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In this Edition: Anniversaries and legacies

The period from July to December 2018 saw the IAEA Environment Laboratories in Monaco commemorate various moments in its history of working for the marine environment. Particularly festive was the 20th anniversary of the Laboratories in their current location at Port Hercule in Monaco: more Member State ambassadors and representatives than ever before came to tour the premises and attend the anniversary reception.

During this period, the new IAEA Collaborating Centre at the National Food Chain Safety Office was redesignated, and the IAEA Ocean Acidification International Coordination Centre, or OA-ICC, turned five years old. The Centre continues to build the capacity of Member States to develop informed responses to the global problem of ocean acidification. Finally, addressing the historical legacy of the Chernobyl accident was at the heart of a new project – which is included in this issue of the Newsletter.

From Mexico to Hungary to Belarus, the Environment Laboratories' activities have taken scientists all over the world as part of their efforts to assist Member States in diverse places and in diverse ways.

For more information on the activities of the IAEA Environment Laboratories, please visit www.iaea.org/nael

David Osborn

Director, IAEA Environment Laboratories



H.S.H. Prince Albert II of Monaco formally opens the ceremony commemorating the 20th anniversary of the Environment Laboratories at Port Hercule. (Photo: Axel Bastello – Palais Princier)

Ambassadors tour Monaco laboratories



Staff of the IAEA Environment Laboratories along with ambassadors and Member State representatives convene on the rooftop of the Port Hercule facilities to mark 20 years of the Laboratories' being located there. (Photo: Axel Bastello – Palais Princier)

Ambassadors and representatives from 36 Member States, more than ever before, visited the IAEA Environment Laboratories in Monaco on October 19 and commemorated 20 years since the laboratories' relocation to their present premises at Port Hercule. During their visit, the ambassadors learned about the work of the laboratories and the use of nuclear and isotopic techniques to study environmental changes in coastal and marine ecosystems. In the evening they attended an anniversary reception in the laboratory premises in the presence of H.S.H. Prince Albert II of Monaco.

“The IAEA Environmental Laboratories are uniquely positioned to provide an invaluable service to IAEA Member States,” said David Osborn, Director of the laboratories. “Nuclear and isotopic techniques can provide the data and precision needed to make good environmental choices and move towards more sustainable development.”

The ambassadors toured the three marine laboratories, where they gained insight into how scientists can monitor environmental radioactivity, ocean acidification and various pollutants as well as their effects on marine life and seafood safety.

“Chile is pleased to have contributed to the development and validation of a nuclear-based methodology to monitor biotoxins in seafood,” said

Gloria Navarrete, Permanent Representative of Chile to the IAEA. “Yet as Chile and others continue to suffer from the burden of recurring and worsening harmful algal bloom events, the work being conducted at the IAEA is more than ever needed to secure aquaculture and fishery production.”

The cooperation between the IAEA and Monaco began in 1961, when the first incarnation of the laboratories, the International Laboratory of Marine Radioactivity, was established. The laboratories still provide an open-access database of marine radioactivity measurements and reference materials that act as standards for laboratories worldwide. The expansion of scientific activities and increased demand from governments led to the opening of two further environment laboratories in Monaco.

“The United States is proud to be a strong supporter of the IAEA Marine Environmental Labs,” said Justen Thomas, Public Affairs Officer at the U.S. Mission to International Organizations in Vienna, including the IAEA. “Whether it is helping us to understand ocean acidification, improving seafood safety, or tackling the challenges posed by marine plastics, the science being practiced at the IAEA labs is helping the United States, and all IAEA Member States, promote a sustainable blue economy and a healthy ocean.”

Ocean Acidification Centre turns five



The potential impacts of ocean acidification on marine organisms and livelihoods are an emerging concern for many countries, and the focus of UN Sustainable Development Goal 14.3. (Photo: Jean-Louis Teyssié/IAEA)

Established in 2013, the IAEA Ocean Acidification International Coordination Centre (OA-ICC) marks

five years in coordinating and promoting global ocean acidification studies and activities and providing a platform for international cooperation in this area.

