

## Workshop on Radionuclide Science and Environmental Quality in the North Pacific

by Yusheng Zhang, Wen Yu and Hongzhi Li



The participants of the PICES/SOA workshop on “Radionuclide science and environmental quality of radiation in the North Pacific” (March 14–15, 2013, Xiamen, People’s Republic of China).

This was the first opportunity for the PICES Study Group on *Radionuclide Science and Environmental Quality of Radiation in the North Pacific* (SG-RS) to meet. The workshop was jointly sponsored by PICES and the State Oceanic Administration (SOA) of China and organized by the Third Institute of Oceanography (TIO/SOA) from March 14–15, 2013, in Xiamen. It was led by Dr. Yusheng Zhang (SG-RS Chairman), Mr. Chuanlin Huo (Marine Environmental Quality (MEQ) Committee Chairman), and Dr. Sinjae Yoo (Science Board Chairman). A total of 20 participants attended the workshop, including 8 SG-RS members from 5 PICES member countries: Canada, China, Japan, Korea and the United States. The International Atomic Energy Agency (IAEA) was represented by the IAEA/RCA project leading country coordinator, Dr. Ronald Szymczak (Australia).

The objectives of the workshop were:

- to review research on marine radiation in each PICES member country;
- to exchange views on how to develop a scientific focus within PICES to understand the quantities and distributions of radionuclides in the North Pacific, and
- to refine the Terms of Reference (TORs) and work plan for a new PICES Working Group on *Assessment of Marine Environmental Quality of Radiation around the North Pacific* (WG-AMR), under MEQ as Parent Committee.

The outcome from this workshop is intended to provide a sound foundation for the establishment of WG-AMR in the near future.

In his introductory remarks, Dr. Yusheng Zhang pointed out that the widespread application of nuclear science and technology as well as a recent nuclear power plant accident had led to increasing amounts of radionuclides released into the North Pacific. Radionuclides with long half-lives could potentially endanger the marine ecosystem and human health through exposures *via* the food chain. Consequently, it is important to monitor the radiation exposure level and to assess the effects of radioactive substances on marine ecosystems in the North Pacific waters. This was the rationale behind China’s proposal at the 2012 PICES Annual Meeting (Hiroshima, Japan) to establish the SG-RS that would make preparations for the future establishment of the WG-AMR. The envisioned working group aims to exchange technologies and share experiences in monitoring radioactive contaminants in North Pacific waters, to assess the radiation effects and radiological risks in these waters and to promote the public understanding of radiation effects. The proposal to form the SG-RS garnered positive support from all PICES member countries and was approved by the Science Board and the Governing Council of PICES.

Dr. Sinjae Yoo and Mr. Chuanlin Huo were invited to make a presentation about the current PICES integrative science program, FUTURE (Forecasting and Understanding Trends, Uncertainty and Responses of North Pacific Marine Ecosystems) and the MEQ Action Plan. Thereafter, the participants discussed and refined the Terms of Reference for the proposed WG-AMR, including their relevance to FUTURE.



The workshop in session.



Facing from left: Mr. Chuanlin Huo (MEQ Chairman), Dr. Sinjae Yoo (Science Board Chairman), Dr. Yusheng Zhang (SG-RS Chairman), and Dr. Jian Chen (Director of Division of International Cooperation, TIO).

Following an active discussion, the TORs for the proposed WG-AMR were refined and agreed upon by all the members as follows:

1. To compare and analyze radiological doses to North Pacific marine organisms from natural and anthropogenic radionuclides in a post-Fukushima world.
2. To examine the utility of applying natural and artificial (from Fukushima and other sources) radionuclides as tracers of circulation, ecological transfers and biogeochemical cycling in the North Pacific (and downstream, e.g., Arctic) environments undergoing modification by climate change.

3. To determine the state of the science with respect to the assessment and mitigation of radiological impacts to marine organisms from natural and anthropogenic releases of radionuclides into the marine environment.
4. To contribute to FUTURE by producing status reports for items 1–3 above, management related guidelines and/or technical manuals.
5. To foster collaboration with other expert groups to achieve the goals of items 1–3.
6. To identify priority research requirements for knowledge gaps identified in items 1–3, the planned expansion of nuclear facilities and other emerging issues in the PICES region.
7. To promote collaboration among PICES member countries and international organizations in the exchange of information on environmental radioactivity and encourage joint surveys/research among PICES member countries.

Participants discussed a 3-year work plan for the proposed working group and explored possible ways to fund the activities. A detailed work plan will be included in the 2013 Annual Report.

A list of the possible WG-AMR members developed in two weeks after the workshop includes the following scientists: John N. Smith (Canada), Hongzhi Li, Wen Yu and Yusheng Zhang (China), Takami Morita, Tsuneo Ono and Tomowo Watanabe (Japan), Gi-Hoon Hong and Suk Hyun Kim (Korea), Vladimir Goryachev (Russia) and Kathryn A. Higley (USA).

The SG-RS report and the proposal to establish WG-AMR, including the Terms of Reference, the work plan and potential members were presented and reviewed at the 2013 inter-sessional Science Board meeting held May 20–21 in St. Petersburg, Russia.



Dr. Yusheng Zhang (ys.zhang@163.com), a senior scientist from the Third Institute of Oceanography, State Oceanic Administration (SOA) of China, has been interested in radioecology and biological effects of marine pollutants on marine organisms and ecosystems. Since 2007, he has been working as a National Project Coordinator of IAEA/RCA projects. Within PICES, Dr. Zhang has been serving as the SG-RS chairman since January 2013.

Dr. Wen Yu (yuwen2001@gmail.com) is a scientific researcher at the Third Institute of Oceanography, State Oceanic Administration of China. She has a broad range of research interests related to marine biota radiation dosimetry, the destiny of radionuclides in marine species and radio-isotope application. Dr. Yu is a National Project Coordinator of the IAEA Fukushima marine impact program. She has been a member of the SG-RS since January 2013.

Mr. Hongzhi Li (lihongzhi6535@126.com) is the Director of the Department of Marine Measurement Sensor Technology at the National Oceanic Technology Center, State Oceanic Administration of China. His research focuses on marine sensor technology, model and application for monitoring of marine pollutants, as well as data processing. He has been a SG-RS member since January 2013.