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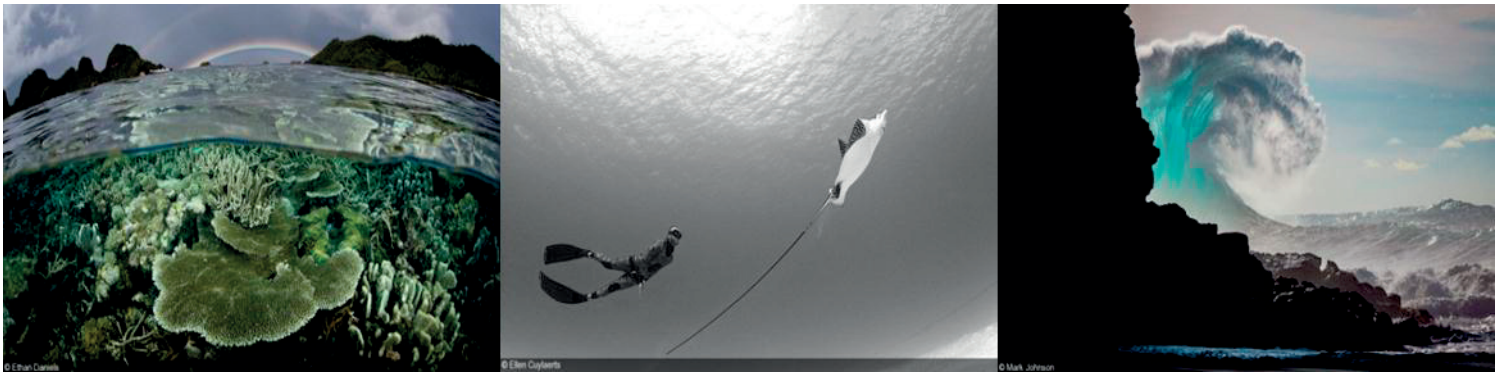
In This Issue

Welcome to the first edition of the newsletter of the IAEA Environment Laboratories. This replaces the former Marine Environment Laboratories newsletter, reflecting a restructure that has seen the marine and terrestrial environment laboratories of the IAEA integrated into a single division. The IAEA's Environment Laboratories in Monaco and Seibersdorf, Austria, in partnership with several collaborating centres around the globe, are unique in the UN system. Through the use and promotion of nuclear and isotopic techniques, the Environment Laboratories play a major role in the journey towards sustainable development, both on land and at sea. Responding to requests for technical assistance from Member States and other UN agencies, the Environment Laboratories provide applied collaborative research, training courses, technical cooperation projects and analytical quality support services for radioactive and non-radioactive contaminants in the environment. Through its environmental programme the IAEA promotes an integrated approach to the study, monitoring and protection of marine, coastal and terrestrial ecosystems from threats such as pollution, climate change and the loss of habitat.

David Osborn
Director NAEL
(Photo: H. Ramadan/IAEA)

In this first edition we focus on the challenge of ocean acidification. Governments across the globe are calling for immediate action to minimize and address the impacts of ocean acidification which will require enhanced scientific cooperation at all levels. The IAEA Environment Laboratories will play a key role in this area and are proud to host the Ocean Acidification International Coordination Centre.

We are also happy to include in this edition the winners of the 2014 World Oceans Day (WOD) photo competition. For more information, visit: http://worldoceansday.org/photocontest/



World Oceans Day (WOD) photo contest winners, see page 5 for more information

In Focus

Ocean Acidification – An Introduction

Something is happening in the ocean: silently, invisibly, the water is changing. The balance of the global ocean chemistry is shifting. Oceanographers studying the content and chemical flux of ocean waters have identified a process that has been accelerating over the last two centuries. The process has been termed ocean acidification, and refers to a decrease in ocean pH by the dissolution of additional carbon dioxide, CO_2, in seawater from the atmosphere. The primary source of the change is the increasing consumption of fossil fuels for energy production in human society, with the resultant emissions of carbon dioxide to the atmosphere.

