U.S. Department of the Interior
U.S. Geological Survey

WATER-RESOURCES INVESTIGATIONS REPORT 00–4046
Perspective views—SHEET 2 of 2
Gardner, J.V., Dartnell, Peter, and others, 2000
Bathymetry and selected perspective views of sea floor north and west of Maui, Hawaii

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PERSPECTIVE VIEWS

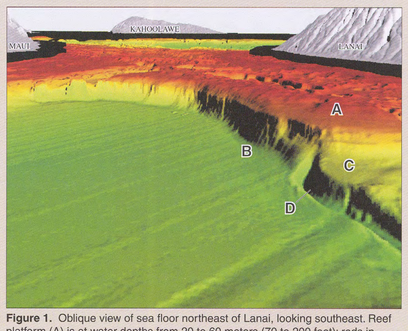


Figure 1. Oblique view of sea floor northeast of Lanai, looking southeast. Reef platform (A) is at water depths from 20 to 60 meters (70 to 200 feet); reefs in background are living reefs at water depth of 20 meters (70 feet). Top of prominent bench (B) is at depth of 100 meters (300 feet). Older reef platform (C) is at water depth of 160 meters (520 feet). Channel (D) 30 meters (100 feet) deep has been scoured along base of older reef platform by strong currents flowing through Pailolo Channel between Lanai, Maui, and Molokai. Width of bottom of image corresponds to 3.7 kilometers (2.3 miles). Vertical exaggeration, 5X.

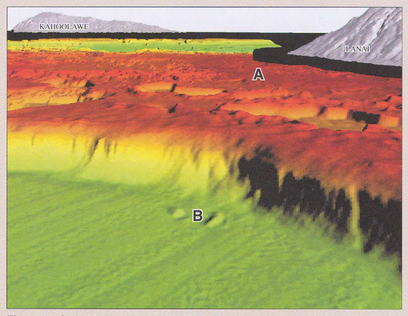


Figure 2. Oblique view of sea floor looking south across reef platform (A) toward Kahoolawe between Lanai and Maui. Escarpment of reef platform has 50-degree slopes constructed of layered reef material. Slump (B) at base of escarpment includes two large (5-meters- or 16-feet-high) blocks that have been transported 700 meters (2,000 feet) away from escarpment. Such reef-escarpment failures are uncommon in this area. Width of bottom of image corresponds to 2.7 kilometers (1.7 miles). Vertical exaggeration, 5X.

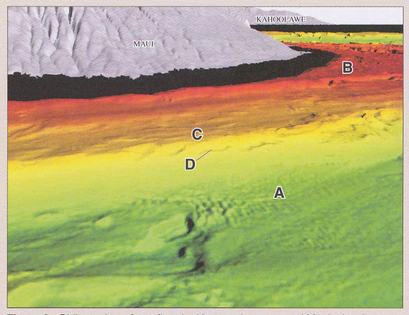


Figure 3. Oblique view of sea floor looking southeast toward Maui, showing sediment waves (A) in water depth of 220 meters (720 feet). Sediment waves on top of drowned reef-platform complex were caused by strong current (estimated to be as much as 3 knots) flowing southward into Pailolo Channel and accelerated by narrow passage between Maui and Molokai. Crests of sediment waves are about 1 meter (3 feet) high, and crest-to-crest distance is about 35 meters (110 feet). Modern reef (B) is at water depth of less than 40 meters (130 feet); older reef (C) is at 120 meters (390 feet), and oldest reef (D) is at 160 meters (520 feet), just west of narrow passage (about 18 kilometers, or 11 miles, wide) between islands. Width of bottom of image corresponds to 3.0 kilometers (1.9 miles). Vertical exaggeration, 5X.

