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ECORD Mission-Specific Platform Expeditions in the International Ocean Discovery Program

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The International Ocean Discovery Program (IODP) is supported by 25 Funding Agencies from around the world, and delivered by 3 Platform Providers; the US National Science Foundation provides the *JOIDES Resolution*, Japan's Ministry of Education, Culture, Sports, Science, and Technology provides the *D/V Chikyu*, and the European Consortium for Ocean Research Drilling (ECORD) 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 the 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 provides MSPs to tackle these targets unreachable by either the *JOIDES Resolution* or *D/V Chikyu*. To date, ECORD has implemented 6 MSP expeditions including to the Central Arctic Ocean, the coral reefs offshore Tahiti and the Great Barrier Reef, the shallow shelf offshore eastern United States, and the Baltic Sea offshore Denmark and Sweden. 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.

After the offshore phase of each ECORD MSP expedition, the cores are transported to the IODP Bremen Core Repository where the cores are split and an invited Science Party conduct a full IODP analysis of the cored material. All results are published online after a 1-year moratorium period, during which Science Party members have exclusive access to the expedition data.

Figure 1: RD2 seafloor drill, IODP Expedition 357.

As the IODP evolves, so do the methods used to collect cores from below the sea bed. ECORD is driving an initiative to use alternative coring technologies in addition to wireline coring that is traditionally used for scientific drilling. One example is the use of robotic sea floor drills to collect high quality core at multiple locations, which were used recently in an IODP expedition to the Atlantis Massif oceanic core complex in the Central Atlantic (Figure 1). Such drills have several advantages, including better core recovery in hard rocks and operating costs that are far cheaper

than standard coring deployed by a drill ship. Likewise, long piston coring is another method to acquire high quality cores along long transects that can now be accommodated by IODP MSP expeditions.