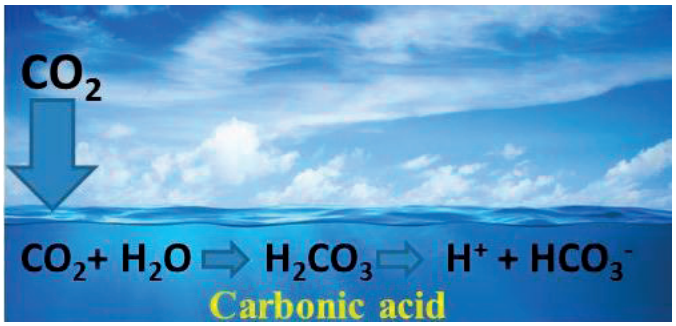


Figure 1. The chemical reaction of atmospheric carbon dioxide, (CO_2), with seawater, (H_2O), absorbed by the surface ocean produces transitory carbonic acid, (H_2CO_3), which rapidly dissociates into free hydrogen ions, (H^+) and bicarbonate ions, (HCO_3^-). (Figure: D. Martini/intern IAEA)

The atmosphere and ocean have remained, for the last several thousands of years, in equilibrium in relation to carbon dioxide gas exchange, and the average global ocean pH has been stable at 8.2. While localized variability occurs naturally, current surface ocean pH is, on average, 8.1. Because pH is on a logarithmic scale, this reduction of 0.1 unit of pH is equivalent to a 26% increase in acidity (number of free hydrogen ions, H^+) from the pre-industrial level. Since the industrial revolution, the amount of carbon dioxide released to the atmosphere has risen steadily to its current level of 37 billion metric tons of carbon dioxide worldwide per year. Approximately 25% of the carbon dioxide released to the atmosphere is subsequently absorbed by ocean surface waters. This equates to more than 25 million tons of CO_2 entering the ocean each day. The rate at which CO_2 is increasing in the surface ocean (top 200 meters) is estimated to be 10 to 100 times faster than at any previous time, as determined from the geologic record of marine sediment cores. Other large natural CO_2 flux occurrences in the past 100s of millions of years have been identified, with accompanying atmospheric temperature increases and ocean pH decreases, and have been associated with major extinction events[(1)].

The importance of this change becomes relevant when it is discussed in the context of biology, and the effects that occur in living organisms. As seawater carbon dioxide increases, pH decreases, and the carbonate ion concentration decreases. Carbonate ions, CO_3^{2-}, are the form of carbon that are most readily used by marine invertebrate organisms to bind calcium for the production of shells and skeletal structures. The reduction in carbonate availability and pH has negative implications for many organisms, as shell production may become energetically more expensive and metabolic conditions become physiologically more stressful.

In the last decade, numerous laboratory experiments on the biological effects of absorption of CO_2 in seawater have been performed. Using experimental levels of CO_2 projected by oceanographic models for the near future, negative effects on growth and survival of many species have been seen[(2)]. Calcifying organisms, those that produce calcium carbonate ($CaCO_3$) such as corals and shellfish, are particularly sensitive. Techniques used by the IAEA Environment Laboratories, can precisely determine the effects of low pH/low CO_3^{2-} under controlled conditions. One method uses the radioisotope of calcium-45 in dose experiments under high CO_2 conditions to measure calcification rates of corals. Other radioisotopic methods allow investigation of the metabolic processes of finfish and shellfish affected by exposure to high CO_2 seawater for periods of days to months. The uptake of radioisotopes of trace elements can reveal changes to the tissue bioaccumulation and cellular bioavailability of metals (like silver, cadmium, cobalt, cesium, manganese, selenium and zinc) in developing eggs, juveniles and adults of marine organisms. Other isotopic methods using the ratio of boron isotopes in marine sediment as a proxy for ocean pH can reconstruct past ocean conditions. Current field studies of plankton such as pteropods (sea butterflies) reveal dissolution of their calcium carbonate structures when increased levels of CO_2 in ambient ocean water make it corrosive. Recently, the corrosive effects of low pH ocean water to pteropod aragonite shells have been observed (Figure 2) in substantial percentages of free-swimming individuals collected off the coast of California, USA[(3)].

