Figure 1. Bathymetry of the Pigafetta and East Mariana basins, with trackline coverage shown in
blue. The contour interval is 500 m. The 5500-m contour is highlighted to emphasize the rough out-
lines of the two basins. Dashed lines indicate contours derived solely from SEASAT and GEOSAT
altimetry. Deep Sea Drilling Project and Ocean Drilling Program drill sites are identified by site
number. The magnetic anomaly identifications are by Roger Larson.

Figure 2. Computer-contoured gravity anomalies derived from SEASAT, GEOSAT, and shipboard
gravity data, with satellite tracklines shown in blue. The contour interval is 20 mgal.
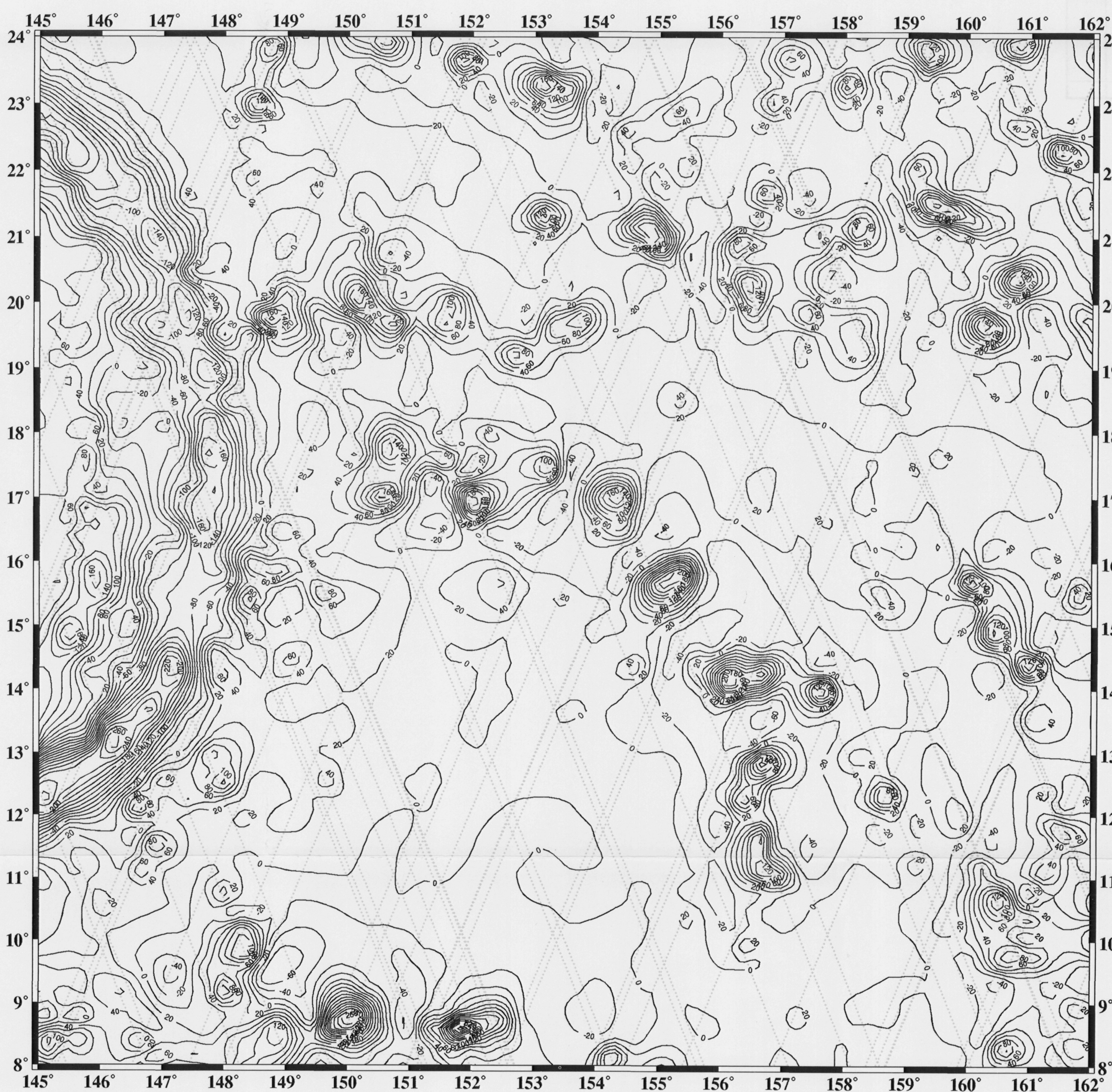


Figure 3. Generalized lithologic columns from ODP Sites 800, 801, and 802. The columns are shown
together for convenience; no correlations are implied. Ages and lithologic units were assigned and
described in Lancelot, Larson, et al. (1990).



