
Environment

Objective

To support Member States in identifying environmental problems caused by radioactive and non-radioactive pollutants and climate change, using nuclear, isotopic and related techniques, and to propose mitigation and adaptation strategies and tools. To enhance the capability 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.

Analysis of Mercury in the Marine Environment

In 2018, the Agency, in close collaboration with the United Nations Environment Programme (UNEP) and the Global Environment Facility, intensified its efforts to support implementation of the Minamata Convention on Mercury, a treaty to protect human health and the environment from anthropogenic releases of mercury and mercury compounds. During the year, the Agency, through its technical cooperation programme and in cooperation with UNEP's Regional Seas Programme, provided expertise and assistance to 20 Member States in Africa — Algeria, Benin, Cameroon, Congo, Côte d'Ivoire, Djibouti, Egypt, Gabon, Ghana, Kenya, Madagascar, Mauritania, Mauritius, Morocco, Namibia, Nigeria, Senegal, South Africa, Tunisia and the United Republic of Tanzania — through training courses, proficiency tests and other modalities, including training in mercury analysis at the Monaco laboratories. In 2018, the Agency also procured mercury analysers for installation in eight African Member States. Such capacity building activities enable laboratories to monitor this toxic element in the environment, a prerequisite for policy makers to implement actions to reduce and/or eliminate the release of anthropogenic mercury in these States.

The Agency continued to assist Member States in enhancing their capabilities to detect mercury and methylmercury in fish and other seafood and in marine sediment, and to study transfer processes up the food chain. In 2018, it developed and validated three analytical procedures for determining mercury and its species in seafood samples. It also produced a new certified reference material for trace elements and methylmercury in fish samples. The new material can be used by Member State laboratories as part of their quality control procedures to validate analytical procedures and to establish traceability against internationally agreed standards.

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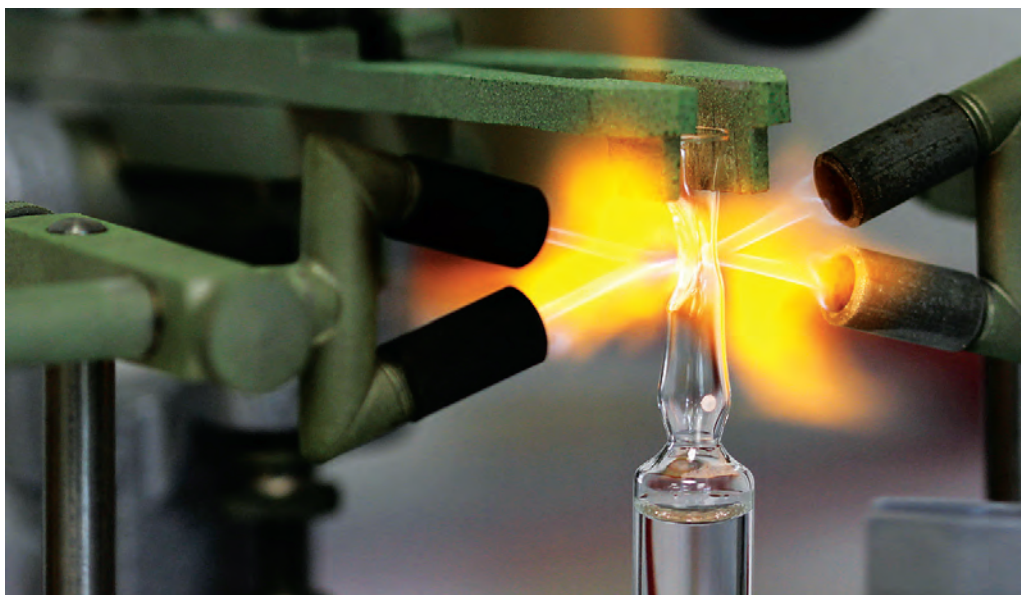


FIG. 1. Sealing of the Agency's carbonate reference material, a standard necessary for high precision carbon dioxide stable isotope calibration and monitoring.

High Precision Atmospheric Greenhouse Gas Monitoring

Knowledge of the small changes in the isotopic composition of greenhouse gases such as carbon dioxide is indispensable for calculating sources and sinks. The Agency provides certified reference materials to the global atmospheric science community and support to intergovernmental and national organizations to ensure the quality and comparability of high precision greenhouse gas measurements. During the year, the Agency developed three new isotopic standards for carbon (carbonate reference material) to supplement a standard released in 2016 (Fig. 1). The new standards enable laboratories worldwide to report consistent isotopic data on greenhouse gases, a necessary input to global climate models.

The Agency is currently the main provider of such standards worldwide. In 2018, the Agency standards were adopted by the World Meteorological Organization as the basis for all stable isotope data reporting at the organization's last meeting of experts on carbon dioxide and other greenhouse gas measuring techniques.

Understanding Contaminants in the Environment and in Seafood

Member States continued to face a variety of challenges in their marine environment with the potential for wide-ranging impacts on people's health and livelihoods. Some of these challenges are made more difficult by the effects of climate change, including extreme weather events and rising sea levels, and scarce resources. Using nuclear and isotopic techniques, the Agency conducted research and helped build scientific and technical capacity in Member States to improve understanding of the behaviour of contaminants in coastal and marine ecosystems and their biota. In 2018, to better understand the movement of heavy metals such as lead into marine organisms, Agency scientists used nuclear and isotopic techniques under controlled laboratory conditions to precisely quantify the movement and fate of contaminants and their impact on a range of aquatic biota such as fish and oysters. This research has allowed Member States to better assess environmental risk, particularly on issues related to seafood safety.

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FIG. 2. Scientists from the Marshall Islands receive training in sampling techniques at the Agency's Environment Laboratories in Monaco to independently monitor environmental radioactivity.

The Agency continued to build capacity in Member States to improve understanding of radionuclide contamination. In 2018, it trained two scientists from the Marshall Islands in gamma spectrometry, enabling them to independently monitor the radioactivity of environmental and food samples (Fig. 2). It also trained two scientists, from Cuba and the Philippines, in the use of the radioligand receptor binding assay, a nuclear tool used to quickly and precisely determine the presence of biotoxins produced by harmful algal blooms. By improving understanding of other contaminants affecting small island developing States, such as heavy metals and persistent organic pollutants, the Agency is contributing to the robustness of seafood safety programmes in these Member States.

Ocean acidification is another environmental challenge facing many Member States, in particular small island developing States that are economically and culturally dependent on the ocean and therefore particularly vulnerable to threats from ocean warming and acidification. As part of its capacity building initiatives, the Agency, through the Ocean Acidification International Coordination Centre (OA-ICC), hosted a Technical Meeting on the Management, Analysis and Quality Control of Ocean Acidification Observation Data in Monaco in October, with participation from 15 scientists representing 15 countries from different regions around the world. During this meeting, participants learned how to apply theories on quality assurance and quality control techniques to their own data sets.