What are the implications of ocean acidification? At a minimum, the expectation is for large-scale changes in marine ecosystems over the coming decades. For example, tropical coral reef structures weakened by acidification will diminish. The reduction of coral reefs, a loss in itself, translates to a cascade of effects that include loss of habitat for reef fish and loss of physical protection to coastal

shorelines, especially important for coastal and island communities of the tropics and sub-tropics. Ecological shifts causing redistribution of populations of fish and shellfish will have impacts on food security for many coastal residents dependent upon resources harvested from the ocean. Ecological cascade effects could also determine the extreme outcome of ocean acidification – mass extinctions of marine life. Marine extinctions are not an improbable consequence of rapid ocean acidification. When keystone species that are significant sources of food disappear, losses at higher trophic levels follow.

The implications of the trend of ocean acidification are drastic and far-reaching, and for this reason scientists have responded internationally to communicate their apprehension concerning the future of human development. As part of this response, the IAEA Environment Laboratories established the Ocean Acidification-International Coordination Center (OA-ICC) to support efforts globally to understand the extent and impact of ocean acidification.

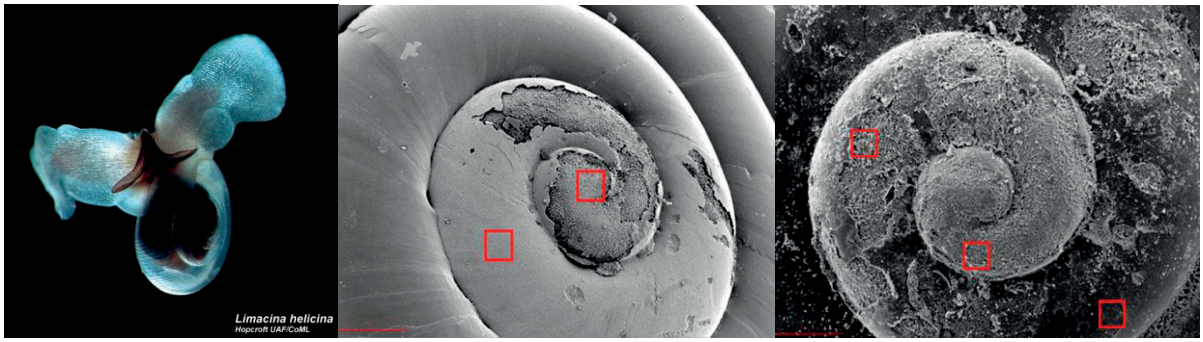


Figure 2. The sea butterfly, with a shell made of aragonite, is sensitive to decreases of carbonate ions and pH. Scale: shell diameter is ~5mm. (*Left*) http://www.arcodiv.org/watercolumn/pteropod/Limacina_helicina.html# *Center and right*: from Bednarsek *et al*, 2014[3].

For further information, please contact: EL@iaea.org

The Other CO_2 Problem-Interview of Dr. James Orr

James Orr
(photo: J.L.Teyssie/IAEA)

James Orr is a research director at the Climate and Environmental Sciences Laboratory (LSCE) of the French Commissariat à l'Energie Atomique et aux Energies Alternative (CEA). After a Ph.D. in Oceanography from Texas A&M University in 1988, he conducted postdoctoral research at Princeton University, and then moved to LSCE in 1992. Since 1995, he has led the Ocean Carbon-Cycle Model Intercomparison Project (OCMIP), an international effort to evaluate, compare, and improve three-dimensional, global ocean, carbon-cycle models. His current research activities focus on the variability in the exchange of CO_2 between the atmosphere and ocean, the transport of carbon within the ocean, and the impact of increasing atmospheric CO_2 concentrations on ocean chemistry and biology, namely, ocean acidification. He is currently the scientific coordinator of the OA-ICC.

Q: Why is ocean acidification called "the other CO_2 problem"?

A: Ocean acidification has been called the other CO_2 problem because like climate change, it is driven by the increasing CO_2 concentrations in the atmosphere. Climate is affected by CO_2 because it is a greenhouse gas – it affects the radiative balance of the atmosphere. But CO_2 is also an acid gas – it reacts with water producing carbonic acid. Although a weak acid, there is so much CO_2 going into the ocean that we can already measure the ocean's increasing level of acidity. Every day, the average person on the planet is responsible for emitting about 20 kg CO_2 to the atmosphere, one-fourth of which is absorbed by the ocean.

