



Preface

On March 11, 2011, the Great East Japan Earthquake hit eastern Japan, causing a gigantic tsunami that swept through a wide range of Pacific coastal Japan. The earthquake had a magnitude of 9.0, which is the strongest ever recorded in Japan. The tsunami was also historical as its run-up height reached over 39 m. These tremendous forces caused unprecedented damage to human life. More than 24,000 people were reported as dead or missing. Moreover, the tsunami caused huge accidents at the Fukushima Nuclear Power Plants. People have been facing a lot of serious problems associated with these disasters.

On the other hand, these disasters also damaged ecosystems along the sea coast. Tidal flats and seaweed beds were destroyed, and fish and other marine organisms disappeared or drastically decreased in number. As a consequence, fisheries have declined, and ecosystem services have deteriorated considerably. Governments, companies and individuals have provided a lot of relief goods as well as financial support for disaster recovery, but local people still face serious problems in housing, work and health maintenance.

In this special issue of *Global Environmental Research*, we focus on the effects of the Great East Japan Earthquake and the subsequent tsunami on human life and the natural environment. The first three articles deal with the scale and conditions of the tsunami and their impacts on the life of humans and local economies. The subject matter of these articles includes the influence of land use, elevation and land conditions on the behavior of earthquakes and tsunamis. We then move on to the next topic of the impact of earthquakes and tsunamis on coastal biodiversity, ecosystems and landscapes. The results of field observations and GIS studies will be introduced. The scale and extent of damage or subsequent recovery differ among different species, groups and ecosystems. Third, we focus on the impacts on agriculture and fisheries. Rice paddies were extensively invaded and damaged by sea water and sea bottom deposits. Seaweed beds, tidal flats and fishing harbors were destroyed, and fishery catches declined. Finally, we deal with the problems of disaster waste and tsunami debris. Lots of waste was produced, and governments had to dispose of it. Huge amounts of tsunami debris emerged and drifted across the oceans. Excellent results on tsunami debris drift simulation in the North Pacific will be shown.

We have previously published a special issue on the effects of the Great East Japan Earthquake and Tsunami on human life and natural environments in our sister Japanese journal *Chikyukankyo* Vol. 18, No. 1, 2013. Although some subjects overlap between the Japanese and current issue, the current issue is not an English version that was simply translated from the Japanese articles. Some articles are totally new for this issue, and further information and analyses have been added to articles with the same subject as before.

In this issue, we do not include articles on the impacts of the nuclear power plant disasters, because there are so many serious problems there and many of the relevant studies are still in progress. Only limited parts of the articles herein deal with the impacts. We plan to focus on the topic in a separate issue in the near future.

I acknowledge the many scientists who helped publish this issue. First of all, I would like to thank all the contributors to this issue. They were busy with their relevant research projects as well as with their regular work, and it must have been difficult to find time to prepare these articles. The reviewers contributed greatly toward improving the articles and making them easier to understand. Some other experts provided useful comments on the structure and contents of the issue. I hope this special issue will contribute greatly to our understanding of the impacts of earthquakes and tsunamis on human life, natural environments and ecosystem services.

Hiroyoshi HIGUCHI
Editor in Chief, *Global Environmental Research*