

# Legacy of Scientific Ocean Drilling

## DISCOVERING EARTH'S SECRETS

219 EXPEDITIONS • 1,353 DRILL SITES • 57,555 CORES • 333,206 METERS OF RECOVERED CORE



The drillship *JOIDES Resolution* uses dynamic positioning to core beneath the seafloor and recover sediments and rocks for scientific research.

### 1950s

- The **American Miscellaneous Society (AMSOC)** submits proposal to NSF in **1957** to drill a hole on the seafloor to reach the Mohorovicic seismic discontinuity that marks the boundary between the Earth's crust and mantle.

*"It is an amazing experience to be able to walk onto a ship and carry out a scientific program that is technically very complex... The overall reliability of the operation is something that ODP can be proud of."*



### 1960s

- During **PROJECT MOHOLE**, the *CUSS I* cores through 200 m of sediment and 14 m of basalt in 3,800 m water depth west of Mexico in **APRIL 1961**. This was made possible by the invention of dynamic positioning, which keeps the drilling vessel stationary over a point on the seafloor.
- During **PROJECT LOCO**, the *Submarex* cores through 55 m of sediment near Jamaica in **1963**.
- The Joint Oceanographic Institutions for Deep Earth Sampling (**JOIDES**) form an ocean drilling consortium in **1964**.
- During **PROJECT CALDRILL**, the *Caldrill* cores six holes across the Blake Plateau in **1965**.
- The *Glomar Challenger* sets sail on the first **Deep Sea Drilling Project** cruise (DSDP Leg 1; Gulf of Mexico) in **1968**.
- The theory of seafloor spreading is confirmed during Leg 3 in the southern Atlantic Ocean, **JANUARY 1969**.



### 1970s

- The first use of a reentry cone on **14 JUNE 1970** allows the reoccupation of an existing borehole during Leg 11, western North Atlantic.
- Evaporites recovered during Leg 13 show that the Mediterranean was a dry basin in the late Miocene, **OCTOBER 1970**.
- Site 270 is cored at a southernmost latitude of 77.5°S in the Ross Sea on **29 JANUARY 1973**, during Leg 28.
- Climate cycles correlated to periodicities in Earth's orbit are seen in sediments recovered during Leg 39, western South Atlantic, **OCTOBER 1974**.
- France, Germany, Japan, the United Kingdom, and the USSR join JOIDES in **1975**, initiating the **International Program for Ocean Drilling (IPOD)** phase.
- Site 461A is cored in the deepest water depth of 7,034 meters at the Mariana Trench on **10 MAY 1978**, during Leg 60.
- Living microorganisms in shallow marine sediments are recovered in the Gulf of California during Leg 64, **JANUARY 1979**. The introduction of the hydraulic piston corer enables the recovery of undisturbed sediments.



### 1980s

- Evidence for major Northern Hemisphere glaciation around 2.4 million years ago is recovered from the Rockall Plateau during Leg 81, **AUGUST 1981**.
- The first short-term ocean-bottom seismometer is installed in the northwest Pacific during Leg 88, **AUGUST 1982**.
- The *JOIDES Resolution* sets sail on the first **Ocean Drilling Program** cruise (ODP Leg 100; Gulf of Mexico) on **29 JANUARY 1985**.
- A shift to a dryer climate in central Africa thought to have led to human migration from Africa starting 2 million years ago is documented during Leg 108, northwestern margin of Africa, **APRIL 1986**.
- The establishment of a permanent West Antarctic ice sheet around 5 million years ago is documented during Leg 113 in the Weddell Sea, **JANUARY 1987**.
- Evidence of long-lived hotspot tracks is recovered during Leg 115 in the Indian Ocean, **JUNE 1987**.
- Uplift of the Himalayas is proposed to have enhanced global cooling, Leg 116, Indian Ocean, **AUGUST 1987**.
- The oldest ocean crust in the northwest Pacific is confirmed to be Jurassic in age (~170 Ma) during Leg 129, **DECEMBER 1989**.



### 1990s

- Hydrothermal metal deposits are recovered from the Juan de Fuca Ridge during Leg 139, **JULY 1991**.
- Hole 504B penetrates into pillow lavas and sheeted dikes of the Costa Rica Rift during Leg 140, **NOVEMBER 1991**.
- Hole 504B becomes the deepest ocean borehole at 2,111 m on **23 FEBRUARY 1993** during Leg 148.
- A link between ice sheet volume and sea level change is demonstrated during Leg 150, eastern margin of North America, **JULY 1993**.
- Large amounts of gas hydrates are found in sediments during Leg 164, eastern margin of North America, **DECEMBER 1995**.
- Evidence of the impact of a meteorite with Earth 65 million years ago, believed to have contributed to the extinction of the dinosaurs, is recovered during Leg 171B on the Blake Nose, **JANUARY 1997**.
- A record amount of core (8,003 meters) is recovered during Leg 175 west of Africa, **OCTOBER 1997**.
- Microbes living in sediments 800 meters beneath the seafloor are discovered during Leg 180 in the Woodlark Basin, **AUGUST 1998**.
- The first long-term ocean-bottom seismometer is installed during Leg 186 off the east coast of Japan, **JUNE 1999**.



### 2000s

- The timing of the opening between Australia and Antarctica, which was critical to the formation of the Antarctic Circumpolar Current and cooling of the Earth that started 33 million years ago, is confirmed during Leg 189 south of Australia, **MARCH 2000**.
- Abrupt climate change during the Paleocene/Eocene Thermal Maximum and Eocene hyperthermals is documented during Legs 198 and 199, central Pacific Ocean, **DECEMBER 2001**.
- The *JOIDES Resolution* sets sail on the first **Integrated Ocean Drilling Program** cruise (IODP Expedition 301; Juan de Fuca Ridge) on **28 JUNE 2004**.
- The *Vidar Viking* cores Site M0003 at a northernmost latitude of 87.9°N at the Lomonosov Ridge during Expedition 302, **AUGUST 2004**.
- Site 1256 penetrates the sheeted dike-gabbro transition in intact ocean crust during Expedition 312 in the Guatemala Basin, **DECEMBER 2005**.
- The *Chikyu* sets sail on her first IODP cruise (Expedition 314; east of Japan) on **21 SEPTEMBER 2007**.
- The converted *JOIDES Resolution* with enhanced science laboratories and improved drilling capabilities resumes IODP operations in **2008**.