Q: Is there real political awareness of this issue?

A: There is a growing political awareness of ocean acidification and its potential impacts. A few years ago, policymakers generally knew nothing of ocean

References:

1. Hönisch *et al*, The Geological Record of Ocean Acidification, Science, 335, 6072, 1058-1063, (2012).
2. Gattuso J-P and Hansson L (editors). Ocean Acidification, 2011, 326 pp, Oxford University Press.
3. Bednarsek *et al*, *Limacina helicina* shell dissolution as an indicator of declining habitat suitability owing to ocean acidification in the California Current Ecosystem, *Proc. R. Soc. B* 281, (2014).

acidification. Today most policymakers have heard of it and some are quite concerned. As for concrete actions, some are now directed to promoting more research on the associated impacts, for which we still know relatively little.

Q: To what extent are the economies of countries impacted?

A: Research into the economic effects of ocean acidification is just beginning. We still know very little although it is expected that potential impacts could be large. Developing countries that rely on seafood as a main source of protein, on tourism associated with coral reefs, and on fisheries in general, particularly aquaculture, seem particularly at risk.

Q: Beyond preventive measures, can you recommend remedial measures that could enhance the resilience of marine ecosystems?

A: The only long-term solution to ocean acidification is to reduce our CO_2 emissions dramatically, but that will take an enormous effort over decades. To buy some time, it has been argued that organisms would stand a better chance to resist ocean acidification if they could be made more resilient by reducing other anthropogenic stresses such as local pollution and overfishing. Some coastal pollution does enhance acidification, for example, the atmospheric deposition of nitrogen and sulphur as well as eutrophication from fertilizer runoff. Reducing these would directly reduce total acidification and so local efforts could be helpful, even though they cannot, by themselves, significantly reduce global CO_2 emissions. Local communities working towards building more resilience is generally a good idea, such as by establishing more Marine Protected Areas (MPAs). These local solutions may, in some cases, help but they will not reduce acidification from the global increase in atmospheric CO_2 nor associated warming.

IAEA OA-ICC fosters cooperation on OA data management

The OA-ICC organized an expert meeting on the management of ocean acidification biological response data at the Environment Laboratories in Monaco, 23-24 April 2014. The meeting brought together 23 ocean acidification scientists and data managers from ten Member States, with a common goal to work towards improving data management practices in order to enhance access, integration and inter-comparison of ocean acidification data and to foster global scientific collaboration.

Participants to the IAEA/OA-ICC meeting, Monaco, 23-24 April 2014. (Photo: J.L.Teyssie/IAEA)

The meeting participants worked on the following activities:

•A revision of Chapter 15 of the "Guide to Best Practices for Ocean Acidification Research and Data Reporting" (http://tinyurl.com/oaicc-data), in particular expanding on biological response data, including recommendations on a data management plan and data policy, common vocabulary and metadata;

•Guidelines for data curators;

•Guidelines for authors of scientific papers on ocean acidification biological response studies, with the goal to facilitate data archiving and comparability;

•A feasibility plan for a one-stop shop for ocean acidification data.

For further information, please contact: EL@iaea.org

Secretary Kerry announces additional funding for IAEA OA-ICC

During the "Our Ocean" conference that took place in June 2014 which was hosted by the United States Department of State and to which, His Serene Highness the Prince Albert II of Monaco participated, Secretary of State John Kerry, announced a contribution to the OA-ICC of $640,000.

HSH Prince Albert II and Secretary of State John Kerry at the "Our Ocean" conference, USA, June 2014. (Photo: PALAIS PRINCIER DE MONACO © all rights reserved)

Winners of the First World Oceans Day Photo Contest

The 8th of June has been designated the World Oceans Day (WOD) by the United Nations to raise global awareness of the challenges faced by the international community pertaining to the threats on our oceans. To mark this event, a photo contest based on five thematic categories was organized through which people would share their vision of beauty and importance of the oceans.

The awarded photos were announced on the 9th June in New York; on page 1: from left to right: In the categories, "Underwater Seascapes": Ethan Daniels, "Human Interaction with the Ocean": Ellen Cuylaerts, "Above Water Seascapes": Mark Johnson. Below, is the 2014 overall photo winner from Jonas Thomar and, on the right, the winners for "Underwater Life": Alan Lo and Svenja Nanfelt for the "Youth Photographer" category.

