

SEAFLOOR MAPPING

The mapping project was established to support the mapping and surveying needs of all MBARI scientists. This includes analyzing previously collected seafloor data from sites of potential interest and collecting new survey data.

Two large programs of new data collection were accomplished in 1998. The first was the collection of survey data using a new hull-mounted 30 kHz swath mapping system. These mapping surveys were completed between February and July. The surveys required nine days off Hawaii, 15 days in the Santa

Barbara Basin, eight days on the Gorda and Juan de Fuca Ridges and nearby transforms and seamount chains, four days on the northern California and Oregon margins, and 24 days in the Monterey Bay region. We collaborated with geologists at the National Oceanographic and Atmospheric Administration (NOAA) and the USGS, who nested small surveys within our larger surveys, to reduce transit

times and maximize coverage offshore Hawaii, Monterey Bay, and central Oregon. In total, we collected swath bathymetry and associated backscatter for 50,131 square kilometers of seafloor at depths ranging from about 50 meters to 4,500 meters. Figure 29 shows the computer-enhanced map of Monterey Bay produced during these surveys.

These maps have already been used as the real-time geographic information systems (GIS) base maps for navigating the ROV *Tiburon* dives on Guide and Gumdrop Seamounts, ROV *Ventana* dives in Santa Barbara Basin, *Ventana* dives in Monterey Bay, and

higher resolution deep-towed 120 kHz mapping on the southern Juan de Fuca Ridge and Puna Ridge.

The second major new data collection program was for a survey of the southern Juan de Fuca Ridge using a high resolution 120 kHz near-bottom towed sidescan system that provides interferometric bathymetry. This survey was done cooperatively with scientists at Oregon State University, who shared ship time to deploy and recover bottom transponders, and to conduct an even higher resolution survey using an ROV-mounted 675 kHz, pencil-beam, scanning sonar. Figure 28 shows the results of the nested survey that used the 30 kHz data as a base map for the higher resolution 120 kHz and 675 kHz surveys. The increasing detail evident in this image demonstrates the utility of such a nested suite of mapping tools in developing dive strategies.

The results from both of these surveys have been spectacular. This project accomplished all its goals for 1998, although reprocessing of some data and regridding maps for specific purposes and creation of publishable maps will continue in 1999. The digital data was almost entirely processed at sea and has been installed on a newly configured computer system at MBARI.

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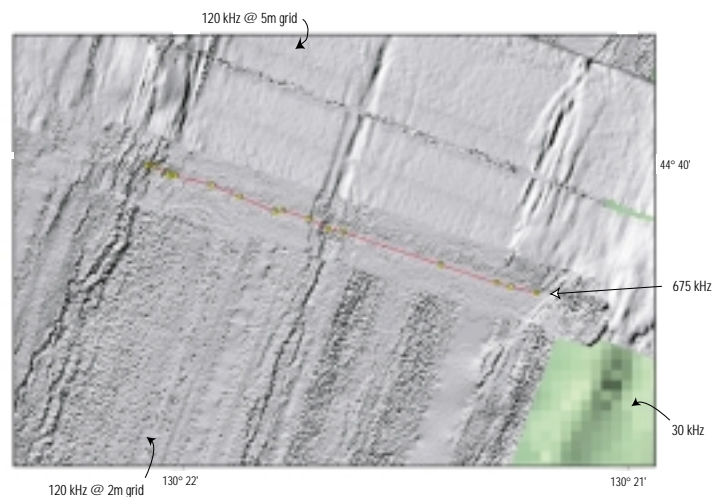


Figure 28. Nested surveys of cleft segment of the Juan de Fuca Ridge.

