PHYSIOGRAPHIC IMAGE

UNITED STATES

PACIFIC OCEAN
CENTRAL CALIFORNIA COAST

CALIFORNIA

MONTEREY BAY

MONTEREY CANYON

MONTEREY FAN

PIONEER CANYON

GUIDE SEAMOUNT

GUIDROP SEAMOUNT

PIONEER SEAMOUNT

ASCENSION CANYON

AÑO NUEVO CANYON

CARMELO CANYON

CARMEL CANYON

SUR RIDGE

SUR CANYON

SHEPARD MEANDER

PILLAR POINT

SAN FRANCISCO BAY

POINT PINOS

MONTEREY

POINT LOBOS

POINT SUR

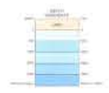
CENTRAL CALIFORNIA COAST

This majestic 3-dimensional view in physiographic image, covering approximately 6,000 square nautical miles of the central California margin, shows the ocean at the sea floor where the uplifted continental block of the North American Plate to the west meets the deepest sea floor of the Pacific Plate in the foreground. The land block is tectonically very active; the San Andreas Fault parallels the coastline less than 10 miles inland from Monterey Bay. The epicenter of the 1989 magnitude 7.1 Loma Prieta Earthquake is only 5 miles from the northwest corner of Monterey Bay; it has been proposed that the Pacific Plate is moving slowly northwestward relative to the North American Plate and the area taking place along the San Andreas and other faults.

This seascape shows relief every bit as rugged and complex as that found on land. There is a drop of more than 2900 meters over two miles from the coastline to the deepest sea floor shown here. Pioneer Seamount, at the foot of the continental slope on the left side of the image, rises more than 2000 meters (about one mile) above the floor of the deep. The Monterey Canyon is of particular interest because it contains a large cone, the Shepard Meander, near the foot of the continental slope. While meanders are commonly associated with rivers in flat land areas or with distributary channels on the flatter parts of the deep sea floor, it is unusual to find one near the foot of the continental slope. Sediments eroded from land as well as from the continental shelf and slope, have been the sources that fed the deeper sea floor in the foreground. The Monterey Fan sediments extend seaward more than 100 miles from the base of the continental slope. In places, the Monterey Fan sediments, resting on the oceanic basement rocks are more than 2 miles thick. Using the new multibeam echo soundings to navigate, scientists diving in submersibles have found some large chemosynthetic clams (which live off naturally-occurring methane seeps rather than oxygen) on the sea floor not far from Shepard Meander.

The computer-generated 3-dimensional views point as this one are opening up a whole new level of detail for those who study sea floor relief. For instance, using a more conventional bathymetric contour map such as the one on page 4, it is difficult to see the large sediment waves on the lower continental slope. On the 3-dimensional view, the sediment waves become more obvious because the level of detail is not constrained by a fixed contour interval.

This physiographic image and map were derived from recent NOAA multibeam surveys of the sea floor within the United States Exclusive Economic Zone (EEZ) that extends 200 nautical miles from shore. The multibeam echo sounders record swaths of sea floor soundings. By overlapping or blurring adjacent swaths, NOAA ships obtain almost 100 percent sounding coverage of the sea floor. This results in millions of soundings for an area of this size. Then the soundings are processed and selected into a 200-meter rectangular grid network that is used to generate the 3-dimensional views and bathymetric maps. The multibeam data were supplemented by some conventional single beam information on the continental shelf near shore.



CENTRAL CALIFORNIA COAST
SUBMARINE PHYSIOGRAPHY
PI-1

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BATHYMETRIC CONTOUR INTERVAL: 250 METERS TO MAXIMUM DEPTH

DATUM: MEAN LOWER LOW WATER

SCALE 1:250,000

VERTICAL EXAGGERATION: 6:1

VIEWING ANGLE: 25° FROM HORIZONTAL

The physiographic image and bathymetry were compiled by the National Ocean Service, Office of Ocean and Coastal Resource Management (OCRM) using data collected by the National Ocean Service (NOS) and the United States Geological Survey (USGS). Digital bathymetric data were provided by the Marine Geology and Geophysics Division of the USGS. Additional information on the data and the specific data collection activities can be found in the publication listed on the index for specific data information. All the physical and geophysical features on the maps have updated the feature and navigational information. It is not intended for navigational purposes. The navigational aids(s), channels, depths and natural charts.

Mercator Transverse Mercator Projection 2012-2013
North American Datum 1983