Overall Winner of the 2014 "World Ocean Day" photo contest: Jonas Thormar

Winner in the "Underwater Life" category: Alan Lo

Winner in the "Youth Photographer" category: Svenja Nanfelt

Raising the bar - Supporting Quality Assurance

Best practice environmental management demands a high degree of confidence in the data and information developed by analytical laboratories. In this context, a training workshop on quality assurance requirements for environmental radioanalytical laboratories took place from the 30 March to 4 April at the IAEA headquarters in Vienna. The participants came from the Iraq, Jordan and the United Arab Emirates under IAEA Technical Cooperation projects IRQ0006, JOR9010, UAE7003 and from China, Romania and UK for fellows and interns hosted at the IAEA laboratories.

Participants to the "Quality Assurance Requirements" workshop, Vienna, 30 March-4 April 2014. (Photo: O. Yusuf/IAEA)

"The natural environment, and our impact on it, is extremely complex and understanding radioactivity in the environment is a key component of good environmental management. Increasingly, Member States are recognizing the need for a systematic approach to improving and harmonizing methodologies for the determination and monitoring of radioactivity in the environment," said David Osborn, Director of the Environment Laboratories. "The lack of specific guidelines and technical documents for quality assurance – for example, quality control procedures, or instrument calibration – contributes to unreliability and incomparability in measurement results. To start filling this gap, this training workshop is facilitating the sharing of knowledge, contributing to better quality in radioanalytical measurement results, and promoting the use of standardized quality assurance procedures in radioanalytical techniques."

Participants were provided with lectures, practical exercises and round-table discussions covering the topics related to compliance with the ISO 17025 quality assurance requirements applied to environmental radioanalytical laboratories. ISO 17025 is an international standard that specifies the general requirements for the competence to carry out tests and/or calibrations, including sampling. It covers testing and calibration performed using standard methods, non-standard methods, and laboratory-developed methods.

The training course included a half-day technical visit to the IAEA laboratories in Seibersdorf, Austria, which gave the participants an opportunity to learn about how nuclear technology can be applied in a range of different fields, including food, health and the environment.

Sampling the coast of Namibia

Following a request for assistance from the Environmental Division of the Ministry of Fisheries and Marine Resources of Namibia, the Environment Laboratories, with their extensive experience in sampling and nuclear applications, participated in a scientific sampling expedition along the coast of Namibia in May 2014.

The main outcomes from this sampling expedition were:

1. to carry out a baseline study of marine radioactivity levels in the Benguela system by collecting marine samples (seawater, sediments, seaweed and biota) along the Namibian coast

2. to generate an extensive database that will include missing trace elements data

3. to assist Namibia with the possibility to set up an environmental monitoring programme

4. to support Namibia in the preparation of a proposal for a national project in the next IAEA technical cooperation (TC) cycle (2016-2017)

Scientists processing seawater samples on board of research vessel "Mirabilis". (Photo: D. Louw, Ministry of Fisheries and Marine Resources, Namibia)

Within the umbrella of this forthcoming TC project, it is planned that some Namibian scientists will be trained in analytical and sampling techniques at the Environment Laboratories and start the implementation of a national project for the next TC cycle.

Sediment, seawater and biota samples were collected, not only for natural and anthropogenic radionuclides, but also for rare earth elements and trace elements and methyl mercury.

For further information, please contact: EL@iaea.org

IAEA Trains Scientists on Environmental Radioactivity Assessments

Between the 10-21 March 2014, 24 scientists from 21 countries participated in a training course on precise and quick assessment of radionuclides in the environment at the Argonne National Laboratory (ANL) in the USA. It was organized by the IAEA/Environment Laboratories in cooperation with the ANL to benefit scientists working in laboratories belonging to the ALMERA (Analytical Laboratories for the Measurement of Environmental Radioactivity) network.

ALMERA is a world-wide network of analytical laboratories capable of providing reliable and timely determination of radionuclides in samples used for both routine and emergency environmental monitoring.