Five years ago, the OA-ICC was launched in Monaco under the [IAEA Peaceful Uses Initiative](#). Since then the project has grown in scale and complexity as IAEA Member States have sought to improve their understanding of how increasing ocean acidification may affect their livelihoods and their ability to report on target 3 of the United Nations' Sustainable Development Goal 14, which specifically addresses ocean acidification.

The Science

Intensive fossil-fuel burning and deforestation over the last two centuries has increased atmospheric carbon dioxide by 50 % above pre-industrial values. The global ocean currently absorbs roughly one third of this human-caused carbon dioxide, and its carbonate chemistry is being fundamentally altered in the process. As a result, the oceans have undergone a decrease in pH, known as ocean acidification.

Ocean acidification has been recognized as a major threat to marine ecosystems. Concern about its impacts on socioeconomically valuable seafood is increasing world-wide. Indeed, as James Orr, Research Director at the Laboratory for Climate and Environment Sciences (LSCE) in France, has remarked, "Ocean acidification is a growing international problem that affects all Member States either directly or indirectly."

Nuclear and isotopic techniques play an important role in studying ocean acidification. The techniques have contributed widely to the understanding of the field both in terms of investigating past changes in ocean acidity and its impacts on marine organisms.

During the past five years, the OA-ICC has trained more than 150 researchers from around the world and enabled more than 60 scientists from developing IAEA Member States to present their work and connect with peers at major international conferences. These courses cover both chemical and biological aspects of ocean acidification, and use the latest methodologies — including nuclear and isotopic techniques — and guidelines to promote best practices.

The OA-ICC has received direct and in-kind contributions from eight IAEA Member States:

Australia, France, Italy, Japan, New Zealand, Sweden, the United Kingdom and the United States, as well as major international organizations and projects. It is adapting its activities to evolve with this rapidly growing research field and to ensure that resources are used where they are needed most.

At the *Our Ocean Conference* in Bali in October 2018, the United States' Government announced a US\$ 839,000 contribution to support the work of the OA-ICC, which comes in addition to earlier US donations to the Centre, including [the most recent one in 2017](#). The new contribution brings the total support from the United States to the OA-ICC over the past five years to over US\$ 3 million, provided through the IAEA's [Peaceful Uses Initiative \(PUI\)](#). Nicole Champagne, Deputy Chief of the U.S. Mission to International Organizations in Vienna remarked: "Promoting a sustainable blue economy and sustainable fisheries are key priorities for the United States. And the ocean needs our concerted action – in order to stay healthy and productive."

Supporting environmental radioactivity monitoring in Mexico

Sampling techniques are crucial for laboratories that perform environmental monitoring. Collecting representative samples and ensuring high quality analytical measurements make environmental monitoring programmes both efficient and effective. This was one of the main reasons behind the Mexican national authorities' request for IAEA support in organizing a national training course on sampling for environmental radioactivity monitoring purposes. Organized by the IAEA Environment Laboratories, the training course took place from 9 to 13 July 2018 at the National Institute of Nuclear Research (ININ) in Ocoyoacac, Mexico. The course was part of a larger, ongoing national technical cooperation project where the focus is to determine a radiological baseline in future sites where the oil and gas industry will be involved. Through activities such as mining or oil and gas extraction, natural radionuclides in the Earth's crust may also be released into the environment. Therefore, it is important to be able to detect how much

radioactivity is present to create a baseline against which any further releases from these activities may be measured, assessed and monitored.

Twenty-seven delegates from 5 Mexican institutions, including the National Institute of Nuclear Research (ININ), the National Commission of Nuclear Security and Safeguards (CNSNS), the National Council of Water (CONAGUA), the National Council of Oil (CNH), and the national petroleum company PEMEX, attended the course. All of them are involved in environmental monitoring and surveillance activities related to nuclear facilities, water or oil production.



Participants at the training course organised by the IAEA Environment Laboratories at the National Institute of Nuclear Research (ININ) in Ocoyoacac, Mexico (Photo: ININ.)