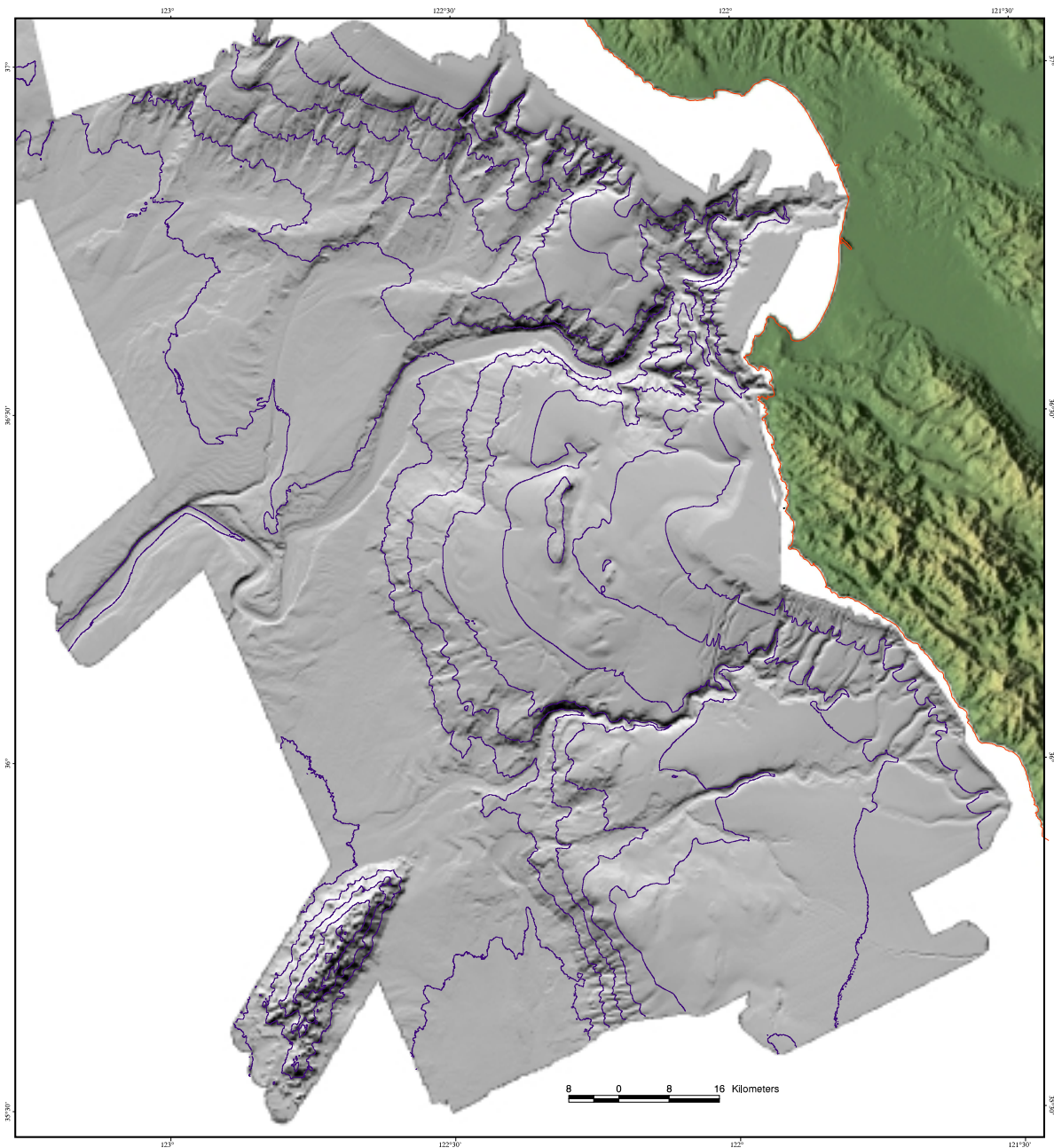


Figure 29. Map showing sun illuminated image of bathymetry data from the 30 kHz swath mapping program. This survey encompasses nearly 17,000 square kilometers of seafloor ranging in depths from 100 meters to 3,500 meters and includes the Ascension, Cabrillo, Monterey, Sur, and Lucia

Canyon systems, as well as much of the upper Monterey Fan Valley and portions of the Monterey Bay and Sur shelf. Many features that were previously mapped by Seabeam are imaged here with finer detail and greater positional accuracy. Newly revealed features include numerous slope failures

associated with subsurface fluid circulation, clearer delineation of surface fault traces along the San Gregorio and Monterey Bay Fault Zones and an extensive pockmark field in the southern part of the area.