Photo of the Drilling Vessel *Glomar Challenger* from the IODP JRSO archive

Deep Sea Drilling Project

11 August 1968–11 November 1983

Legs 1–96

Initial Reports of the Deep Sea Drilling Project

Zenodo Archive

Photo of the Drilling Vessel *Glomar Challenger* from the IODP JRSO archive

Publisher's notes

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About the Deep Sea Drilling Project

The Deep Sea Drilling Project (DSDP) was the first of four international scientific ocean drilling programs that have operated more than 55 years.

On June 24, 1966, the Prime Contract between the National Science Foundation (NSF) and The Regents, University of California was signed. This contract began Phase I of the DSDP, which was based out of Scripps Institution of Oceanography at the University of California, San Diego. Global Marine, Inc. conducted the drilling operations.

The Levingston Shipbuilding Company laid the keel of the drilling vessel (D/V) *Glomar Challenger* on October 18, 1967, in Orange, Texas. The ship was launched on March 23, 1968, from that city. It sailed down the Sabine River to the Gulf of Mexico, and after a period of testing, DSDP accepted the ship on August 11, 1968.

Through contracts with Joint Oceanographic Institutions, Inc. (JOI), NSF supported the scientific advisory structure for the project and funded predrilling geophysical site surveys. Scientific planning was conducted under the auspices of the Joint Oceanographic Institutions for Deep Earth Sampling (JOIDES). The JOIDES advisory group consisted of 250 distinguished scientists from academic institutions, government agencies, and private industry from all over the world.

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Over the next 30 months, Phase II consisted of drilling and coring in the Atlantic, Pacific, and Indian Oceans as well as the Mediterranean and Red seas. Technical and scientific reports followed during a 10 month period. Phase II ended on August 11, 1972.

The success of *Glomar Challenger* was almost immediate. On Leg 1 Site 2 under a water depth of 1067 m (3500 ft), core samples revealed the existence of salt domes. Oil companies received samples after an agreement to publish their analyses. The potential of oil beneath deep ocean salt domes remains an important avenue for commercial development today.

However, the purpose of *Glomar Challenger* was scientific exploration. One of the most important discoveries was made during Leg 3. The crew drilled 17 holes at 10 different sites along an oceanic ridge between South America and Africa. The core samples retrieved provided definitive proof for continental drift and seafloor renewal at rift zones. This confirmation of Alfred Wegener's theory of continental drift strengthened the proposal of a single, ancient land mass, which is called Pangaea. The samples gave further evidence to support the plate tectonics theory, which at the time attempted to explain the formation of mountain ranges, earthquakes, and deep-sea trenches.

Another discovery was how youthful the ocean floor is in comparison to Earth's geologic history. After analysis of samples, scientists concluded that the ocean floor is probably no older than 200 million years. This is in comparison with the 4.5 billion year age of our Earth. As the seafloor spreads from the rifts, it descends again beneath tectonic plates or is pushed upward to form mountain ranges.

The International Phase of Ocean Drilling (IPOD) began in 1975 with the Federal Republic of Germany, Japan, the United Kingdom, the Soviet Union, and France joining the United States in field work aboard *Glomar Challenger* and in postcruise scientific research.

Glomar Challenger docked for the last time with DSDP in November 1983. Parts of the ship, such as its dynamic positioning system, engine telegraph, and thruster console, are stored at the Smithsonian Institution in Washington, DC.

With the advent of larger and more advanced drilling ships, the research vessel (R/V) *JOIDES Resolution* replaced *Glomar Challenger* in January 1985. The new program, called the Ocean Drilling Program (ODP), continued exploration from 1985 to 2003, at which point it was replaced by the Integrated Ocean Drilling Program. The Integrated Ocean Drilling Program was in turn replaced by the International Ocean Discovery Program (IODP) in 2013, and IODP ran from 2013 through 2024. *JOIDES Resolution* served all three programs subsequent to DSDP.

DSDP Core Samples, Publications, and Data

The ship retrieved core samples in 30 ft long cores with a diameter of 2.5 in. These cores are currently stored at three IODP repositories in the USA, Germany, and Japan. One half of each core is called the archive half and is preserved for future scientists. The working half of each core is used to provide samples for ongoing scientific research.

