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SPOTLIGHT 11. Mission-Specific Platforms

The Integrated Ocean Drilling Program adopted mission-specific platform (MSP) expeditions in 2003 to extend the program's capabilities for a new generation of scientific drilling projects in areas inaccessible to *JOIDES Resolution*, for example, ice-covered seas, waters shallower than 100 m, and areas with hard rock exposed at the seabed or with unconsolidated sediments.

MSP expeditions are implemented by the European Consortium for Ocean Research Drilling (ECORD) Science Operator (ESO) through a partnership with the British Geological Survey (BGS), the German Center for Marine Environmental Sciences (MARUM, Universität Bremen), and the European Petrophysics Consortium (which includes the University of Leicester in the UK and the University of Montpellier in France).

Since its inception, ESO has successfully staged eight MSP expeditions from the Arctic to the South Pacific. The expeditions have provided new insights into the Arctic's Cenozoic paleoenvironmental and climatic evolution, new data on the paleoceanographic evolution of the tropics as recorded in coral reefs, new knowledge of the role of serpentinization in driving hydrothermal systems that sustain microbiological communities, and new information on the mechanics and effects of large meteorite impacts.

The platforms and drilling services used in MSP expeditions are typically contracted from the commercial sector. In addition, the majority of International Ocean Discovery Program (IODP) standard measurements are not collected at sea, but instead during onshore science gatherings hosted by the IODP Bremen Core Repository. In this respect, MSPs give the community access to leading-edge as well as alternative technologies without the need to maintain a permanent drilling infrastructure. This creates the opportunity to redefine what constitutes a scientific drilling platform and encourages "high risk" proposals in new areas of science.

One of the most successful MSP approaches has been to adapt shore-based mining technologies for use on traditional offshore platforms. This approach was successfully implemented for Expedition 310 (Tahiti Sea Level), Expedition 313 (New Jersey Shallow Shelf), and Expedition 364 (Chicxulub Impact Crater). The smaller cutting surface area of the drill bits and coring tools used by these systems, in combination with a raised platform (Expeditions 313 and 364 only) standing on the seabed (photo), makes possible higher core recovery and better core quality in lithologies that otherwise are challenging to drill by wider-diameter systems deployed from floating platforms.

More recently, the introduction of seabed robotic drilling is yielding promising results. During Expedition 357 (Atlantis Massif Serpentinization and Life), when these drills were first applied for IODP, they achieved a new record in core recovery (up to 75%) for the uppermost 15 m in exposed hard rock environments. The robotic drills provide a future vehicle for other technologies and experiments to be developed and implemented in support of scientific ocean drilling. For example, using such a drill, Expedition 357 deployed novel water sensor and sampling assemblies to study in situ ephemeral fluid properties and installed borehole plug systems that offer the opportunity to repeatedly revisit these sites to resample equilibrated borehole fluids.

The flexibility of using MSPs offers the scientific community opportunities to take advantage of new technologies or employ existing technologies in innovative ways. Using the MSP approach will be critical for future scientific ocean drilling projects that require both onshore and offshore experiments. MSPs remain the only way for the scientific ocean drilling community to investigate areas where no drilling platform has gone before.

— David McInroy and Gilbert Camoin

Platforms such as Liftboat *Myrtle* that sit on the seabed provide a stable environment for drilling and coring, resulting in higher core recovery. *Credit: D. Smith*

MISSION SPECIFIC PLATFORMS STATISTICS

Number of expeditions	8
Number of sites	80
Number of holes	137
Number of cores	3,547
Number of expedition operational days	609*
Total distance drilled	10,241 m
Total distance cored (attempted)	8,424 m
Length of core recovered	6,672 m
Average core recovery (all expeditions)	79%
Most core recovered on a single expedition	1,645 m (Exp. 381)
Highest recovery on a single expedition	100% (Exp. 364)
Deepest borehole	1,335 mbsf (Exp. 364)
Deepest water depth	1,568 m (Exp. 357)
Shallowest water depth	19.8 m (Exp. 364)
Highest latitude	87°56.0'N (Exp. 302)
Distance traveled	38,745 nm

*Offshore and Onshore Science Party