Deep Sea Drilling project recovers ocean floor 140 million years old

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An area in the northwestern Pacific has been drilled by the Deep Sea Drilling Project and has been shown to be a remnant of the Early Mesozoic ocean floor of more than 140 million years ago. It appears to be the oldest part of the Pacific and quite probably the old,-!st oceanic area in existence today. It is a substantial remnant of an ocean that has existed and has recorded earth history through the entire time in which the Atlantic Ocean grew from a small gash in a large continental mass to its present proportions. Sediments as old as those recovered from this ancient ocean floor exist only in a small strip at the extreme edges of the Atlantic. This area of great antiquity lies east of the Mariana - Bonin Islands and north of the Caroline Islands.

Scripps Institution of Oceanography of the University of California at San Diego is managing institution for the Deep Sea Drilling Project under a $12.6 million contract with the National Science Foundation. The project is a part of NSF's National Research Program of Ocean Sediment Coring.

The Joint Oceanographic Institutions Deep Earth Sampling (JOIDES), a consortium of five oceanographic institutions - Woods Hole Oceanographic Institution, Lamont Doherty Geological Observatory of Columbia University, The Institute for Marine Sciences of the University of Miami (Florida), The University of Washington (Seattle) and Scripps assisted in the development of the proposal for the Deep Sea Drilling Project.

Advice regarding scientific planning is being provided by panels whose members are broadly representative of the nation's scientific community, drawn from many Universities, government agencies and industrial organizations.

Dr. Alfred G. Fischer, of Princeton University, and Dr. Bruce Heezen, of Columbia University, w~re Cruise Co-Chief Scientists on Leg Six.

The Glomar Challenger left Honolulu on June l l and arrived in Guam on August 5, having drilled 34 holes at 17 drill sites.

A total of 11 882 feet of hole was drilled. Of this, 3,000 feet was cored, and 127 cores with a total length of 2,216 feet were recovered. The materials obtained ranged from deep-sea clays and zalcareous oozes to volcanic ash, flint, limestone, and volcanic rock called basalt. Locally atolls and volcanic islands contribute sand and pebbles to the abyssal sea floor.

Site 51 is in the deepest water in which drilling has been attempted to date (19,622 feet), and has the distinction of having required the longest drill string (20,087 feet) so far used from a floating platform.

The immediate scientific results of this cruise are chiefly contributions to our knowledge of the age and history of the Pacific ocean floor, and some new insight into submarine vulcanism. Some new light has been shed on the distribution and development of oceanic plant and animal communities in past ages, and on the accumulation and alteration of sediments on the deep-sea floor: much more will be learned as the preliminary phases of this study are completed in the next three months. The scientific findings of greatest immediate significance are listed below.

An understanding of the history of the western margins of the Pacific Ocean is also economically important, as background for the intensive search for petroleum in that area.

1. The northwestern Pacific, east of the Mariana-Bonin Islands and north of the Caroline Islands, is the oldest part of the Pacific, and probably the oldest oceanic area in existence today - a remnant of Early Mesozoic ocean floor in excess of 140 million years ago.

2. From this old area the oceanic crust gradually becomes younger eastward to the California coast. The west side of the old area is abruptly bounded by younger crust, 25-50 million years old, under the Philippine Sea and the area of the Caroline Islands. The boundary runs along the Marianas Trench and along a major fracture zone.

3. These findings pose two major alternatives in explanation. Either the strip along which most of the Pacific sea floor has grown, the East Pacific Rise portion of the globe girdling Mid-Oceanic Ridge, once extended all around the eastern, northern, and western sides of the North Pacific; or alternatively the Philippine Sea and Caroline area have had their crust formed or remodelled by processes distinct from those which are making oceanic crust in the Mid-Oceanic Ridge.

4. In the past it has generally been assumed that outpourings of lava on the sea floor produce the rough topographic relief associated with the Mid-Oceanic Ridge. Drilling in the area of the Caroline Islands has shown that submarine lava flows of regional dimensions can also produce very flat, smooth ocean floor, and that the ocean has not only volcanic mountains, but also lava plains perhaps analogous to those of our northwestern States.