

## Preface

In the fiscal year 2006, Nagasaki University selected 10 research proposals and designated them as “Nagasaki University Major Research Projects”, to materialize the University’s 6-year initiative, and has provided intensive support to each project until the end of FY 2009. The project entitled “Restoration of Marine Environment and Resources in East Asia” is among one of the most important, together with “Global Strategic Center for Radiation Health Risk Control” in radiation health science and “Integrated Global Control Strategy for Tropical and Emerging Infectious Diseases” in tropical disease science. Our project aims to elaborate the scientific basis for the restoration of the environment and resources in East Asia, in particular the East China Sea (ECS) region, by implementing collaborative research with universities and institutions in Korea and China.

This book is a summary of our scientific endeavors during the last 5 years. The main framework behind our research activity includes the “Joint Symposium on Tidal Flat Issues—Nagasaki University and Korea Ocean Research & Development Institute” and the “International Workshop on Oceanography and Fisheries Science in the East China Sea”, which was convened (in the following order, in turn) first at Jeju National University in 1997, then at Nagasaki University, Shanghai Ocean University, and the University of Ryukyus. These symposia and workshops have significantly consolidated the ties between Japanese, Chinese, and Korean scientists in the fields of chemical, environmental and physical oceanography, fisheries science, and marine biology. In “The 7th International Workshop on Oceanography and Fisheries Science in the East China Sea” held in Shanghai in December 2009, the member universities agreed to invite National Taiwan Ocean University as the 5th member university, thereby completing a ring of science encircling the ECS.

The ECS is ailing. Recently, Halpern et al. (2008) published a paper in *Science* (319, 948–952) that vividly describes the spatial heterogeneity and distribution of cumulative human impact on the world’s marine ecosystems, and ranks the ECS as having one of the most evident footprints of human activity. Nonetheless, the ECS remains among the most important fishing grounds for the surrounding countries, and the livelihood of millions of people that rely on it for a sustainable source of marine production. Besides food supply, equally important are the ecological services that the ECS offers. For example, such services include the regulation of the local climate, replenishment of atmospheric oxygen, mitigation of global warming by absorbing atmospheric carbon dioxide, and the cycling of nutrients. Thus, the ECS is and will remain to be an invaluable body of water for our society in spite of perceptible degradation in its recent state.

The book was conceived with a view to synthesize knowledge from ECS adjacent countries (Japan, China and Korea), with the hope that it will contribute to

reversing the worrisome trends that are becoming apparent. There are two parts: The first part contains 7 papers, which compare alterations to the environment after the completion of land reclamation projects in two tidal flats, Ariake Bay in Japan and Saemangeum Bay in Korea. The first 4 papers on Ariake Bay discuss the impacts of bottom water hypoxia (H. Nakata et al.), dynamics of the surface currents determined by DBF, ADCP, and floating buoys (A. Tada et al.) and numerical model analysis of residual currents and salt fluxes (two papers by A. Manda et al.). Two papers on Saemangeum examine the interactive influences of dyke construction and winter monsoon on sand movement (H. J. Lee) and heavy metal levels of the surface water and sediment (K. T. Kim et al.). Finally, S. Lee et al. examine and compare how dyke construction in Saemangeum and Isahaya (in Ariake Bay) affects the tides. The second part contains 14 papers. Of them, the first 3 papers review issues related to harmful algal blooms (HABs), such as the historical environmental changes in Ariake Bay deduced from dinoflagellate cysts (K. Matsuoka and H. H. Shin), the occurrence of HABs and the strategies against them in Korea (H. G. Kim), and the records of HAB outbreaks and environmental conditions near the Changjjan River estuary (M. Zhou). There is a section on biodiversity and behavior, including monitoring bacterial diversity using T-RFLP (V. Thiyagarajan et al.), bacterial abundance and diversity in the lining of *Capitella* burrows (M. Wada et al.), the distribution of tintinnids in the ECS and adjacent waters (J. B. Lee and Y. H. Kim), and the biology of herbivorous fish (A. Yamaguchi et al.). The subsequent 3 papers concern endocrine disrupting chemicals (EDCs) and their biological impacts; the relationship between environmental levels and vitellogenin contents of goby fishes (Y. Takao et al.), estrogenic activity in estuaries (M. Nagae et al.), and a comparison of EDC levels in Japanese, Korean, and Chinese waters to discuss their biological implications (K. Soyano et al.). A section on toxins and diseases addresses human intoxication by pufferfish (O. Arakawa et al.), fish kill mechanisms of red-tide phytoplankton species (D. Kim et al.), and *Perkinsus* infection in marine shellfish (K. S. Choi et al.). Finally, a paper reviews recent developments in ocean acidification research (A. Ishimatsu and A. Dissanayake).

The contents of these 21 papers represent where we stand after 5 years of intensive collaborative research in the field. It is our hope that the knowledge compiled in this book will encourage further investigations beyond international borders, and help overcome the occasional impediments that hinder international scientific research, caused by conflicting national interests.

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