The participants attended lectures on the theoretical approaches to effective sampling campaigns for environmental radioactivity monitoring, on the proper collection of representative samples from the various environmental compartments, such as aerosols, soil, waters, etc., and on sample preservation prior to analysis in the laboratory. Participants also took part in a ‘hands-on’ session on the use of aerosol and soil sampling equipment and on in-situ measurement techniques. This session was especially practical given this equipment and these techniques are generally used in the framework of a standard environmental radioactivity monitoring programme.

“The course contributed to strengthen the participants’ theoretical knowledge and practical skills in designing proper sampling plans, in applying relevant sampling techniques and in using sampling equipment for environmental radioactivity monitoring. It provided, in addition, an excellent basis for enhancing coordination among Mexican institutions involved in environmental

monitoring activities,” said Mr Aurelien Pitois, technical officer of the IAEA project.

A final round-table discussion gave participants the opportunity to reflect on how this course will assist them in their environmental monitoring work.

IAEA Collaborating Centre for production and characterization of reference materials

Following three previous Collaborating Centre designations, the Radioanalytical Reference Laboratory of the Food and Feed Safety Directorate in Hungary’s National Food Chain Safety Office has once again been redesignated for the period 2017 to 2021.

Collaborating Centres are Member State institutions, departments or laboratories that work with the IAEA to implement selected programmatic activities such as the development and practical application of nuclear technology and techniques. To date, the Hungarian laboratory’s work with the IAEA has included the production of reference materials, the training of fellows and scientific visitors in radioanalytical techniques and assistance with water sampling exercises.

“We are extremely pleased to renew this Collaborating Centre agreement,” said David Osborn, Director of the IAEA Environment Laboratories. “Not only is this Centre one of the IAEA’s oldest, but it could be described as a workhorse in the areas of reference material production and training. Reliable reference materials are extremely critical to our research – in fact, it would be impossible to undertake our work without them.”

The main objective of the Collaboration Agreement is to enhance the reliability and comparability of radioanalytical measurement results by providing suitable reference materials for quality control. Good quality reference materials act as measurement yardsticks, which are vital for the validation of scientific tests.

“We are very pleased that the Collaborating Centre has been redesignated because it is important for both the laboratory and Hungary to cooperate internationally in the field of nuclear safety, and for the continuous training and development of professionals working in the laboratory,” said Attila Nagy, Deputy Director of the National Food Chain Safety Office. “For these reasons, it is essential to organize and evaluate round robin tests and comparisons for which the Hungarian laboratory can provide the right scientific expertise and assistance. It is also a continuous opportunity for us and for the Collaborating Centre to develop and test new and future scientific ideas.”



Aldo Malavasi, Deputy Director General and Head of the Department of Nuclear Sciences and Applications (recently retired), hands over the Collaborating Centre redesignation plaque to Dr. Attila Nagy, Deputy Director of Hungary's National Food Chain Safety Office. (Photo: IAEA)

“Since becoming a Collaborating Centre in 2005, the National Food Chain and Safety Office has been a very important partner for the IAEA,” said Aldo Malavasi, IAEA Deputy Director General and Head of the Department of Nuclear Sciences and Applications. “They have prepared, characterized and established new reference materials to aid in quality control and have also conducted multiple feasibility studies and undertaken several training activities. Hungary has emerged as a leader in the field of international science, and the good work done by this Centre in partnership with the IAEA has served to highlight the country's efficiency in this area.”

By focusing on research, development and training, Collaborating Centres such as Hungary's help countries reach important targets of the United Nations'

Sustainable Development Goals. Currently, the IAEA has 31 active Collaborating Centres worldwide.

Understanding the Chernobyl legacy – managing radioactive materials on the Chernobyl-contaminated territories



Participants in the distance, observing the radioactive waste disposal site near the former village Masany in the Chernobyl Exclusion Zone (Photo: Alexander Ulanowski/IAEA)

The Terrestrial Environment Laboratory – one of the four laboratories of the IAEA's Environment Laboratories – is supporting a regional technical cooperation project to improve the remediation and management of the terrestrial and freshwater environments affected by radioactive material of Chernobyl origin.