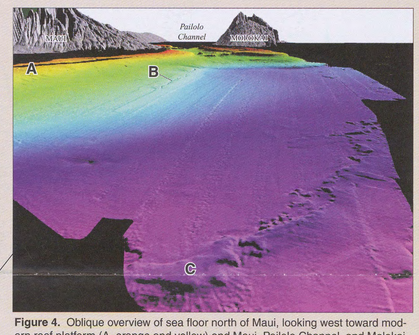


Figure 4. Oblique overview of sea floor north of Maui, looking west toward modern reef platform (A, orange and yellow) and Maui, Pailolo Channel, and Molokai. Oldest and deepest reef (C) is nearly level (<0.5-degree slope), at water depths ranging from 550 meters (1,800 feet) on west to 625 meters (2,050 feet) on east. Width of bottom of image corresponds to 10.0 kilometers (6.2 miles). Vertical exaggeration, 5X.

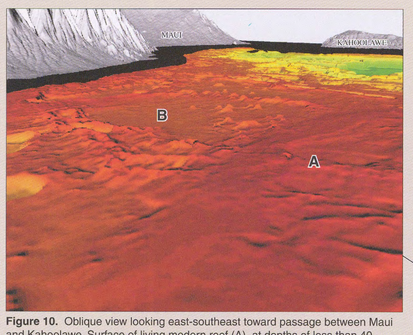
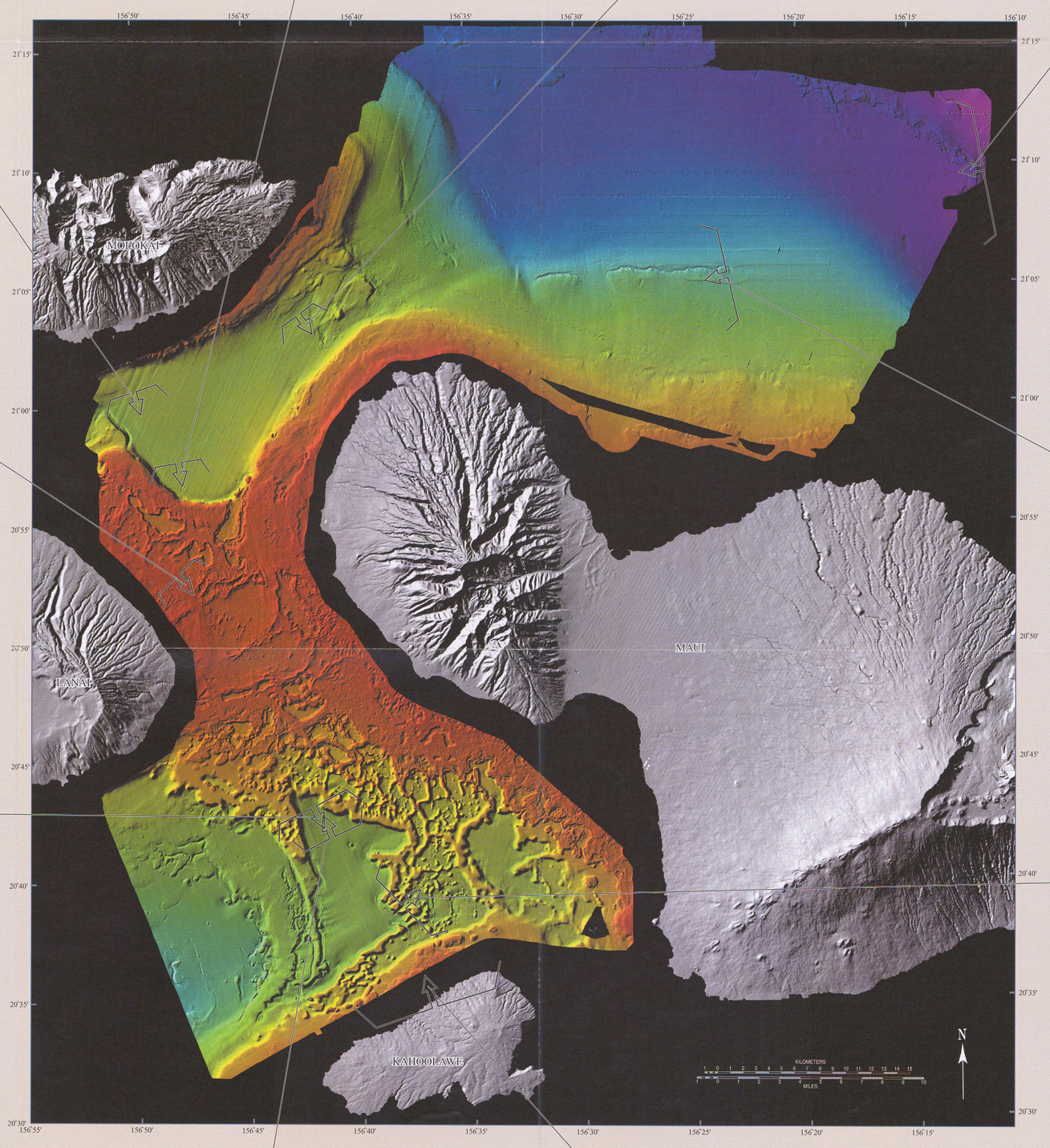


