

## Preface

Our understanding of the earth's dynamics has chiefly been obtained through long-term geophysical observations on land. This limits and possibly biases our understanding of how continents grow or how ocean floors recycle in the mantle. To improve our understanding of these questions, we require higher resolution and more accurate data on the 3-D internal structure and dynamics of the earth. To do this we must conquer the ocean floor, the last frontier of intra-earth exploration.

Initiatives are now being made in this direction. The Japanese Ocean Hemisphere network Project (OHP), which aims to cover the East Asia-West Pacific area by a permanent geophysical network consisting of seismological, geomagnetic, and geodetic sensors, is one example.

An international symposium entitled "New images of the earth's interior through long-term ocean-floor observations" was held at Kazusa Akademia Center, Chiba Prefecture, Japan on November 6–8, 1997. More than hundred researchers (39 from outside of Japan) in different disciplines, including those specialized in instrumental design, on-land and/or sea-floor observation, seismology, electro-magnetism, geodynamics, mineral physics etc., gathered to understand the present state of the art and to discuss in which direction we should be heading to bring about breakthroughs with novel geophysical observations. Observational gaps exist in space, in time, in frequency, and in dynamic range. The fates of plates in the mantle, their role in mixing the mantle and possibly causing plumes, and observations that can improve our understanding of these phenomena were the main theme.

This special issue of EPS is an outcome of the symposium, and consists of 16 solicited papers. The first four papers present the state-of-the-art of the sea-floor geophysical observations. The next five papers discuss the detailed three dimensional seismic structure beneath the East Asia-West Pacific region where the OHP network will be deployed. They are followed by two seismology papers on the global scale problems. And the final five papers are on the geodynamical inferences and consequences of the geophysical observations on the different parts of the mantle.

We thank all the contributors of the special issue, as well as the attendants of the wonderful symposium from which we got the energy to complete this special issue. We also express our great gratitude to the referees of the papers. Without their prompt assistance, we could not have completed this special issue on time (almost!) as we planned.

Special issue guest editors:  
Hitoshi Kawakatsu  
Craig Bina  
Alex Forte