
Environment

Objective

To identify environmental problems caused by radioactive and non-radioactive pollutants and climate change, using nuclear, isotopic and related techniques, and to propose mitigation/adaptation strategies and tools. To enhance the capability of Member States to develop strategies for the sustainable management of terrestrial, marine and atmospheric environments and their natural resources, in order to address effectively and efficiently their environment related development priorities.

ALMERA

The Agency's global Analytical Laboratories for the Measurement of Environmental Radioactivity (ALMERA) network celebrated its twentieth anniversary in 2015. Since its founding in 1995, the network has grown from 24 laboratories in 15 Member States to 156 laboratories in 85 Member States. ALMERA has contributed significantly to harmonizing methods for natural and anthropogenic radionuclide analysis of environmental samples. In 2015, in response to Member State interest in high throughput radiochemical methods, particularly in emergency situations, the Agency and the ALMERA network began development and validation of methods for rapidly determining radiostrontium in soil and seawater.

During the year, the Agency coordinated two training activities to address priorities identified by ALMERA members. In May, a two week training course on methods for rapid assessment of environmental radioactivity was organized in collaboration with Argonne National Laboratory (ANL) in the United States of America. The laboratory based training, held at ANL with 22 participants from 20 Member States, focused on the rapid determination of plutonium isotopes and americium-241 in soil and sediment samples using alpha spectrometry, based on an ALMERA validated method. The course included a practical exercise on evaluation of complex gamma spectra of environmental samples, a field exercise on detection and sampling in cases of environmental contamination, and specific applications of the RESRAD (RESidual RADioactivity) dose assessment tool.

The second training course, held in November, provided instruction on in situ gamma ray spectrometry. As in situ measurement techniques have an important role in nuclear and radiological emergency preparedness, the course prompted a high level of interest among the ALMERA members. Organized in collaboration with the Spiez Laboratory, the Federal Office of Public Health and the NBC (Nuclear Biological Chemical) Centre of Competence in Switzerland, the one week training course, hosted by the Spiez Laboratory, was attended by 24 participants from 23 Member States. The highlight of the training was a practical field exercise in which the participants carried out measurements in emergency conditions simulated with the short-lived radioactive gamma ray emitter technetium-99m (Fig. 1).

“the Agency and the ALMERA network began development and validation of methods for rapidly determining radiostrontium in soil and seawater.”



FIG. 1. Field gamma spectrometry training in Switzerland under simulated emergency conditions.

Environmental Monitoring

The Agency continued its focus on environmental monitoring in 2015. In response to a request from the Institute of Environmental Radioactivity of Fukushima University, it provided support for radioecological monitoring and remediation of forests. In the framework of an IAEA Action Plan on Nuclear Safety project entitled 'Marine Monitoring: Confidence Building and Data Quality Assurance', aimed at ensuring the quality of Japan's marine monitoring data, the Agency organized a proficiency test for determining radionuclides in seawater and conducted two interlaboratory comparisons for radionuclides in samples of seawater, sediment and fish (Fig. 2). The results of the test and the interlaboratory comparisons showed the performance of the participating laboratories to be very good. During the year, work concluded on a large scale technical cooperation project involving 23 countries in the Asia and the Pacific region. Carried out with funding



FIG. 2. Fish samples being prepared for an interlaboratory comparison of radionuclide measurements carried out by the Agency and laboratories in Japan.

from the Peaceful Uses Initiative, the project developed regional capacity for monitoring the possible impact of radioactive releases from the Fukushima Daiichi nuclear power plant on the marine environment.

In the framework of an agreement with the Regional Organization for the Protection of the Marine Environment (ROPME), the Agency analysed oyster and marine sediment samples from the ROPME Sea Area to determine levels of radionuclides, trace elements, organic contaminants and biotoxins related to harmful algal blooms. The analysis was part of the ROPME mussel watch programme, aimed at assessing marine pollution in the coastal zone of the participating Member States.

To support environmental monitoring in Member States, the Agency organized ten proficiency tests involving more than 490 laboratories to check their capabilities for analysis of radionuclides, trace elements or organic contaminants in environmental samples. The Agency also published four proficiency test reports on radionuclide analyses in seawater in the IAEA Analytical Quality in Nuclear Applications Series.

During the year, the Agency provided intensive training to support Member States in the remediation of sites contaminated by past uranium mining and milling activities. During a course hosted by ANL, participants were trained in the use of the RESRAD-BIOTA dose assessment tool for evaluating risk at radioactively contaminated sites. In the framework of the United Nations Environment Programme (UNEP) Mediterranean Action Plan, the Agency held two training courses at the IAEA Environment Laboratories in Monaco to support national marine pollution monitoring programmes in the Mediterranean region. The courses were designed to improve the analytical skills needed for determination of contaminants in marine samples (Fig. 3).



FIG. 3. Sediment sampling (left) and laboratory training (right) for marine pollution monitoring as part of the Agency's support to participants in the UNEP Mediterranean Action Plan.

“the Agency organized ten proficiency tests involving more than 490 laboratories to check their capabilities for analysis of radionuclides, trace elements or organic contaminants in environmental samples.”

Development of Regional Networks

The Ocean Acidification International Coordination Centre (OA-ICC) continued to support the development of collaborative networks in areas where ocean acidification data are scarce. In 2015, the Latin-American Ocean Acidification Network (LAOCA) was established during an expert meeting in Chile supported by the OA-ICC. Discussions on creating similar networks took place at regional training courses on ocean acidification held in China in October, and in South Africa in November, which were attended by 54 participants from 27 Member States. During these initial discussions, Member States began to assess existing ocean acidification capacity, technical facilities and opportunities for collaboration, with the goal of producing joint project proposals.

During the year, the Agency began training representatives of Member States in the use of a radiotracer methodology developed at the IAEA Environment Laboratories to study the impact of ocean acidification. Training was provided via several technical cooperation projects, and the subject was included in the curriculum of a newly developed three week

training course entitled 'Marine Ecosystems and Industries at Risk: Impact of Multiple Stressors'. The course, organized jointly with ANL, was held at the IAEA Environment Laboratories in Monaco in November, and attended by 19 trainees from 16 Member States.

“the Agency began training representatives of Member States in the use of a radiotracer methodology developed at the IAEA Environment Laboratories to study the impact of ocean acidification.”

In 2015, the Agency signed new practical arrangements to provide a framework for closer collaboration with Member States in different regions. An agreement with the UNEP Mediterranean Action Plan was signed to assist Member States in improving the quality of data from laboratories implementing marine pollution monitoring. The Agency also concluded three new practical arrangements: with the Commission on the Protection of the Black Sea Against Pollution, to strengthen data quality assurance for the analysis of contaminants in the marine environment; with the Secretariat of the Pacific Regional Environment Programme (SPREP), on ocean acidification, climate change, coastal pollution, pollution source identification and improvement of analytical quality; and with the Regional Organization for the Conservation of the Environment of the Red Sea and Gulf of Aden (PERSGA), on monitoring ocean acidification and pollution in the Red Sea and Gulf of Aden.

During the year, the Agency launched a coordinated research project on improving monitoring strategies for ciguatera fish poisoning and on method validation for an optimized receptor binding assay for the related biotoxin. It also signed a cooperation agreement with the Malarde Institute in French Polynesia, and participated in the first interagency meeting on ciguatera, with representatives of the World Health Organization, the Food and Agriculture Organization of the United Nations and the Intergovernmental Oceanographic Commission.