

Scientific Ocean Drilling: Voyage of Discovery beyond 2013



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Scientific ocean drilling, one of the longest running and most successful international collaborations in Earth sciences, is now preparing for a seamless transition from the Integrated Ocean Drilling Program (IODP) to a new program phase. The current IODP, which shall terminate in September 2013, was built upon the accomplishments of the previous two legacy programs Deep Sea Drilling Project (DSDP) and Ocean Drilling Program (ODP), and has conducted cutting-edge investigations of the seafloor since 2003. IODP employs three complementary types of drilling platforms, each with operational capabilities to support transformative science across a vast extent of Earth's oceans. The next phase of scientific ocean drilling, the International Ocean Discovery Program, is scheduled to start in October 2013 and will build on the new research plan "Illuminating Earth's Past, Present and Future". This science plan outlines the framework for the new IODP with four themes addressing fundamental questions about Earth's climate, deep-sea life, geodynamics and geohazards (IODP 2011). It will facilitate a long-term and global perspective on some of today's most pressing environmental issues. Planning for the new phase began in early 2009 with inputs solicited from the international community at the INVEST confer-

ence on new ventures in scientific drilling with over 600 scientists from 21 nations.

Multi-platform operations will also serve the science community for the post-2013 program (Fig. 1). Chikyū, the Japanese-operated riser type platform, will provide access to the deep ocean crust, Earth's mantle, seismogenic zones and hydrocarbon-prone regions. The US-supplied non-riser type vessel JOIDES Resolution, will continue to demonstrate its capabilities with the goal of operating with a full annual schedule. It will address a multitude of science objectives, in particular on climate history and the deep seafloor biosphere. Finally, the mission-specific platforms provided by the European Consortium for Ocean Research Drilling (ECORD), will be deployed in challenging environments such as in shallow waters and ice-covered waters of the Arctic.

Subseafloor observatories developed within the ocean drilling community are another key feature of the new science plan. They will collect data at multiple depths along a borehole. These data can be combined with seabed and water-column studies. International collaboration has made it possible to link subseafloor observatories through cabled networks for real-time monitoring off the coasts of Japan, North America and Europe. China is currently developing plans for similar networks.

The new IODP program will continue to offer open access to all data and samples collected during expeditions after a scientific moratorium. Legacy cores collected since the start of the DSDP in 1968 through present are kept in three core repositories and are available for sampling by scientists and for educational purposes. The existing administrative structure of IODP will be maintained. In particular, the international IODP Science Advisory Structure will continue to guide proposal evaluation, scientific technology review, site characterization examination and safety assessment. The journal "Scientific Drilling", published jointly with ICDP, will continue without interruption.

The main features of the new IODP preserve the international, science-driven and multidisciplinary foundations of the program while providing new and exciting opportunities for oceanographic, microbiological and deep Earth discoveries. The results emerging from new IODP will provide benefits to society by advancing our understanding of geohazards, evolution of life and global climate change.

References

- IODP (2011) *Illuminating Earth's Past, Present, and Future*. www.iodp.org/Science-Plan-for-2013-2023/
- Schoof C (2010) *Nature Geoscience* 3: 450-451

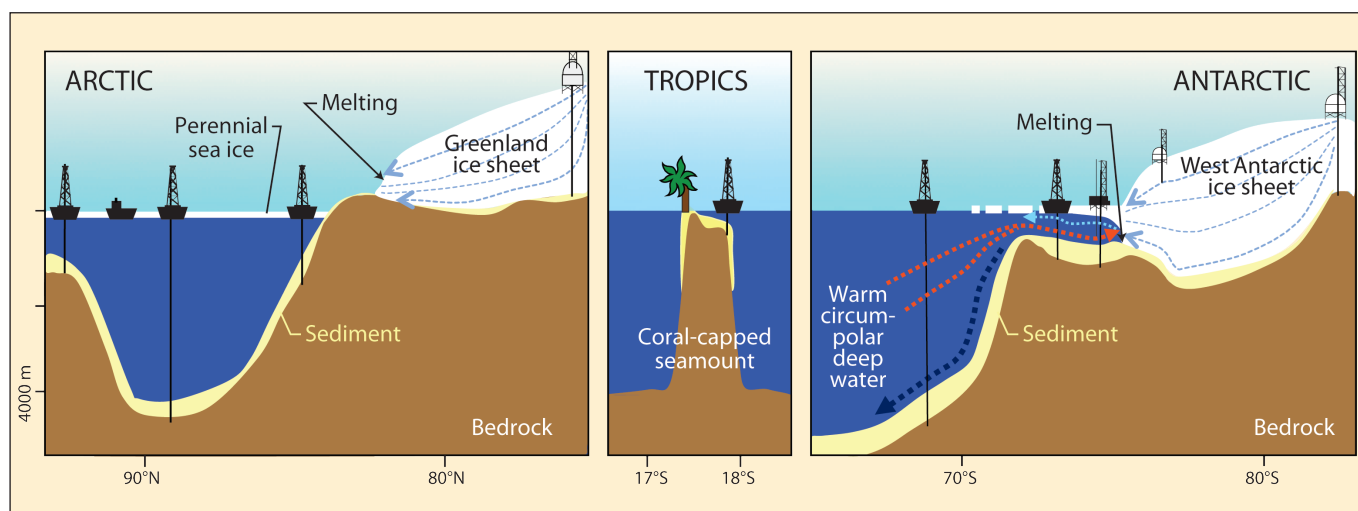


Figure 1: International Ocean Discovery Program (IODP) drilling strategy at the poles and tropics to collect records linking climate, ice sheet, and sea level histories on geologic time scales. Red arrows represent warm water flow beneath floating ice, recently recognized as a key factor in accelerating ice loss from West Antarctica. Elements of this figure were adapted from Schoof (2010).