Within the framework of the project, a regional meeting was organized in Gomel, Belarus from 29 to 31 October 2018, hosted by the Institute of Radiology. Participating in the meeting were specialists from the Republic of Belarus, the Russian Federation, and Ukraine involved in long term management of terrestrial and freshwater environments contaminated

after the Chernobyl accident. The main purpose of the meeting was to review national experiences and best existing practices in the three Member States related to recovery of the contaminated areas with a focus on management of radioactive materials, including both regulatory, technical and socio-economic aspects.

A broad range of topics were covered in the presentations and discussions. The discussions were focused on affected countries' national experiences in managing radioactive materials created as a result of the past and current activities in populated and evacuated areas, as well as in the Chernobyl Exclusion Zone (CEZ). An overview of contemporary international regulatory guidance and requirements on the handling and storing of radioactive materials was given as a basis for comparison of the existing national practices and legislation.



Without anthropogenic pressure, the wildlife in the Chernobyl exclusion zone is flourishing. Przewalski horses (pictured) found their habitat within abandoned settlements. (Photo: Valery Yurko/PSRER)

Among other problems addressed were those associated with return of the previously abandoned contaminated areas to normal life or economic use, informing the public and relevant authorities (nationally and internationally) on the radiological situation and sharing practices for safe and healthy living. All these – along with practical examples and approaches for the actual management, storage and disposal of radioactive material – were discussed at the meeting.

The meeting participants stressed the need, given similarity of the existing radiological challenges and

existing close ties between the three countries affected by the Chernobyl accident, to harmonise national regulatory approaches and technical methods in the area of radiological protection of population and remediation of the affected environment.

The participants stressed the importance of systematisation and conservation of data on decontamination programmes, techniques and practices, information on handling and storing radioactive materials, especially, on those actions performed in the early phase following the accident. The participants noted, as a new phenomenon, the removal of radiological restrictions for some of the contaminated areas, thus allowing their return to normal living or economic activity. The development of accompanying legislative and regulatory norms as well as appropriate public information were also discussed.

Among the challenges facing the contaminated areas is the presence of radioactive materials that consist of low contaminated remediation waste, debris of buried houses and facilities, and radioactive material (e.g. forest products, firewood) routinely originated from the contaminated territories. Therefore, dissemination and sharing of contemporary experiences in the management of radioactive materials remains a highly important item in the Chernobyl legacy agenda. The meeting concluded that the IAEA efforts to promote and support effective management of radioactive material as well as further revitalisation of the areas affected by the Chernobyl accident are very important and helpful.

During the meeting, participants also visited the Polessie State Radiation-Ecological Reserve (PSRER, Belarus) where most of the disposal facilities and storage sites for radioactive waste and other radioactive materials produced due to the Chernobyl accident in Belarus are located. The participants visited the abandoned settlements Babchin, Borshchovka and Masany and were given a possibility to approach and to see facilities of different types located in the CEZ.