Figure 10. Oblique view looking east-southeast toward passage between Maui and Kahoolawe. Surface of living modern reef (A), at depths of less than 40 meters (130 feet), shows patchy nature of living reef rising up from drowned reef (B) at water depths of 50 to 75 meters (160 to 250 feet). Width of bottom of image corresponds to 3.3 kilometers (2.1 miles). Vertical exaggeration, 5X.



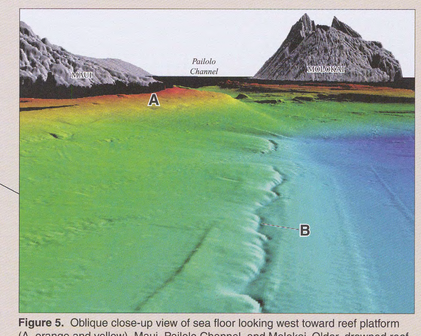


Figure 5. Oblique close-up view of sea floor looking west toward reef platform (A, orange and yellow), Maui, Pailolo Channel, and Molokai. Older, drowned reef (B), at depth of 400 meters (1,300 feet), rises 30 meters (100 feet) above sea floor on north side. Width of bottom of image corresponds to 7.8 kilometers (4.8 miles). Vertical exaggeration, 5X.

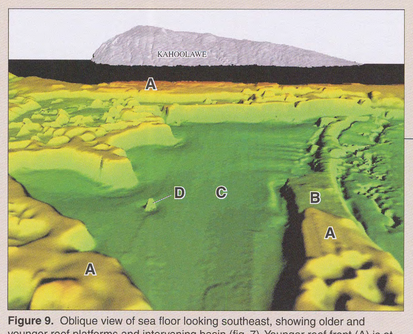


Figure 9. Oblique view of sea floor looking southeast, showing older and younger reef platforms and intervening basin (fig. 7). Younger reef front (A) is at water depth of 140 meters (460 feet) and rises 110 meters (360 feet) above basin floor with slopes of 18 degrees. Older (deeper) reef platform (B) is at water depth of 230 meters (760 feet) and rises 80 meters (260 feet) above basin floor. Nearly flat basin floor (C) is tilted toward south; depths increase from about 300 meters (1,000 feet) in north (left side) to about 320 meters (1,100 feet) in south (right side). Isolated reef pinnacle (D) rises about 50 meters (160 feet) above basin floor. Width of bottom of image corresponds to about 5.5 kilometers (3.4 miles). Vertical exaggeration, 5X.

