

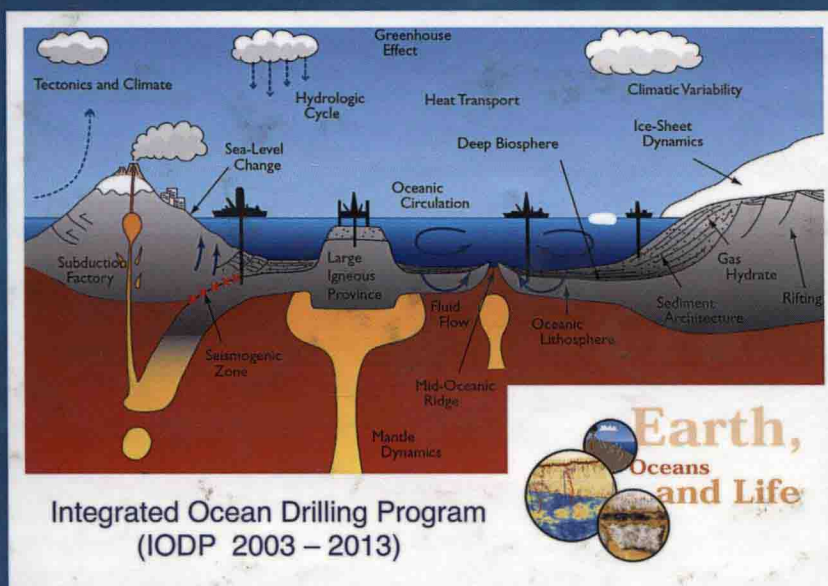
DEVELOPMENTS IN MARINE GEOLOGY

7

EARTH AND LIFE PROCESSES DISCOVERED FROM SUBSEAFLOOR ENVIRONMENTS

A DECADE OF SCIENCE ACHIEVED BY THE
INTEGRATED OCEAN DRILLING PROGRAM (IODP)

R. STEIN, D. BLACKMAN, F. INAGAKI AND H.-C. LARSEN



SERIES EDITOR: R. STEIN

Developments in Marine Geology

Volume 7

Earth and Life Processes Discovered from Subseafloor Environments

A Decade of Science Achieved by the
Integrated Ocean Drilling Program (IODP)

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Developments in Marine Geology

Volume 7

**Earth and Life Processes Discovered from
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Preface

Since 1968, the Deep Sea Drilling Project (DSDP: 1968–1983), Ocean Drilling Program (ODP: 1983–2003) and Integrated Ocean Drilling Program (IODP: 2003–2013) have provided crucial records of past and present processes and interactions within and between the biosphere, cryosphere, atmosphere, hydrosphere, and geosphere. The early DSDP–ODP exploratory phase resulted in the confirmation of the unifying theory of plate tectonics, shortly followed by the development of new fields of research such as paleoceanography, astronomically tuned geochronology, structure and geodynamics of the ocean crust, mineral resources in oceanic hydrothermal systems, marine gas-hydrate reservoirs, sub-seafloor life and biogeochemical cycles, and others. Research within the IODP encompasses a wide range of fundamental and applied topics that affect society, such as global change, evolution and diversity of life, natural hazards such as earthquakes, submarine landslides and volcanism, and the internal structure and dynamics of our planet (Figure 1). Unlike the previous, single vessel drilling programmes, the IODP operated with three different drilling vessels: the riser-equipped drilling vessel D/V *Chikyu* provided by Japan, the non-riser drilling vessel *JOIDES Resolution* provided by the United States, and ad-hoc chartered drilling vessels tailored to specific missions such as the high Arctic or carbonate reef drilling. These mission-specific platforms were provided by the European Consortium for Scientific Ocean Drilling (ECORD). With this improved and more diversified drilling capability, the IODP focused on three broad scientific themes laid out in its guiding science plan: (1) The Deep Biosphere and the Subseafloor Ocean, (2) Environmental Change, Processes and Effects, and (3) Solid Earth Cycles and Geodynamics.

