INTRODUCTION TO
THE SPECIAL ISSUE ON

# THE IMPACT OF THE OCEAN DRILLING PROGRAM

BY ROBERT BURGER AND KANTARO FUJIOKA

Exactly one year before man landed on the moon, on July 20, 1968, another scientific undertaking began that was much less publicized but perhaps just as important in its ultimate contribution to scientific knowledge. Leg 1 of the Deep Sea Drilling Project (DSDP) embarked from Orange, Texas, to three sites (Gulf of Mexico, near the Bahamas, and offshore Bermuda) to inaugurate an extended period of unparalleled discovery in the Earth sciences. Nearly 40 years later, after 218 expeditions have been completed and 332,370 meters of sediments and rock have been recovered from the seafloor, scientific ocean drilling is still going strong. It remains a fundamental tool for researchers seeking to improve knowledge of the Earth.

DSDP, which operated from 1968 to 1983, was followed by the Ocean Drilling Program (ODP) (1983–2003), which was succeeded by the Integrated Ocean Drilling Program (IODP) (2003–present). These programs have explored all of the world's oceans (Figure 1). The expeditions have involved thousands of researchers from many countries and have greatly expanded our knowledge of Earth, from early successes such as verifying the "young" age of oceanic crust and confirming aspects of the theory of plate tectonics, to more recent accomplishments, including the discovery and understanding of a vast microbial biosphere deep beneath the seafloor (see Smith et al., this issue), and deducing that the high Arctic Ocean was once as warm as the waters of Florida (see Moran et al., this issue). A testament to the value of these programs is that after nearly 40 years of operations, scientific ocean drilling is nowhere near winding down; in fact, its goals are becoming ever more ambitious and innovative.

We now find ourselves in unfamiliar waters: for the first time in many years, no ocean drilling expeditions are underway. *JOIDES Resolution* is being renovated to improve its capabilities for IODP and could potentially resume operations as early as November 2007. The new Japanese drillship, *Chikyu* ("Earth"), is currently in sea trials, and is expected to begin IODP operations in October 2007. IODP's next European-managed "Mission-Specific" expedition (with specific drilling platforms contracted to investigate ice-covered and shallow-water areas inaccessible to the U.S. and Japanese ships) is scheduled to occur off the U.S. coast of New Jersey in May 2007. Thus, although no pipe is now being tripped and no calls of "core on deck" can be heard, this hiatus is akin to an anticipatory breath before a whirlwind of activity. In a little over a year, the IODP will realize its full potential for the first time, with three drilling platforms operating simultaneously, providing the capabilities to drill deeper and conduct more analyses in a wider variety of locations than ever before.

As we are in the midst of this pause before the IODP begins full implementation, now is the ideal time to reflect upon some of the many successes of ocean drilling, and to look forward to the new challenges. This special issue of *Oceanography* is meant to do both. Moore and

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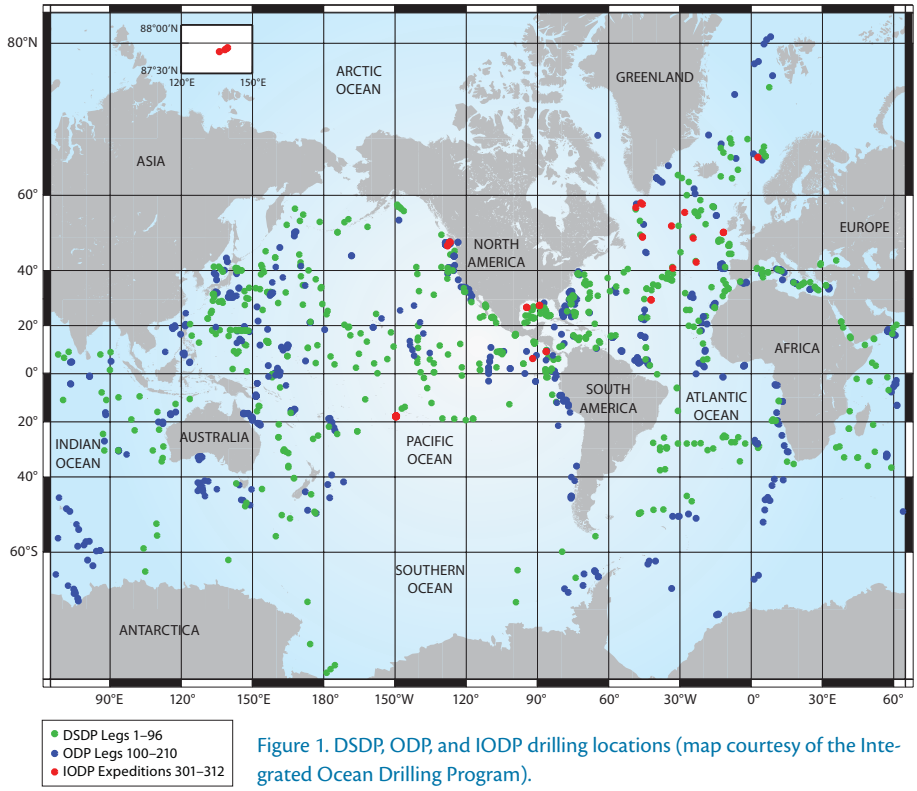


Figure 1. DSDP, ODP, and IODP drilling locations (map courtesy of the Integrated Ocean Drilling Program).

Pälike introduce the issue by providing an overview of the contributions that ocean drilling has made in establishing and refining the geologic timescale. Several papers, all from this issue, (Filippelli et al., Ravelo et al., Thomas et al., Takashima et al., and Moran et al.) address how far we've come with respect to understanding Earth's climatic history. Understanding crustal processes has also been a primary goal of many expeditions, and ocean drilling will continue to expand our understanding of the structure of the oceanic crust (Dick et al.), the formation and climatic implications of Large Igneous Provinces (Coffin et al.), and how oceanic crust is recycled in subduction zones (Tatsumi and Stern). Understanding the genesis of earthquakes, with its clear societal importance, will be addressed by drilling in the seismogenic zones at convergent plate boundaries (Kinoshita et al.) and by installing a global network of seismic observatories in existing boreholes (Suyehiro et al.). Ocean drilling scientists and engineers have also been innovative in developing long-term subseafloor observatories to better understand the hydrology and chemistry of the oceanic crust (Kastner et al.), and have been at the forefront of gas hydrate research (Trehu et al.). Gas hydrate research is an area with clear societal importance in their resource potential and possible effects on global climate. Finally, Curewitz and Taira, and Evans et al., complete this issue with a look to the future of the program, outlining the many new capabilities of the multi-platform approach of the IODP.

In addition to the scientific articles, there are also a number of short pieces with the unifying theme of "life at sea" interspersed throughout the issue, contributed by members of the scientific community who sailed on one or more DSDP, ODP, or IODP expeditions. These remembrances are meant to provide additional insights about participating in scientific ocean drilling.

We hope that this issue will convey to readers the significance and value of scientific ocean drilling and of the opportunities that lie ahead. With three drilling platforms soon to be operating, there will be many chances to participate in future expeditions. Application information can be found at: http://www.iodp.org/apply-to-sail, and we encourage you to apply! Perhaps in 2007 you'll find yourself waiting for the next "core on deck"—and the continuing discovery that comes with it.

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