# **IODP Mission-Specific Platform Expeditions and Their Role in a Future Scientific Ocean Drilling Program**

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IODP[[1]](#footnote-1) is currently supported by 22 Funding Agencies from around the world, and delivered by 3 Platform Providers. The United States NSF[[2]](#footnote-2) provides the riserless drillship *JOIDES Resolution*, Japan's MEXT[[3]](#footnote-3) provides the riser drillship *D/V Chikyu*, and the ECORD[[4]](#footnote-4) provides mission-specific platforms (MSPs) which are contracted on a case-by-case basis.

Each IODP platform provides specialist capability. The *JOIDES Resolution* has provided high-quality riserless coring since 1985, and has played a pivotal role in global scientific ocean drilling throughout various generations of IODP. The *D/V Chikyu* delivers deep riser-mode drilling capability, giving earth scientists access to deeper targets and potentially providing a method to reach the Mohorovičić discontinuity. As capable as the two dedicated IODP platforms are, they are unable to reach all geological targets, such as those located under ice-covered seas, in shallow water, in environmentally sensitive areas or in certain hard-to-drill lithologies such as carbonate reefs and loose sediments.

ECORD has provided MSPs to tackle the targets unreachable by either the *JOIDES Resolution* or *D/V Chikyu*. To date, ECORD has implemented 9 MSP expeditions including to the Central Arctic Ocean, to the coral reefs offshore Tahiti and the Great Barrier Reef, to the shallow shelf areas offshore eastern United States, Mexico and in the Baltic Sea, and to the ultra-deep waters of the Japan Trench. These projects had multiple scientific objectives, including the recovery of records of climate and sea level change, and the recovery of previously unknown buried microbiological communities.

MSPs typically do not have the same level of onboard laboratory infrastructure compared to the *JOIDES Resolution*, *D/V Chikyu* and other scientific research vessels. The offshore phase of an MSP expedition carries a smaller scientific team, who focus on measuring ephemeral properties and other measurements that are required to guide the coring strategy at sea. All other analyses are deferred to the Onshore Science Party, held after the offshore phase at the IODP Bremen Core Repository and MARUM[[5]](#footnote-5), where the cores are split and the invited Science Party conduct a full IODP analysis of the cored material.

As IODP evolved, so did the methods used to collect cores from below the seabed. ECORD actively promotes the use of alternative coring technologies on MSPs, in addition to heave-compensated wireline coring that is traditionally used for scientific drilling. Examples include the use of land-based mining-style coring offshore (Expeditions 310: Tahiti, 313: New Jersey, 364: Chicxulub), robotic sea floor drills to collect high quality core at multiple locations for Expedition 357: Atlantis Massif on an oceanic core complex in the Central Atlantic, and giant piston coring used for Expedition 386 in the Japan Trench. Alternative systems like these have several advantages, including better core recovery in target lithologies and lower operating costs than heave-compensated wireline systems deployed by a drill ship.

Following the end of the present IODP program in 2024 ECORD and Japan have liaised to combine their efforts in scientific ocean drilling. Under this new program MSPs will leave their niche as drilling platforms in ice-covered, shallow water, etc areas and embrace scientific drilling in all ocean environments.

This presentation will summarise past MSP achievements, outline the latest ideas for future ocean drilling program(s), and provide future scientific ocean drilling proponents and scientists with information on the key capabilities, benefits, and flexibilities of MSPs.

1. International Ocean Discovery Program, 2 National Science Foundation (United States), 3 Ministry of Education, Culture, Sports, Science, and Technology (Japan), 4 European Consortium for Ocean Research Drilling, 5 Center for Marine Environmental Sciences, University of Bremen [↑](#footnote-ref-1)
2. [↑](#footnote-ref-2)
3. [↑](#footnote-ref-3)
4. [↑](#footnote-ref-4)
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