

## PREFACE

Mangrove forests are important to people living near tropical and sub-tropical coasts as wood and food resources and for coastal protection. They are also important from the global view point of the earth's natural environment. Mangrove environments are formed through strong feedback relations between biota, landform, water flow and the atmosphere. Though the earlier studies of mangroves focused on the trees, later studies revealed that water flows play a very important role in mangrove ecosystems, differentiating from freshwater wetlands and terrestrial ecosystems. Mangrove areas are periodically inundated by brackish water, with salinity ranging from that of seawater to that of freshwater, usually twice a day by astronomical tides. The hydrodynamics caused by the tide and sea waves are the dominant physical factors affecting the mangrove ecosystems. Unfortunately, the importance of hydrodynamics and physical processes has often been underestimated or even ignored by resources managers, sometimes the local people living next to mangrove areas, and commonly by many scientists, even though there a number of scientific publications about hydrodynamics and physical processes in mangroves have appeared in the last quarter of a century. This problem has arisen because scientists often do not communicate with the public, and because physical and biological oceanographers and foresters have commonly found it difficult to integrate their studies. In mangrove forests, biota, for example, mangrove trees have prudently watched water stream which inundates with tidal period, and survived from generation to generation. In order to ensure the conservation and ecologically sustainable utilization of mangrove environment the above physical actions and their roles in the environment must be understood. After the old saying that "when in Rome ...",

*"When in mangrove forests, watch the stream as mangroves have done."*

To make these possible, this book focuses on

- 1) to introduce the importance of physical processes to foresters, coastal managers, researchers and engineers who are dealing with mangrove environments;
- 2) to illustrate the physical mechanisms that have been understood and those for which further research is necessary;
- 3) to help coastal physical researchers and geographers recognize the peculiarity of the physical mechanisms in mangrove areas, in comparison with other coastal areas;
- 4) to encourage students to study physical processes in mangrove areas;
- 5) to save students' research time by collecting articles that are at present widely scattered.

This book comprises two parts. In Part I, the outline of mangrove physics particularly connected to mangrove environment is described, centering on the following aims,

- 1) to summarize the present state of mangrove physics, citing the articles reprinted in Part II, which are presented as case studies;
- 2) to show the roles of physical processes in the natural environment in mangrove areas; and
- 3) to distinguish the physical processes in mangroves which have been solved and those which need further studies.

Unfortunately, articles cited in this book are limited to those written in English, because of the above purposes. We can find many articles written in other languages, which include original

and valuable information. We hope they will be informed worldwide with English from the above viewpoint.

In Part II, the published papers by the three authors of this book are collected into several groups based on generic subjects.

The authors hope that this book will be used as a manual for preserving and utilizing the mangrove environment, and be helpful to scientists, foresters, geographers, engineers, government agencies and students not only in the field of physics but also in the fields of forestry, fisheries, ecology, biology, chemistry, dendrology, geology, and also sociology and eco-tourism, etc., all of which dealing with the mangrove environment.

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