# Editorial Preface

## Dear Reader:

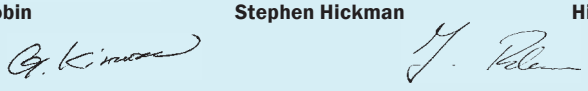
On 23–26 May, 2006, eighty scientists and engineers from around the world met at Miyazaki, Japan, at a workshop jointly sponsored by the Integrated Ocean Drilling Program (IODP) and the International Continental Scientific Drilling Program (ICDP). The purpose of this workshop was to review the state of the art in scientific drilling into fault zones, and discuss scientific and technological issues faced by future fault zone drilling projects on land and at sea.

The workshop provided a forum for an open and detailed exchange of scientific and technical knowledge, ideas, lessons learned, and the fundamental science drivers shared by the various projects. It joined together participants from a number of active fault zone drilling projects, to address both the science and technology of drilling, sampling, testing, and long-term monitoring of active faults, especially those at plate boundaries.

Fault zone drilling projects are different from most other scientific drilling efforts. In general, fault zone targets include discontinuities and small, anomalous intervals in large rock volumes, rather than a continuous stratigraphic succession. The targets of interest are often the locations of poorest drilling conditions, such as a highly-fractured and potentially overpressured rock volume. The scientific approach shared by all fault zone drilling projects focuses on conducting extensive geophysical logging; *in situ* stress, fluid pressure and permeability measurements; core, cuttings and fluid sampling; and surface-to-borehole geophysical site characterization studies in and around active fault zones. These studies then often provide the basis for long-term downhole monitoring of seismicity, strain, fluid pressure and other parameters directly within or adjacent to an active fault zone. The technological complexity of these endeavors requires a concentrated multinational engineering effort, with step-by-step improvement of drilling, sampling, downhole measurements and long-term monitoring equipment and techniques, as fault zone drilling projects target ever-increasing depths and temperatures.

The Workshop on Fault Zone Drilling in Miyazaki was very successful in meeting these goals. It provided a forum for scientific and technological cross-fertilization between projects, and contributed to a much-needed transfer of experience and expertise from completed and ongoing fault zone drilling projects to those under development. This special issue of *Scientific Drilling* contains the workshop report, plus short and extended abstracts of many of the oral and poster presentations given at the workshop. It is hoped that this issue reflects the current trend of increased collaboration between fault zone drilling projects undertaken by IODP and ICDP, and highlights the healthy base of understanding of the mechanics of faulting and earthquake generation derived from fault zone drilling projects worldwide.

**Harold Tobin** **Stephen Hickman** **Hisao Ito**



**Gaku Kimura** **Jan Behrman**

**Front cover:** Seismicity of the San Andreas Fault as seen from a vantage point in the Earth looking to the northwest. Hypocenters were determined by Cliff Thurber and Haijiang Zhang (University of Wisconsin) and Steve Roecker (Rensselaer Polytechnic Institute) using data from the Parkfield Area Seismic Observatory as well as the USGS and University of California at Berkeley seismographic networks. The SAFOD main hole is shown in red, extending downward from the surface facility (star). The surface trace of the fault is shown in black draped over the topography. EarthVision plot prepared by Luke Blair (USGS). **Left Inset:** Part from "Earth system components, processes and phenomena" illustration by Asahiko Taira (CDEX) taken from the IODP initial science plan (2001).



**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 subsea-floor 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, CRIS Building-Room 05-101,
Hokkaido University, N21W10 Kita-ku,
Sapporo, 001-0021 Hokkaido, Japan.
Tel: +81-11-738-1075
Fax: +81-11-738-3520
e-mail: journal@iodp-mi-sapporo.org
url: www.iodp.org/scientific-drilling/

**Editorial Board for Special Issue 1:** Hisao Ito (Japan Agency for Marine-Earth Science and Technology), Jan Behrmann (IFM-GEOMAR), Steve Hickman (U.S. Geological Survey), Harold Tobin (University of Wisconsin-Madison), Gaku Kimura (University of Tokyo).

***Scientific Drilling:***
**Editor-in-Chief** Hans Christian Larsen
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Send comments to:
journal@iodp-mi-sapporo.org

**Copy Editing**
Glen Hill, Obihiro, Japan.

**Layout, Production and Printing**
Mika Saido (IODP-MI),
and
SOHOKKAI, Co. Ltd., Sapporo, Japan.

**IODP-MI**
Washington, DC, U.S.A.
Sapporo, Japan
www.iodp.org
**Program Contact:** Nancy Light
nlight@iodp.org

**ICDP**
GeoForschungsZentrum Potsdam
Potsdam, Germany
www.icdp-online.org
**Program Contact:** Ulrich Harms
icdp@gfz-potsdam.de

All figures and photographs courtesy of the IODP, unless otherwise specified.

Regular Number 6 of *Scientific Drilling* will be distributed in:
**March 2008**