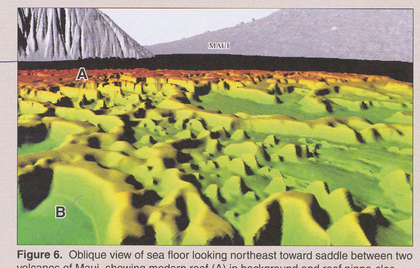


Figure 6. Oblique view of sea floor looking northeast toward saddle between two volcanos of Maui, showing modern reef (A) in background and reef pinna-cles separated by basins in foreground. Reef front in lower left corner (B) is 120 meters (390 feet) high, and top of bank is at water depth of 160 meters (520 feet). Width of bottom of image corresponds to 6.0 kilometers (3.7 miles). Vertical exaggeration, 5X.

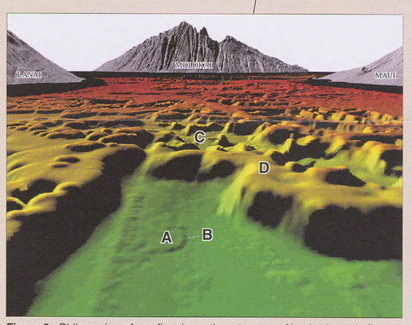


Figure 8. Oblique view of sea floor in northwest corner of basin shown in figure 7, looking northwest. Probable small debris flow (A) on basin floor is 1.2 kilometers (0.75 mile) long and 0.70 kilometer (0.43 mile) wide on basin floor. Toe of feature (B) rises 7 meters (20 feet) above basin floor. If feature is debris flow, then it is evidence of collapse of section of drowned-reef wall. Drowned-reef pinnacles (C) and platforms (D) are visible in background. Width of bottom of image corresponds to 5.0 kilometers (3.1 miles). Vertical exaggeration, 5X.

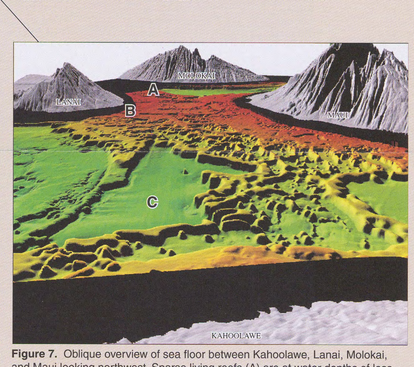


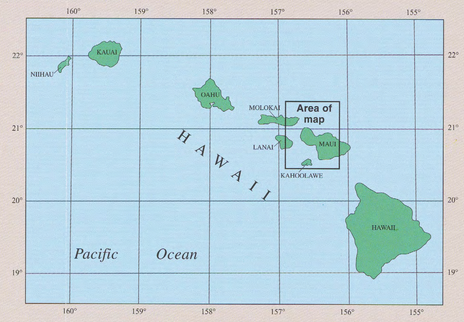
Figure 7. Oblique overview of sea floor between Kahoolawe, Lanai, Molokai, and Maui looking northwest. Sparse living reefs (A) are at water depths of less than 40 meters (130 feet) between Lanai and Maui; drowned reef platforms and pinnacles (B) are at water depths of 50 to 85 meters (160 to 280 feet). Large basin (C) in middle of view is shown in more detail in figures 8 and 9. Maui is known to be subsiding about 2 millimeters (0.008 inch) per year under load of volcano; subsidence rate has slowed over time. In addition, long-term sea level rises and falls at about 2 millimeters per year (0.008 inch per year). Horizontal distance between Lanai and Maui is about 20 kilometers (12 miles), and width of bottom of image corresponds to about 10 kilometers (6.2 miles). Vertical exaggeration, 5X.

EXPLANATION

No bathymetric data

Depth—In meters below mean low low water level

100
200
300
400
500
600
700



BATHYMETRY AND SELECTED PERSPECTIVE VIEWS OF SEA FLOOR NORTH AND WEST OF MAUI, HAWAII

By

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Larry A. Mayer and John E. Hughes Clarke, University of New Brunswick, Canada

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