Selected Publications

- Regional workshop on Monitoring and Management Strategies for Benthic HABs**, TESTER P.A., DECHRAOUI BOTTEIN M-Y., LEMEE R., Harmful Algae News, 60, pp. 16
- Large-Scale Sea Turtle Mortality Events in El Salvador Attributed to Paralytic Shellfish Toxin-Producing Algae Blooms**, AMAYA O., QUINTANILLA R., STACY B.A., DECHRAOUI BOTTEIN M-Y., FLEWELLING L., HARDY R., DUENAS C., RUIZ G., Frontiers in Marine Science, 5, pp. 411
- Addressing the Problem of Harmful Algal Blooms in Latin America and the Caribbean- A Regional Network for Early Warning and Response**, CUELLAR-MARTINEZ., RUIZ-FERNANDEZ A.C., ALONSO-HERNANDEZ C.M., AMAYA-MONTERROSA O., QUINTANILLA R., CARRILLO-OVALLE H.L., ARBELAEZ N., DIAZ-ASENCIO L., MENDEZ S.M., VARGAS M., CHOW-WONG N.F., VALERIO-GONZALEZ L.R., ENEVOLDSEN H., DECHRAOUI BOTTEIN M-Y., Frontiers in Marine Science, 5, pp. 411
- Insights into the Biosynthesis of Cyclic Guanidine Alkaloids from Crambeidae Marine Sponges**, SILVAS.B.L., OBERHANSLI F., TRIBALAT M-A., GENTA-JOUE G., TEYSSIE J-L., DECHRAOUI BOTTEIN M-Y., GALLARD J-F., EVANNO L., POUPON E., THOMAS O.P., Angewandte Chemie, 131, pp. 530-535
- An attainable global vision for conservation and human well-being**, TALLIS H.M., HAWTHORNE P.L., POLASKY S., REID J., BECK M.W., BRAUMAN K., BIELICKI J.M., BINDER S., BURGESS M.G., CASSIDY E., CLARK A., FARGIONE J., GAME E.T., GERBER J., ISBELL F., KIESECKER J., MCDONALD R., METIAN M., MOLNAR J.L., MUELLER N.D., O'CONNELL C., OVANDO D., TROELL M., BOUCHER T.M., MCPEEK B., Frontiers in Ecology and the Environment, 16, pp. 563-570
- Allometric relationship in the bioaccumulation of radionuclides (¹³⁴Cs & ²⁴¹Am) and delineation of contamination pathways (food and seawater) in bloody cockle *Anadara senilis* using radiotracer techniques**, KURANCHIE-MENSAH., POUIL S., TEYSSIE J-L., OBERHANSLI F., WARNAU M., METIAN M., Journal of Environmental Radioactivity, 192, pp. 448-453
- Effects of ocean acidification on ¹⁰⁹Cd, ⁵⁷Co, and ¹³⁴Cs bioconcentration by the European oyster (*Ostrea edulis*): Biokinetics and tissue-to-subcellular partitioning**, SEZER N., KILIC Ö., METIAN M., BELIVERMIS M., Journal of Environmental Radioactivity, 192, pp. 376-384
- Application of nuclear techniques to environmental plastics research**, LANCTOT C.M., AL-SID-CHEIKH M., CATARINO A.I., CRESSWELL T., DANIS B., KARAPANAGIOTI H.K., MINCER T., OBERHANSLI F., SWARZENSKI P.W., TOLOSA I., METIAN M., Journal of Environmental Radioactivity, 192, pp. 368-375
- Specific effect of trace metals on marine heterotrophic microbial activity and diversity: key role of Iron and Zinc hydrocarbon-degrading bacteria**, BALTAR, F., GUTIÉRREZ-RODRÍGUEZ,A, MEYER, M, SKUDELNY, I,SANDER, S,THOMSON, B, NODDER, S, MIDDAG, R, MORALES, S., Frontiers in Microbiology, 9, 3190.
- Biochemical composition of the cold-water coral *Dendrophyllia cornigera* under contrasting productivity regimes: Insights from lipid biomarkers and compound-specific isotopes**, GORI, A., TOLOSA, I., OREJAS, C., RUEDA, L., VILADRICH, N., GRINYO, J., FLOGEL, S., GILI, J.M., GROVER, R., FERRIER-PAGES, C., Deep Sea Research Journal, Part I 141, pp.106-117.
- Paraffin Wax Spill Identification by GC-FID, GC-MS and GC-IRMS**, KIENHUIS, P., FITZ, N., TOLOSA, I., BLAGA, C., PESCHIER, L., Case Studies in Oil Spill Environmental Forensics, 2018, pp. 157-186.
- Copper pollution exacerbates the effects of ocean acidification and warning on kelp microscopic early life stages**, LEAL, P., HURD, C., SANDER, S., ARMSTRONG, E., FERNANDEZ, P., SUHRHOFF, T., ROLEDA, M., Scientific Reports (2018)
- A baseline study on trace and rare earth elements in marine sediments collected along the Namibian coast**, ORANI, A.M., VASSILEVA, E., WUSOCKA, I., ANGELIDIS, M., ROZMARIK, M., LOUW, D. A, Marine Pollution Bulletin, 131, pp. 386-395
- Marine sponges as a powerful tool for trace elements biomonitoring studies in coastal environment**, ORANI, A.M., BARATS, A., VASSILEVA, E., THOMAS, O.P., Marine Pollution Bulletin, 131, pp. 633-645
- Sustained upwelling of subsurface iron supplies phytoplankton blooms around the southern Kerguelen plateau, Southern Ocean**, SCHALLENBERG. C., BESTLEY, S., KLOCKER, A., TRULL, T., DAVIES, D., GAULT-RINGOLD, M., ERIKSEN, R., LANNUZEL, D., RODEN, N. SANDER, S., STUART, A., SUMNER, M., TOWNSEND, A., VAN DER MERWE, P., WESTWOOD, K., WUTTIG, K., BOWIE, A., Journal of Geophysical Research: Oceans, 10, pp. 1-18
- Certification for Trace Elements and Methyl Mercury mass fractions in IAEA-456 marine sediment sample**, VASSILEVA, E., AZEMARD, S., MANDJUKOV, P., Accreditation and Quality Assurance, 23, pp. 29-37
- Determination of ultra-trace level of ²³²Th in seawater by ICP-SFMS after matrix separation and preconcentration**, WUSOCKA, I., VASSILEVA, E., Analytical Chimica Acta, 1000, pp. 144-154
- Copper toxicity to blue mussel embryos (*Mytilus galloprovincialis*) The effect of natural dissolved organic matter on copper toxicity in estuarine waters**, ZITOUN R, CLEARWATER S, HASSLER C, THOMPSON K, ALBERT A, SANDER S., Science of the Total Environment, 653, pp. 300-314
- Worldwide interlaboratory comparison on the determination of trace elements in a fish sample IAEA-MESL-ILC-TE-BIOTA-2017**, AZEMARD, S., VASSILEVA, E., Analytical Quality in Nuclear Applications Series, IAEA/AQ/56, ISSN 2074-7659, Vienna 2018
- Certification of Trace Elements and Methylmercury Mass fractions in Fish Homogenate IAEA 476**, Analytical Quality in Nuclear Applications Series, IAEA/AQ/57, ISSN 2074-7659, VASSILEVA, E., AZEMARD, S., Vienna 2018

