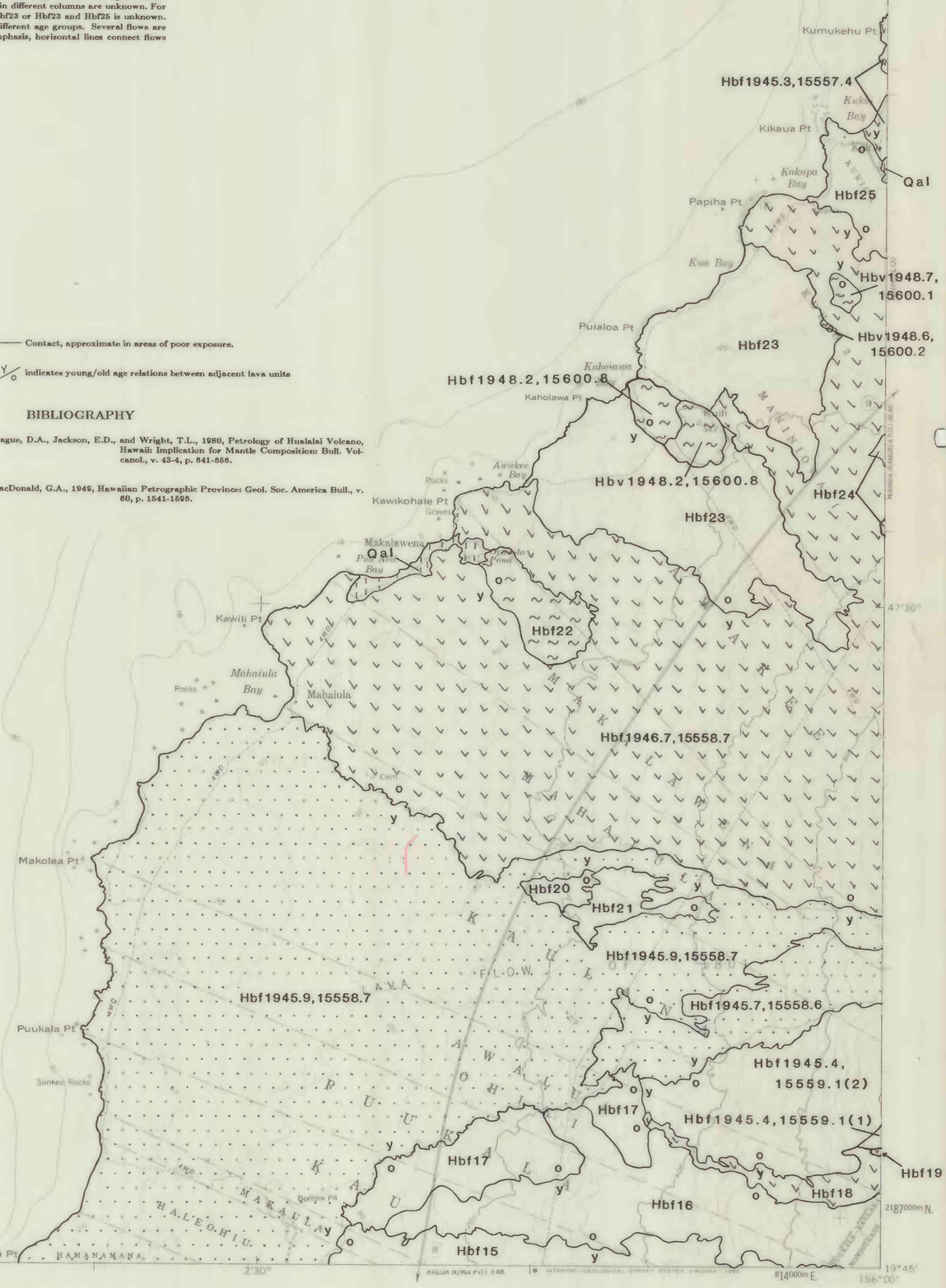
Contact, approximate in areas of poor exposure.

Y/O indicates young/old age relations between adjacent lava units

BIBLIOGRAPHY

Clague, D.A., Jackson, E.D., and Wright, T.L., 1980, Petrology of Hualalai Volcano, Hawaii: Implication for Mantle Composition: Bull. Volcanol., v. 43-4, p. 641-656.

MacDonald, G.A., 1949, Hawaiian Petrographic Province: Geol. Soc. America Bull., v. 60, p. 1541-1596.



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SCALE 1:24 000

CONTOUR INTERVAL 40 FEET
DOTTED LINES REPRESENT 20-FOOT CONTOURS
DATUM IS MEAN SEA LEVEL
DEPTH CURVES IN FEET—DATUM IS MEAN LOWER LOW WATER
THE RELATIONSHIP BETWEEN THE TWO DATUMS IS VARIABLE
SHORELINE SHOWN REPRESENTS THE APPROXIMATE LINE OF MEAN HIGH WATER
THE MEAN RANGE OF TIDE IS APPROXIMATELY 1 FOOT

TRUE NORTH
MAGNETIC NORTH
APPROXIMATE MEAN DECLINATION, 1982

HAWAIIAN ISLANDS
QUADRANGLE LOCATION

ROAD CLASSIFICATION
Heavy-duty — Light-duty
Unimproved dirt
State Route

PRELIMINARY GEOLOGIC MAP OF MAKALAWENA QUADRANGLE, HAWAII

by
David A. Clague and Wendy A. Bohrson

1985