

INTRODUCTION

Mauna Loa, the largest volcano on Earth, lies largely beneath the sea, and until recently only generalized bathymetry of this giant volcano was available. However, within the last two decades, the development of multibeam sonar and the improvement of satellite navigation systems (Global Positioning System) have increased the availability of precise bathymetric mapping. This map combines topography of the subaerial southern part of the volcano with modern multibeam bathymetric data from the south submarine flank. The map includes the summit caldera of Mauna Loa Volcano and the entire length of the 100-km-long southwest rift zone that is marked by a much more pronounced ridge below sea level than above. The 60-km-long subaerial segment of the rift zone abruptly changes trend from southwest to south 30 km from the summit. It extends from this bend out to sea at the south cape of the island (Kalae) to 4 to 4.5 km depth where it impinges on the elongate west ridge of Apuupuu Seamount. The west submarine flank of the rift-zone ridge connects with the Kahuku fault on land and both are part of the amphitheater head of a major submarine landslide (Lipman and others, 1990; Moore and Clague, 1992). Two pre-Hawaiian volcanic seamounts in the map area, Apuupuu and Dana Seamounts, are apparently Cretaceous in age and are somewhat younger than the Cretaceous oceanic crust on which they are built.

TOPOGRAPHY

Elevation data were gridded at 200-m spacing and contoured by computer on a Mercator map projection at a scale of 1:150,000. Both subaerial and submarine topographic data were contoured at an interval of 10 m; every tenth (100 m) contour is heavier and marked with ticks on the downslope side. Subaerial topography (area 1 on index map) is indicated by a faint brown tone on the main map, and is based on recent digital elevation data from 7.5' quadrangles of the U.S. Geological Survey. The data were generated from parallel scan lines across stereoscopic models projected from aerial photographs.

BATHYMETRY

The most detailed previous bathymetry available on the west side of Mauna Loa was generated to characterize the giant Alike landslide (Lipman and others, 1988) from single beam surveys of the U. S. Geological Survey ship *S.P. Lee* in 1976 (Normark and others, 1978) and 1978 and from the British Institute of Oceanographic Sciences vessel *Farnella* in 1986. Pre-existing detailed single-beam bathymetry of the upper part of the southwest rift zone is from surveys of the *S.P. Lee* in 1978 (Moore and others, 1990). Nearshore bathymetric mapping (area 2 on index map) was collected from single-beam sonar surveys in from the NOAA National Ocean Service Hydrographic Database, National Geophysical Data Center.

Multibeam bathymetry in the southwestern part of the map area (area 3a on index map) was collected from the NOAA ship *Surveyor*, R.V. Forster commanding, during August-November 1986 and April 1987. Multibeam bathymetry in the southeastern part of the map area (area 3b on index map) was collected from the NOAA ship *Discoverer*, R.V. Smart commanding, during August-September 1991 (Fox and others, 1992). Multibeam surveys of a strip including the crest of the submarine south rift-zone ridge (area 4 on index map) were made from the U.S. Navy vessel *Laney Chouest*, Victor Gislair commanding, in October 1992 as part of a joint program of NOAA, National Undersea Research Program, and the U.S. Navy with M. O. Garcia, Chief Scientist. Multibeam depth contours are based on an uncorrected oceanic sound speed of 1,500 m/s, and consequently reported depths may deviate slightly from true ocean depths. This map is not intended for navigational purposes.

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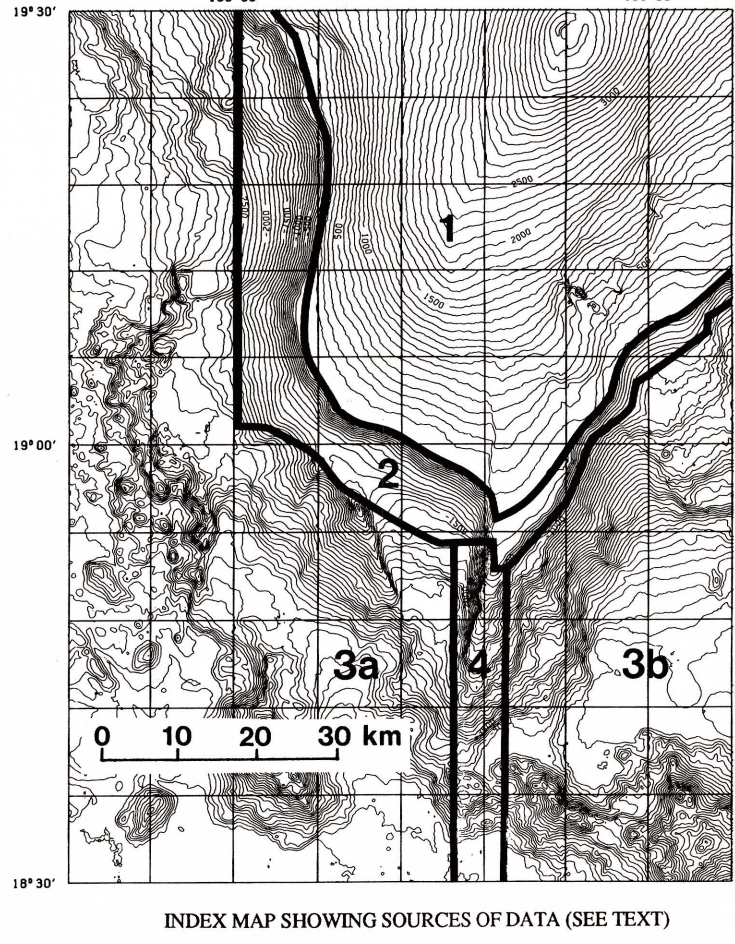
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BATHYMETRY OF SOUTHERN MAUNA LOA VOLCANO, HAWAII

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