This book is the first comprehensive compilation of synthesis papers presenting key results of cutting-edge research carried out within the IODP during the decade 2003–2013 of IODP operations. The different specialty chapters are written by internationally well-known and accepted experts in their fields of research.

The book is divided into five parts. Chapter 1 summarizes the major highlights obtained during the one decade of ocean science research within the IODP. The following Chapters 2 to 4, the “heart of the book,” present in more detail the main IODP results devoted to the three main IODP themes: *The Deep Biosphere and the Subseafloor Ocean*, *Environmental Change, Processes and Effects*, and *Solid Earth Cycles and Geodynamics*. In Chapter 5, an appendix,

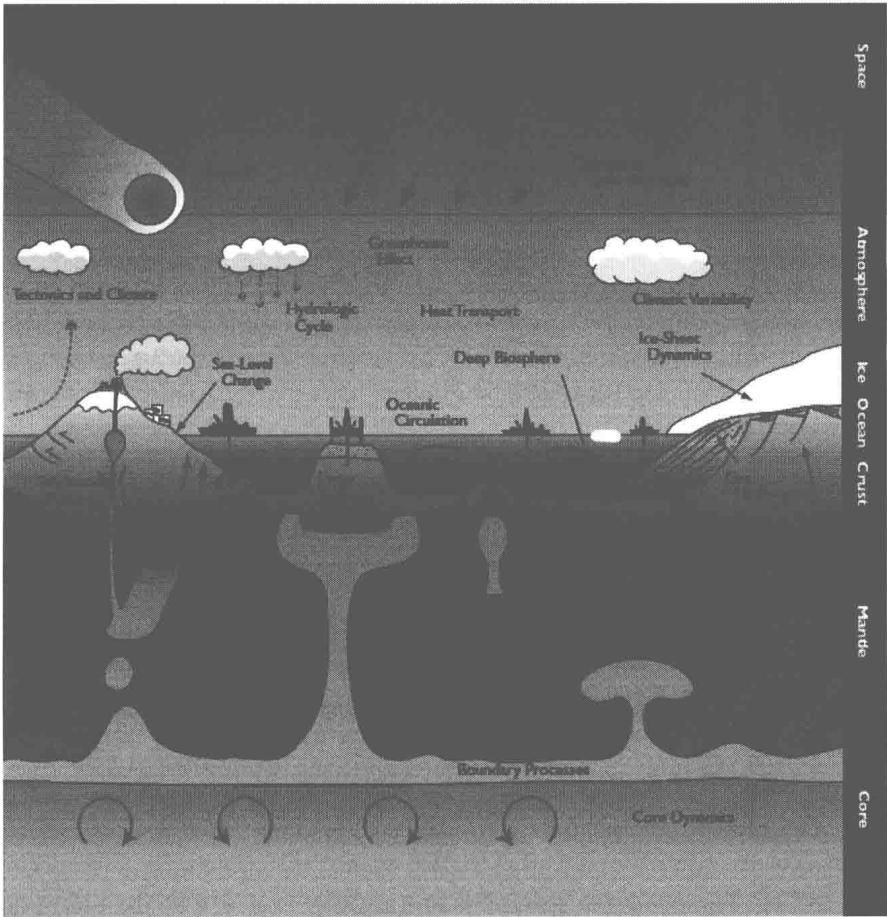


FIGURE 1 Earth system components, processes, and phenomena to be studied by scientific ocean drilling. *Figure from the IODP Initial Science Plan; www.iodp.org/initial-science-plan.*

background information about each expedition is shortly presented in one-page summaries.

This book is suitable for lecturers, graduate students as well as scientists interested in all types of Earth system studies, with special emphasis on the deep biosphere, paleoclimate, and solid earth dynamics.

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**Ruediger Stein, Donna Blackman, Fumio Inagaki
and Hans-Christian Larsen (Eds.)
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