Ocean Margin Systems

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Editors

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With 213 Figures, 61 in Color, and 31 Tables

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Preface

Ocean margins are the transitional zones between the oceans and continents where most of the sediments derived from the land are deposited. The effective processes here are influenced by a variety of steering mechanisms, from mountain building and climate on the land to tectonics and sea-level fluctuations at the margins of the seas. These areas are also of great importance for the global biogeochemical cycles because, although they only make up about 20% of the ocean's surface, 50% of the global marine production takes place here.

The region of the ocean margins extends from the coastal zone across the shelf and the continental slope to the toe of the continent. More than 60% of all people live in the adjacent coastal land areas, and they have intensively exploited the coastal waters for the extraction of raw materials and nutrients over a long period. In recent times, human activity has spread farther out into the oceans as the margins gain increasing attention as potential centers for hydrocarbon exploration and industrial fisheries. The great commercial potential of these regions, however, is countered by the presence of high potential hazards, for example, in the form of earthquakes and possible tsunamis triggered by slope instability, which can have a direct impact on the densely populated coastal regions.

The ocean margins are a dynamic system in which many processes shape the environment and impact the utilization and hazard potentials for humans. Can the study of ocean margin systems help in devising strategies for coping with this environment? What regulates the long-term development of ocean margins? How do fluids affect the material budgets? Do we have a good idea about the life at and especially below the seafloor? To discuss these kinds of questions we brought together experts from various disciplines of the marine sciences with a strong interest in these systems, to promote discussion between workers in different fields by focussing on a common topic of great interest to society.

The meeting, which took place in Delmenhorst near Bremen in Germany, Nov. 19 to 23, 2000, was arranged in the framework of a "Hanse Conference" within the interdisciplinary program of the Hanse-Wissenschaftskolleg, a foundation set up to promote interdisciplinary studies in collaboration between the universities of Bremen and Oldenburg. The aim of the Hanse Conferences in general is to provide opportunities for experts from different fields of the sciences and humanities to come together and explore the larger framework of topics of common interest. What unites the participants is their desire to look over the fence to neighboring disciplines. Young colleagues who wish to build an interdisciplinary career are particularly welcome.

In conducting the conference, we have attempted to avoid the disadvantages common to many large scientific meetings characterized by information-overload and lack of time for discussion. Instead, we have loosely followed the model of the "Dahlem Konferenzen", introduced by the late Dr. Silke Bernhard. An advisory committee of six scientists from different disciplines met well before the conference to formulate the overall goal and the themes of four discussion groups. This committee was also responsible for producing an initial list of invited participants, a list subsequently expanded through the recommendations of invitees. We aimed for about 40 scientists, complemented by selected graduate students and postdoctoral researchers. The conference was set for four days. Within each of the four theme sections, several participants were asked to provide background papers in their fields, as a basis for discussion. The aim is to have these papers sent as drafts to all participants one month before the conference, to stimulate the formulation of questions and critical comments.

The focus of activity within the Hanse Conferences is discussion, and not presentation of talks. The participants come with the background knowledge acquired through the study of the overview papers prepared for the conference. On the first day of the conference each of the four discussion groups agree on a list of topics derived from the questions and comments that arise from the study of the background

papers. The following two days are dedicated to debating these topics, within the four discussion groups. On the fourth day, each group reviews a summary prepared by its rapporteur, who presents the most important results of the discussions. Suggestions for modifications to the summary are incorporated into the final summary, which is presented at the end of the conference to the entire assembly, by each of the rapporteurs. At this meeting, comments are invited by all participants on any of the points raised.

The final proceedings, which are published in this book, begin with a general section containing scientific as well as marine technological overview papers of broad interest. The thematic sections then follow, ordered from physical processes regulating ocean margin development and subsurface material transport to the huge diversity of habitats for benthic life and microbial activity found in these regions.

The final report from each group follows each of the thematic sections, which contain the revised background papers. All papers benefited from peer review. It is hoped that they will be useful in informing the ongoing discussions on preservation, exploration, exploitation, and risk assessment of ocean margins, wherever such debate may take place. We especially hope that high-school and college teachers find much material in these proceedings to enrich their courses in environmental sciences. In the educational realm, a marriage between physical understanding of the Earth's life support systems and an appreciation of history leading to responsibility will be necessary to provide the basis for political action which can deal with the challenge of the sustainable use of delicate marine ecosystems.

The Hanse Conference on Ocean Margin Systems was also planned as part of the development of a Marine Science Plan for Europe, to be drafted by the Marine Board of the European Science Foundation (ESF) in 2001. Focusing on the ocean margins, which form a significant part of the European waters in the North Atlantic and in the Mediterranean, the final group reports formulate recommendations for future ocean margin research within an European Research Area under a joint European Marine Science Plan.

The Convenors
Delmenhorst, November 2000

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