Foreword

On October 20, 2006, a session titled “*The human dimension of jellyfish blooms*” was held at Yokohama, Japan, as a part of the Fifteenth Annual Meeting of PICES (North Pacific Marine Science Organization, <http://www.pices.int/>). The session was aimed at highlighting large high-density jellyfish blooms, which are becoming increasingly common in many marginal seas in the North Pacific and in other regions of the world’s oceans. These blooms may have direct effects on fish recruitment through predation on vulnerable early life stages of marine fishes, or indirect effects through competition for limited food resources with exploited species. In addition, high concentrations of jellyfish influence humans in other ways, such as through economic losses in tourism from beach closures, by impeding commercial fishing through net clogging, and by loss of energy production from clogged power plant intakes. This session sought to understand the causes of the proliferation and expansion of these blooms in coastal waters and to determine whether climatic or anthropogenic changes have led to the recent blooms.

The session was convened by Drs. Richard D. Brodeur (U.S.A.), Jiahua Cheng (China), Hitoshi Iizumi (Japan) and Won Duk Yoon (Korea), and consisted of 13 oral and 7 poster presentations (see the list below). The invited talks focused on factors that have led to increases in gelatinous zooplankton in a number of regions around the world. As noted above, the economic implications of these blooms can be staggering, leading to complete loss of some very valuable fisheries. One of the more important ideas brought out at the session was the concept of a ‘jellyfish spiral’ where many factors acting synergistically cause jellyfish to increase, and once these jellyfish populations are established, reverting to fish-dominated ecosystems is difficult. However, in several case studies, including the Bering Sea and Black Sea, there can be decreases in jellyfish populations due to decreased production and by the introduction of jellyfish predators, respectively.

Many of the contributed papers discussed case studies in different regions of the world, with a substantial emphasis on the giant jellyfish, *Nemopilema nomurai*, that has increased its biomass since 2002 in coastal waters in East Asia and has appeared in huge numbers along coasts, causing serious trouble. The subjects of talks covered not only the pelagic adult stage that is most visible but also the benthic polyp stage, about which we know relatively little for many species. Several presentations discussed ways of estimating jellyfish abundance by acoustics, examining the stomachs of predators, and by aerial photography. Numerical models of ocean circulation were shown to be an effective means of examining jellyfish dispersal in coastal waters. A number of studies have started to use ecosystem models to assess the effects of jellyfish on ecosystems, and some success has been achieved.

It became apparent from the session that jellyfish have been increasing in a number of ecosystems around the world and that with current scenarios of ocean change due to warming, overfishing, eutrophication, and habitat modification, we can expect to see this trend continue in the future. The fishing industry is beginning to adapt to these changes by employing jellyfish excluders on trawl nets and by finding new markets for jellyfish products. Advice is also being offered to the power generation industry on ways to predict or control jellyfish ingress in power plant cooling systems. Cooperation between scientists and industry will be essential in averting what could become both an ecological and financial crisis in the future.

In this special issue of *Plankton and Benthos Research*, four papers are published as original articles. We hope that this issue will present important information on the jellyfish bloom from various viewpoints, and in turn, will encourage further studies on this fascinating subject that will lead to the development of countermeasures in the near future. We sincerely thank the reviewers for their helpful comments and the Editorial Board of *Plankton and Benthos Research* for the opportunity to publish this special issue. We also thank PICES for support of this publication.

Hitoshi Iizumi, Fisheries Research Agency
Haruto Ishii, Tokyo University of Marine Science and Technology