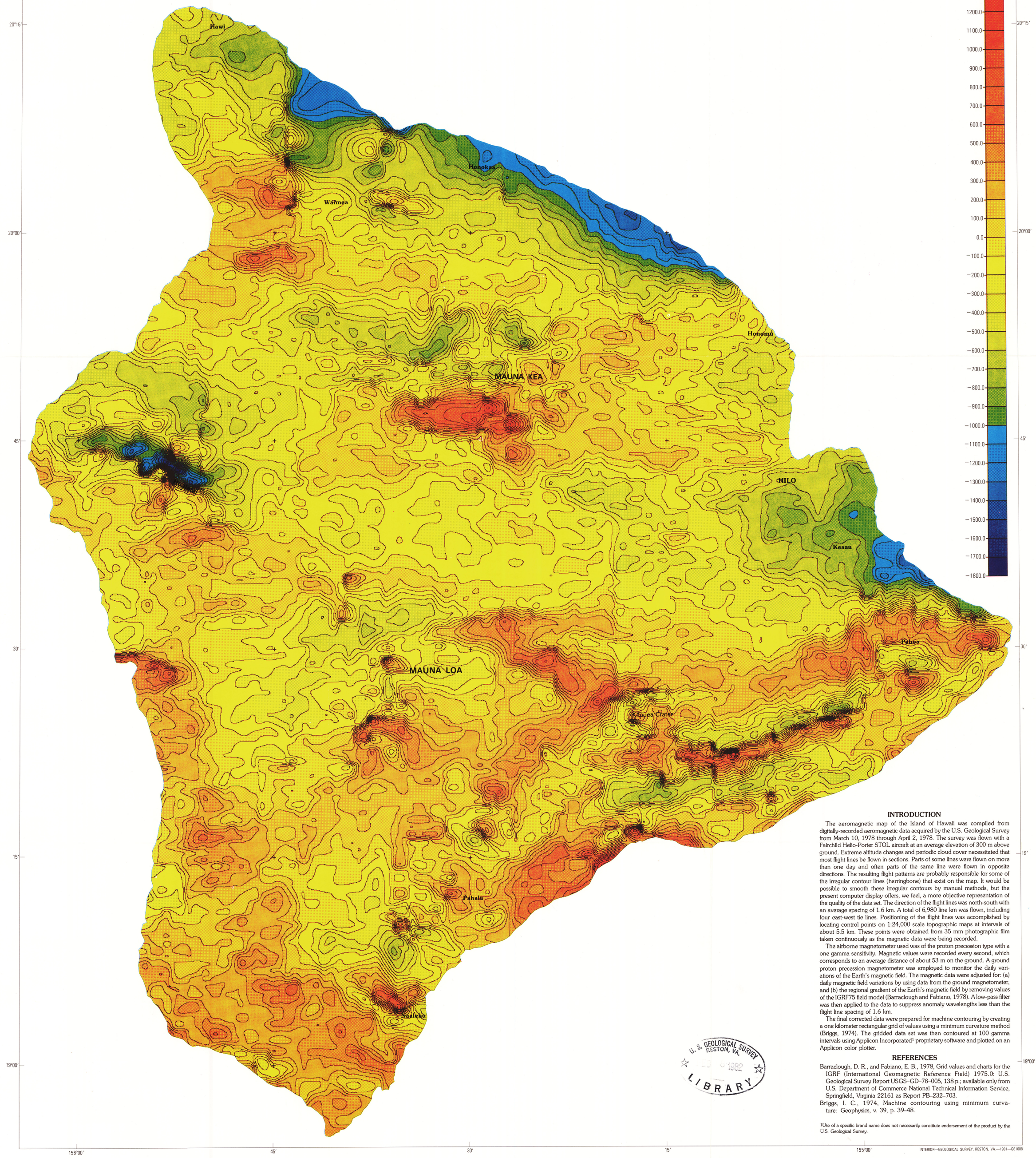
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

GEOPHYSICAL INVESTIGATIONS
MAP GP-946

156°00′ 45′ 30′ 15′ 155°00′

20°15′
20°00′
45′
30′
15′
19°00′



GAMMAS

1300.0
1200.0
1100.0
1000.0
900.0
800.0
700.0
600.0
500.0
400.0
300.0
200.0
100.0
0.0
−100.0
−200.0
−300.0
−400.0
−500.0
−600.0
−700.0
−800.0
−900.0
−1000.0
−1100.0
−1200.0
−1300.0
−1400.0
−1500.0
−1600.0
−1700.0
−1800.0

INTRODUCTION

The aeromagnetic map of the Island of Hawaii was compiled from digitally-recorded aeromagnetic data acquired by the U.S. Geological Survey from March 10, 1978 through April 2, 1978. The survey was flown with a Fairchild Helio-Porter STOL aircraft at an average elevation of 300 m above ground. Extreme altitude changes and periodic cloud cover necessitated that most flight lines be flown in sections. Parts of some lines were flown on more than one day and often parts of the same line were flown in opposite directions. The resulting flight patterns are probably responsible for some of the irregular contour lines (herringbone) that exist on the map. It would be possible to smooth these irregular contours by manual methods, but the present computer display offers, we feel, a more objective representation of the quality of the data set. The direction of the flight lines was north-south with an average spacing of 1.6 km. A total of 6,980 line km was flown, including four east-west tie lines. Positioning of the flight lines was accomplished by locating control points on 1:24,000 scale topographic maps at intervals of about 5.5 km. These points were obtained from 35 mm photographic film taken continuously as the magnetic data were being recorded.

The airborne magnetometer used was of the proton precession type with a one gamma sensitivity. Magnetic values were recorded every second, which corresponds to an average distance of about 53 m on the ground. A ground proton precession magnetometer was employed to monitor the daily variations of the Earth's magnetic field. The magnetic data were adjusted for: (a) daily magnetic field variations by using data from the ground magnetometer, and (b) the regional gradient of the Earth's magnetic field by removing values of the IGRF75 field model (Barraclough and Fabiano, 1978). A low-pass filter was then applied to the data to suppress anomaly wavelengths less than the flight line spacing of 1.6 km.

The final corrected data were prepared for machine contouring by creating a one kilometer rectangular grid of values using a minimum curvature method (Briggs, 1974). The gridded data set was then contoured at 100 gamma intervals using Applicon Incorporated[1] proprietary software and plotted on an Applicon color plotter.

REFERENCES

Barraclough, D. R., and Fabiano, E. B., 1978, Grid values and charts for the IGRF (International Geomagnetic Reference Field) 1975.0: U.S. Geological Survey Report USGS–GD–78–005, 138 p.; available only from U.S. Department of Commerce National Technical Information Service, Springfield, Virginia 22161 as Report PB–232–703.

Briggs, I. C., 1974, Machine contouring using minimum curvature: Geophysics, v. 39, p. 39–48.

[1]Use of a specific brand name does not necessarily constitute endorsement of the product by the U.S. Geological Survey.

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SCALE 1:250 000

5 0 5 10 15 MILES

5 0 5 10 15 KILOMETERS

AEROMAGNETIC MAP OF THE ISLAND OF HAWAII

By

R. H. Godson, C. J. Zablocki, H. A. Pierce, J. B. Frayser,
C. M. Mitchell and R. A. Sneddon

1981

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