"The ALMERA network is a valuable resource for ensuring reliable and timely determination of radionuclides in the environment." said David Osborn, Director of the Environment Laboratories. "Such a training course is important to reinforce the analytical skills of the personnel in the ALMERA laboratories interested in developing their rapid response capabilities so as to be better prepared should any radiological emergency occur."

Training course on rapid assessment methods, 10-21 March 2014 at the ANL, USA. (Photo: I. Osvath/IAEA)

During the training course, participants attended lectures and practical exercises and participated in field work and laboratory hands-on practical work. Lectures focused on specific applications of dose assessment codes and analysis of complex gamma-ray spectra of environmental samples, and were followed by practical exercises on real cases. Participants practiced field detection methods and sampling methodology in case of environmental contamination. A laboratory hands-on practical exercise relevant to the rapid determination of radionuclides in the environment was organized. The participants practiced a rapid radiochemical laboratory procedure validated by ALMERA laboratories and published by the IAEA. Special attention was also given to quality aspects of sampling and analytical work during the training course.

It is planned that this course will be repeated in 2015 for the benefit of further ALMERA member laboratories.

For further information, please visit the IAEA ALMERA website: http://nucleus.iaea.org/rpst/ReferenceProducts/ALMERA/index.htm

GESAMP / WG39 workshop

The 2nd workshop of GESAMP's (Group of Experts on the Scientific Aspects of Marine Environmental Protection) working group 39: "Global trends in pollution of coastal ecosystems" took place at the Environment Laboratories between the 12-16 May 2014. The objective of the Working Group is to contribute to reducing coastal ecosystem stress globally by providing stakeholders, scientists and society in general, an objective and global assessment of pollution trends during the last century. It focuses on sensitive coastal ecosystems, through retrospective ecosystem analysis, by using dated environmental archives and time-series data when available.

Participants to the 2nd workshop of GESAMP, Monaco, 12-16 May 2014. (Photo: J.L.Teyssie/IAEA)

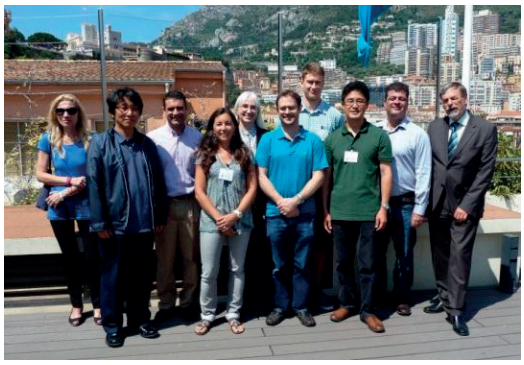
Experts from seven Member States attended the workshop during which UNINMAR-UNAM (Institute of Marine sciences and Limnology, Universidad Nacional Autónoma de México) presented a "LME (Large Marine Ecosystem) pollutants" database. An analysis tool to assess pollution trends in a chosen temporal series was also presented. The methodologies were thoroughly studied by the working group 39 and successfully applied using digitized data of the California Current as a pilot case study that is reported on LME 03. After carrying out a literature survey and reviewing the most relevant papers, future tasks were

assigned with revised working methodologies and delineated within WG39.

For further information, please contact: EL@iaea.org

MODARIA / WG10 meets in Monaco

The MODARIA (Modelling and Data for Radiological Impact Assessments) Working Group 10 (WG10) met at the Monaco Marine Laboratories on the 3-5 June 2014. MODARIA is a Special Project hosted by the Department of Nuclear Safety and Security. The aim of the MODARIA Programme is to improve the capabilities of environmental radiation dose assessment by improving data acquisition for model testing and comparison, reaching a consensus on modelling philosophies, approaches and parameter values, and the development of methods and the exchange of information. MODARIA/WG10 is tasked with developing models to study the release of radionuclides to the marine environment in two regions: the North Pacific in relation to the Fukushima accident, and the Baltic Sea. Ten meeting participants coming from eight Member States attended the meeting. Each meeting participant gave a presentation to update the group on their own work and developments, which was followed by discussion on the results and the way forward.