Selected Upcoming Events

Dates	Description	Location
28 January-1 February	Latin American and Caribbean Advanced Training on Ocean Acidification Monitoring (Cooperation Meeting)	Santa Marta, Colombia
4-8 February	Second Research Coordination Meeting on Behaviour and Effects of Natural and Anthropogenic Radionuclides in the Marine Environment and their Use as Tracers for Oceanography Studies	IAEA Environment Laboratories, Monaco
26-28 March	Third Research Coordination Meeting on Toxicological and Ecotoxicological Assessment of Benthic Algae and Their Toxins to Achieve Sustainable Management of Marine Ecosystem Services	IAEA Environment Laboratories, Monaco
15-18 April	The 4th Global Ocean Acidification Observing Network (GOA-ON) International Workshop (Cooperation Meeting)	Hangzhou, Zhejiang, China
23-25 April	Technical Meeting on Building Resilience to Address Ocean Change: Drivers of Vulnerability and Implications for Adaptation	IAEA Environment Laboratories, Monaco
6-10 May	Training Workshop on In Situ Characterisation of Contaminated Sites	Pecs, Hungary
13-14 May	UN Environment / IAEA Expert Consultations Meeting on Mercury Monitoring on Soil and Biota Matrices	IAEA Environment Laboratories, Monaco
2-16 June	Sampling mission within the framework of NA-EL project NA/38 on data quality support of marine monitoring off-shore Fukushima	Fukushima, Japan
11-13 June	Training Workshop on the Analysis of Short-Lived Radionuclides by Gamma-Ray Spectrometry	IAEA, Vienna, AUSTRIA
24-28 June	Technical Meeting on the Use of Best Practices for Ocean Acidification Experiments in Multi-Stressor Scenarios	IAEA Environment Laboratories, Monaco

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