Editorial Preface

Dear Reader:

In 2009 scientific ocean drilling for the first time utilized the capabililty to conduct closed hole, mud-assisted drilling through the deployment of a ‘riser’—an approximately 0.5-meter-diameter steel pipe that connects the drilling vessel to a cased hole in the seafloor. The riser vessel *Chikyu* (front page) now offers the scientific community this capability that opens up totally new research opportunities. Sadly, not science, but the 2010 environmental disaster in the Gulf of Mexico made words like riser, blow-out-preventer, casing, cementing of holes, etc. part of everyone’s vocabulary. But we can be proud that after four decades and more than 1300 scientific drill sites in the oceans, not a single drop of oil have been released into the ocean due to scientific drilling.

The new technology does not stop with riser drilling, but includes *in situ* observatories providing time-series of fluid flow, pressure, stress and strain, or seismic activity, thereby extending our science from records of the past to observing “Earth in motion”. Preparations for observatories to be established within the seismogenic zone offshore Japan is reported on p.4. The material brought into the seismogenic zone by the Philippine Sea plate pushing below Japan is reported on p.14. When fully completed, this project will allow observations to be made very close to the zone where truly large earthquakes occur, and, therefore, like the Hubble telescope, provide a much clearer picture of the processes that take place.

The revolutionary finding that life *on* Earth in fact is complemented by deep microbial life *in* the Earth is addressed on pp.35 and 46. ICDP has now extended the search for deep microbial life—previously mainly demonstrated from below the ocean seafloor—to continental areas such as sediments below lakes. This discovery of potentially large, subsurface life and carbon reservoir follows in the heels of the major carbon reservoir identified by scientific drilling over the last decade or so—the vast gas hydrate deposits along many continental margins, in the climate-sensitive Arctic Ocean and at the bottom of Lake Baikal. As gas hydrates sublimate at elevated temperatures, potential doomsday scenarios could be envisaged if global warming triggered a cascading effect of greenhouse gas release. Scientific drilling allowed for detecting this phenomenon, and it is a key tool to predict the consequences of future sea-level rise (p.26).

In Iceland, attempts are made to harvest CO_2 neutral energy by deep drilling with required new technology into very hot crust (p.40). If more globally successful, this pioneering effort could lead to less dependence on fossil fuels. And finally, on p.56, a recent workshop reports on how and where to possibly fulfill the 50-year-old quest to drill through the entire ocean crust and into the underlying mantle. With riser drilling onboard *Chikyu*, this is now becoming a real possibility.

Hans Christian Larsen
Editor-in-Chief

Ulrich Harms
Editor

Front Cover: *Chikyu* at night before departure for the Nankai Trough, one of the most active earthquake zones in the world. (11 May 2009, Port of Shingu, Japan)
Left inset: The riser tensioner. The six riser tensioner cylinders (yellow) support the riser pipe (white) in the center.

Scientific Drilling

ISSN **1816-8957** (printed version)
1816-3459 (electronic version)

Scientific Drilling is a semiannual journal published by the Integrated Ocean Drilling Program (IODP) with the International Continental Scientific Drilling Program (ICDP). The editors welcome contributions on any aspect of scientific drilling, including borehole instruments, observatories, and monitoring experiments. The journal is produced and distributed by the Integrated Ocean Drilling Program Management International (IODP-MI) for the IODP under the sponsorship of the U.S. National Science Foundation, the Ministry of Education, Culture, Sports, Science and Technology of Japan, and other participating countries. The journal’s content is partly based upon research supported under Contract OCE-0432224 from the National Science Foundation.

Electronic versions of this publication and information for authors can be found at http://www.iodp.org/scientific-drilling/ and http://www.icdp-online.org/scientific-drilling/. Printed copies can be requested from the publication office.

IODP is an international marine research drilling program dedicated to advancing scientific understanding of the Earth by monitoring and sampling subseafloor environments. Through multiple drilling platforms, IODP scientists explore the program’s principal themes: the deep biosphere, environmental change, and solid Earth cycles.

ICDP is a multi-national program designed to promote and coordinate continental drilling projects with a variety of scientific targets at drilling sites of global significance.

Publication Office
IODP-MI, Tokyo University of Marine Science and Technology,
Office of Liaison and Cooperative Research 3rd Floor,
2-1-6, Etchujima, Koto-ku, Tokyo
135-8533, JAPAN
Tel: +81-3-6701-3180
Fax: +81-3-6701-3189
e-mail: journal@iodp.org
url: www.iodp.org/scientific-drilling/

IODP-MI
Tokyo, Japan
www.iodp.org
Program Contact: Miyuki Otomo
motomo@iodp.org

ICDP
German Research Center for Geosciences – GFZ
www.icdp-online.org
Program Contact: Ulrich Harms
ulrich.harms@gfz-potsdam.de