Participants to the MODARIA working group 10, Monaco, 3-5 June 2014. (Photo: J.L.Teyssie/IAEA)

For further information, please contact: EL@iaea.org

Quality Assurance in Mediterranean marine pollution monitoring programmes

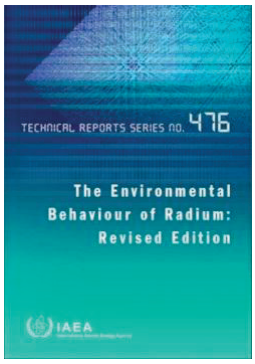
A Letter of Agreement (LoA) has been signed between the United Nations Environment Programme (UNEP) and the IAEA/Environment laboratories (NAEL) on 16 May 2014 "to provide a framework of cooperation and understanding and to facilitate collaboration between UNEP and IAEA to further share their goals and objectives with regard to capacity building activities related to analytical techniques used in monitoring and research programmes in the marine environment of the Mediterranean Sea". In the framework of the LoA, NAEL is organizing two proficiency tests on the measurement of trace elements and organic contaminants (pesticides, PCBs, petroleum hydrocarbons and flame retardants) in marine biota and sediments, with the participation of nationally designated Mediterranean laboratories. Also, two parallel training courses on the analysis of these contaminants in marine samples will be organised in Monaco on 3-14 November 2014, for 12 scientists working in laboratories participating in national marine pollution monitoring programmes of Mediterranean Member States.

NAEL has had a long-stranding collaboration with UNEP/Mediterranean Plan (MAP) since 1986, acting as a specialized coordinating center for the UNEP's Regional Seas Programmes and the Regional Analytical Centre for UNEP/MAP - MED POL (Programme for the Assessment and Control of Pollution in the Mediterranean Region).

Training course on the analysis of organic pollutants in Monaco. (Photo: J.L.Teyssie/IAEA)

For further information, please contact: EL@iaea.org

New Technical Reports

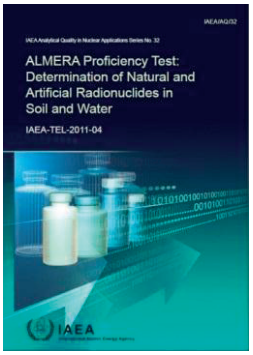


Part of the mission of the IAEA is to facilitate the transfer of knowledge in nuclear science and technology used for various peaceful purposes. One method to do so is the publication of documentation for information or practical use. In the first half of 2014, the Terrestrial Environmental Laboratory (TEL) of NAEL was responsible for the publication of three such documents.

"The Environmental Behaviour of Radium: Revised Edition", Technical Reports Series No. 476, provides an outline of radium behaviour in terrestrial, freshwater and marine environment. The primary objective of the report is

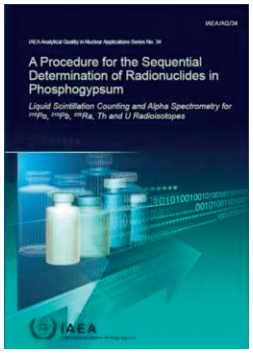
to provide Member States with information for use in the radiological assessment of accidental releases and routine discharges of radium in the environment, and in remediation planning for areas contaminated by radium.

(*http://www-pub.iaea.org/books/IAEABooks/10478/The-Environmental-Behaviour-of-Radium-Revised-Edition*)



"ALMERA Proficiency Test: Determination of Natural and Artificial Radionuclides in Soil and Water", Analytical Quality in Nuclear Applications Series No. 32, presents the results of the ALMERA proficiency test IAEA-TEL-2011-04. IAEA proficiency tests and interlaboratory comparison exercises are organized on a regular basis specifically for the members of the ALMERA network. These exercises are designed to monitor and demonstrate the performance and analytical capabilities of the network members, and to identify gaps and problem areas where further development is needed.

(*http://www-pub.iaea.org/books/IAEABooks/10603/ALMERA-Proficiency-Test-Determination-of-Natural-and-Artificial-Radionuclides-in-Soil-and-Water*)



"A Procedure for the Sequential Determination of Radionuclides in Phosphogypsum. Liquid Scintillation Counting and Alpha Spectrometry for ^{210}Po, ^{210}Pb, ^{226}Ra, Th and U Radioisotopes." Since 2004, the Environment Programme of the IAEA has included activities aimed at the development of a set of procedures for the determination of radionuclides in terrestrial environment samples. For the analyst, tested and validated analytical procedures are extremely important tools for the production of reliable and comparable data. This procedure for sequential determination is a recommended and validated procedure in accordance with ISO guidelines.