The initial and scientific results from DSDP Legs 1–96 were published in the *Initial Reports of the Deep Sea Drilling Project*. These reports describe the core materials and scientific data obtained at sea and in shore-based laboratories postcruise. These volumes were originally prepared for NSF, National Ocean Sediment Coring Program, under Contract C-482, by the University of California, Scripps Institution of Oceanography. The printed books were scanned by the Texas A&M University Digital Library and prepared for electronic presentation by the Ocean Drilling Program Science Operator, Texas A&M University College of Geosciences, with funding from NSF, in 2007. In 2025, the DSDP digital volumes were archived in the IODP Community at Zenodo.org, an international open source, open access research data archive.

DSDP Coring Operations

Although itself a remarkable engineering feat, *Glomar Challenger* was the site of many advances in deep ocean drilling. One problem solved was the replacement of worn drill bits. A length of pipe suspended from the ship down to the bottom of the sea might have been as long as 20,483 ft (6243 m) (as was done on Leg 23 Site 222). The maximum depth penetrated through the ocean bottom could have been as great as 4,262 ft (1299 m) (as at Site 222). To replace the bit, the drill string must be raised, a new bit attached, and the string remade and run back down to the bottom. However, the crew must thread this

string back into the same drill hole. The technique for this formidable task was accomplished on June 14, 1970, in the Atlantic Ocean in 10,000 ft (3048 m) of water off the coast of New York. This re-entry was accomplished with the use of sonar scanning equipment and a re-entry cone that had a diameter of 16 ft (4.88 m) and height of 14 ft (4.27 m).

One major technological advance was the introduction of the hydraulic piston corer in 1979, which permitted virtually undisturbed cores of sediment to be recovered. This greatly enhanced the ability of scientists to study ancient ocean environments.

Another technological advance was the extended use of the holes after drilling. Geophysical and geochemical measurements were made during and after drilling, and occasionally long-term seismic monitoring devices were installed in the drilled holes. This extended our understanding of the dynamic processes involved in plate tectonics.

From 11 August 1968 to 11 November 1983, *Glomar Challenger* achieved the following impressive drilling accomplishments:

Total distance penetrated below the seafloor	325,548 meters
Total interval cored	170,043 meters
Total core recovered and stored	97,056 meters
Overall core recovery	57%
Number of cores recovered	19,119
Number of sites investigated	624
Number of expeditions completed	96
Deepest penetration beneath the ocean floor	1,741 meters
Maximum penetration into basaltic crust	1,080 meters
Deepest water (Leg 60 Site 461A)	7,044 meters
Total distance traveled	375,632 nautical miles

On This Zip File

The zipped file contains the contents of a volume of the Initial Reports of the Deep Sea Drilling Project. ## is the leg number.

It is recommended that you first open the Leg ## Table of Contents.PDF file that contains the table of contents for the volume and, keeping the file open, navigate back to this file as you work through the volume. The numbers preceding the chapters in the table of contents correspond to the numbers in the PDF file names in the zipped volume.

A typical volume may contain the following*:

Leg ## Table of Contents.PDF: This file contains the table of contents for the volume.

Preliminary Pages: This folder contains a file with the volume's front matter.

Part #: These folders contain the main chapters of the volume. Folders typically include introduction chapters, site reports, shipboard and shore studies, and synthesis chapters.

Maps: This folder contains a map showing the locations of all Deep Sea Drilling Project drilling sites. The map is available in multiple formats. The folder may also contain a leg-specific site location map if it was included in the original volume.

Core Photos: This folder contains the entire set of digitized core images produced by scanning the original negatives. The folder may also contain black and white and/or color close-up photos.

Appendices: This folder contains appendix chapters that usually include tabulated data.

Back Pocket Foldout: This folder contains oversized figures and tables.

Volume Cover: This folder contains a scanned image of the printed volume cover.

Index: This folder contains a volume specific index.

*Note: Not every volume contains the same folders, and folders may be named and organized differently in each volume. This list contains an overview of all potential folders a volume may contain.