**37. DATA REPORT: BATHYMETRY OF THE PIGAFETTA AND EAST MARIANA BASINS[1]**

Carl Brenner[2] and Michael Angell[2,3]

Several bathymetric charts of the western Pacific Ocean have been
prepared from shipboard echo-soundings over the last two decades
(Chase et al., 1970; Iwabuchi, 1984; Mammerickx and Smith, 1985).
This map (Fig. 1, backpocket foldout), which incorporates more
recent echo-soundings as well as data from satellite altimetry, was
compiled and contoured over a period of several months before Leg
129 in order to provide a base map and tectono-geomorphic reference
frame for Leg 129 drilling investigations and results. After the drilling
leg, the map was revised to include bathymetric soundings collected
aboard the *JOIDES Resolution* as well as those from several sub-
sequent cruises in the area carried out by the University of Hawaii. In
general, the track coverage is more plentiful in the western part of the
map than the eastern, and, to a lesser extent, in the southern part than
the northern. Both of these trends reflect the relative proximity of
these more densely covered regions to accessible ports (such as
Guam) and the correspondingly larger amount of ship traffic in these
areas. The total track coverage of bathymetric soundings is shown in
blue in Figure 1 (backpocket foldout). All institutions responsible for
the cruises that constitute the bathymetric data base are listed in Table
1.

The computer-contoured gravity field, as derived from a combina-
tion of SEASAT and GEOSAT satellite investigations plus shipboard
gravimetric data, is shown in Figure 2 (backpocket foldout). The
methodology of preparation and presentation is that of Haxby and
Hayes (1991). Satellite tracks are shown in blue. Gravity data were
used to verify (or, in some cases, infer) the existence of seamounts and
guyots with little or no bathymetric coverage. While the practice of
assuming topographic expression of all gravity anomalies is not
always scientifically indicated, it is quite reasonable in an environ-
ment such as this—a deep ocean basin dotted with discreet and
unpredictably located seamounts and guyots. Estimates of size and
summit depth for features defined solely by gravity data were based
primarily on the observed relationship between bathymetry and grav-
ity for those features with good bathymetric control. The age and
probable subsidence history of the features in question were also
taken into account. Summit depths were difficult to estimate with
precision, because anomaly intensity is more a function of total
feature mass than summit depth alone. Also, because the accuracy of
gravity anomalies calculated from satellite data is highly dependent
on data density, the reader is encouraged to examine the satellite track
chart shown in blue on Figure 2 (backpocket foldout). All bathymetric
contours in Figure 1 (backpocket foldout) derived from gravity data
alone are shown with dashed lines.

The East Mariana and Pigafetta basins both trend northwest-south-
east. The East Mariana Basin is bounded on the west by the Mariana
Trench, to the south by the Caroline Seamounts (sometimes called the
"Caroline Ridge"), and to the north and east by the Magellan
Seamounts. The Pigafetta Basin is located immediately north and east
of the Magellan Seamounts and is bounded to the northeast by the

Marcus-Wake seamount chain. Both the East Mariana and Pigafetta
basins are characterized by broad abyssal plains about 5500–6000 m
deep (though the northern part of the East Mariana Basin is slightly
deeper than 6000 m) and an assortment of seamounts and guyots of
varying depths. The Magellan Seamounts, which divide the two
basins, correspond tectonically to the Ogasawara Fracture Zone. The
detailed tectonics of the region are discussed elsewhere in this vol-
ume.

The lithologies of Ocean Drilling Program Sites 800 and 801
(drilled in the Pigafetta Basin) and 802 (drilled in the East Mariana
Basin) are shown in Figure 3 (backpocket foldout).

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TX (Ocean Drilling Program).
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[3] Current address: Geomatrix Consultants, 100 Pine Street, 10th Floor, San Francisco,
CA 94111, U.S.A.

Table 1. Sources for bathymetric soundings used in the com-
pilation of Figure 1.

Bureau of Mineral Resources, Canberra, Australia
IFREMER, Centre de Brest, France
Institute for Geophysics, University of Texas at Austin, Austin, TX
Japanese Geological Survey, Kawasaki-shi, Japan
Lamont-Doherty Geological Observatory, Palisades, NY
National Oceanographic and Atmospheric Administration, Rockville, CO
Ocean Drilling Program, Texas A&M University, College Station, TX
Ocean Research Institute, Tokyo, Japan
Scripps Institution of Oceanography, La Jolla, CA
University of Hawaii, Honolulu, HI
U.S. Geological Survey, Menlo Park, CA
U.S.S.R. Academy of Sciences, Moscow, U.S.S.R.
Woods Hole Oceanographic Institution, Woods Hole, MA