Glomar Challenger Off to Drill Sea's Floor

By WALTER SULLIVAN

Inaugurating an international effort to probe the deepest layer of the oceanic crust, the drill ship Glomar Challenger left San Juan, P.R., yesterday headed for the mid-Atlantic.

There, in 14,500 feet of water a short distance east of the ridge midway between Africa and North America, she will attempt to bore at least 6,600 feet into the ocean floor rock.

In the past, the deepest such rock penetration has been only 1,909 feet altough the ship has been able to drill as much as 4,630 feet where there was a great accumulation of sediment.

The project, known as IPOD for International Phase of Ocean Drilling, succeeds the Deep Sea Drilling Project carried out over the last seven years by the same ship. The new effort differs in being more international in scope and seeking far deeper penetrations into the sea floor.

Its goals bear on some of the most basic problems in earth science. These include the manner in which the deep-sea floor, which covers more than half the earth's surface, has evolved, the nature of the force that is steadily widening the Atlantic Ocean and the manner in which ore deposits of oceanic origin were formed.

Drill Sites Chosen

If all goes well it is hoped that the first hole can be drilled in about a month. After a return to port, the Glomar Challenger would then drill additional holes along a line perpendicular to the Mid-Atlantic Ridge and along a line parallel to it.

The first line would probe the crust at increasing distances from the ridge, where the entire Atlantic sea floor is believed to have been formed as the Americas separated from Europe and Africa. In this way it should become clear to what extent the crust changes with age.

Holes equal distances east and west of the ridge will penetrate sea floor formed roughly 80 million years ago, according to magnetic evidence on the bottom. These will assess the extent to which the formative process was symmetrical on opposite sides of the ocean.

The north-south line of drill holes will lie along the zone of sea floor formed nine to 10 million years ago. One theory to account for the spreading apart of the Atlantic is that a massive plume of molten rock rising from deep within the earth under Iceland is forcing apart the two sides of the ocean.

In support of this, some scientists point to a systematic change in composition of rock dredged along the Mid-Atlantic Ridge at increasing distances from Iceland. They believe this is because molten rock from the plume, flowing beneath the crust, becomes increasingly diluted by other material.

The north-south chain of holes, whose drilling is to begin late next summer, would test whether this holds true at great depth and at great distance from Iceland.

The IPOD budget for the next three years is planned at $50 million. Britain, Japan and the Soviet Union have each agreed to contribute a million dollars yearly. West Germany is expected to renew its annual commitment of such a sum and France is also expected to join. The balance of the cost is borne by the United States.

While the area directly on the ridge is the youngest, there is insufficient sediment there to "spud in" the drill pipe. It will not bite into the rock unless it has first penetrated enough sediment to hold it steady.

The first drill site has been chosen because it appears from seismic evidence to contain a "pond" of sediment a few hundred feet deep. Beneath that are believed to be some 1,300 feet of "pillow" basalts and other lava forms typical of underwater eruptions.

These are thought to have spread over the sea floor as that zone was forming along the middle-ocean ridge millions of years ago. Beneath is a rather similar layer 5,000 feet thick. Only when those layers have been pierced can samples of the underlying "third layer" be retrieved.

The latter is two and a half miles thick and is thought to represent the basement of the oceanic crust that is being carried away from the midocean ridge. Composition should help explain how a large part of the earth's surface bas been—and is still being—formed.

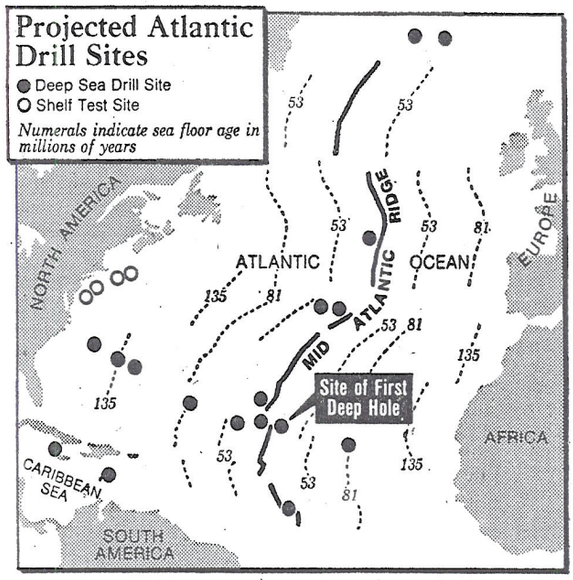
In another project, approved a month ago by the United States Geological Survey, a deep test hole is to be bored into the Baltimore Canyon of the outer continental shelf 80 miles off New Jersey and another one into Georges Bank off Cape Cod. In each case, an alternative drill site also has been approved.

Shallow-Water Drilling

In contrast to deep-sea drilling, the water depths in no cases reach 300 feet. The penetrations are to range from 16,000 to 22,000 feet into sedimentary basins that it is hoped, are rich in oil.

The drilling is to be done by the Ocean Production Company, operating for the Continental Offshore Stratigraphic Test group, an oil industry consortium. The results can then be used by participants in bidding for leases of offshore drill sites next May and August.

The information must be made public 60 days after issuance of the first lease within 50 miles of the drill site or, in any case, within five years.



The New York Times/Dec. 2, 1975