

The ocean bottom – a region nearly 2.

5 times greater than the total land area of the Earth – is a vast frontier that even today is largely unexplored and uncharted.

Until about a century ago, the deep-ocean floor was completely inaccessible, hidden beneath waters averaging over 3,600 meters deep.

Totally without light and subjected to intense pressures hundreds of times greater than at the Earth's surface, the deep-ocean bottom is a hostile environment to humans, in some ways as forbidding and remote as the void of outer space.

Although researchers have taken samples of deep-ocean rocks and sediments for over a century, the first detailed global investigation of the ocean bottom did not actually start until 1968, with the beginning of the National Science Foundation's Deep Sea Drilling Project (DSDP).

Using techniques first developed for the offshore oil and gas industry, the DSDP's drill ship, the Glomar Challenger, was able to maintain a steady position on the ocean's surface and drill in very deep waters, extracting samples of sediments and rock from the ocean floor.

The Glomar Challenger completed 96 voyages in a 15-year research program that ended in November 1983.

During this time, the vessel logged 600,000 kilometers and took almost 20,000 core samples of seabed sediments and rocks at 624 drilling sites around the world.

The Glomar Challenger's core samples have allowed geologists to reconstruct what the planet looked like hundred of millions of years ago and to calculate what it will probably look like millions of years in the future.

Today, largely on the strength of evidence gathered during the Glomar Challenger's voyages, nearly all earth scientists agree on the theories of plate tectonics and continental drift that explain many of the geological processes that shape the Earth.

The cores of sediment drilled by the Glomar Challenger have also yielded information critical to understanding the world's past climates.

Deep-ocean sediments provide a climatic record stretching back hundreds of millions of years, because they are largely isolated from the mechanical erosion and the intense chemical and biological activity that rapidly destroy much land-based evidence of past climates.

This record has already provided insights into the patterns and causes of past climatic change – information that may be used to predict future climates.