(*http://www-pub.iaea.org/books/IAEABooks/10711/A-Procedure-for-the-Sequential-Determination-of-Radionuclides-in-Phosphogypsum-Liquid-Scintillation-Counting-and-Alpha-Spectrometry-for-210Po-210Pb-226Ra-Th-and-U-Radioisotopes*)

Visit of JCAC scientists - aftermath of Fukushima accident

Between 23-26 June 2014, Dr. Yoshihiro Ikeuchi, Executive Director, and Mr. Takeshi Maeyama, Quality Control Group leader, from the Japan Chemical Analysis Centre (JCAC) visited the Environment Laboratories in Monaco to discuss and compare respective analytical methods for the assessment of some radiologically significant isotopes. The scientists also visited the facilities and presented the data they determined on-site after the Fukushima accident. As a follow-up to their visit, JCAC will enroll in the ALMERA network.

JCAC scientists presenting Fukushima data in EL, Monaco. (Photo: L. Liong Wee Kwong/IAEA)

NAEL Retreat 2014

The 2014 NAEL retreat took place mid-April and was a rare opportunity where the four laboratories could gather together to brainstorm, share views and participate in activities that strengthened the team well beyond the work environment.

NAEL team, Monaco, 12-16 May 2014 (Photo: J.L.Teyssie/IAEA)

Monacology 2014

"Monacology", Monegasque Awareness Week for Children on Environment and Sustainable Development, was held between 9-13 June with the support of the Monaco Education, Youth and Sports Department. Through workshops on different issues (environment, radioactivity, waste and recycling, biodiversity, seas and oceans, sustainable mobility, etc.) children learnt how to become

responsible citizens in their surrounding world. The IAEA/NAEL booth was themed on carbon and consisted of 4 workshops presenting carbon's ubiquitous nature and necessity to organic life, its impact on the marine environment as a waste but also the useful aspects of its radioactive form. More than 1200 children aged 5-17 visited the booth.

Staff Spotlight

Hussein Ramadan
(photo: J.L.Teyssie/IAEA)

Mr. Hussein Ramadan graduated as a computer engineer from the University of Nice, France. He has worked in the Engineering and Electronics Support (EES) group since 1996 as the computer equipment and network (inter and intra) supervisor. He coordinates all IT issues that include audio / video / telephone communications and provides very active assistance with help desk support. He is also the Environment Laboratories staff representative and is always eager to help staff as well as newcomers.

Jean Louis Teyssie
(photo: H.Ramadan/IAEA)

Mr. Jean Louis Teyssie studied biochemistry/biology in Montpellier, France and has worked at the RadioEcology Laboratory (REL) since 1981. During his long career, he has acquired substantial knowledge and is very eager to transfer this to interns, trainees and to the general public through simplified, fun and educational workshops.

"I am a craftsman of radioecology who has been very lucky to evolve in a highly intellectual multicultural environment" says Jean Louis.

Interns' Corner

"When I first arrived at the Environment Laboratories I was amazed by the laboratories. The perfect organization as well as the support of the staff allowed me to rapidly integrate into the practical laboratory team. This huge challenge for "unexperienced radiation workers" to deal with isotopes is definitely facilitated by the willingness of the team to transfer their knowledge. EL is one of the few laboratories in the world that allow interns to work in such a specific context. Before being authorized to handle radiotracers, I first had to master the theoretical aspects of radiation safety and protection through lectures, then practise laboratory techniques under the close supervision of experienced staff. One of the most serious problems facing coastal waters is related to Harmful Algal Blooms or HABs, a phenomenon commonly known as "red tides". HABs can cause the entry of toxic substances into the human food chain. At the moment, I am investigating the fate of HAB toxins in fish maintained under various environmental conditions. I am feeding Mediterranean fish with the toxic microalgae *Gambierdiscus* sp. responsible for the "ciguatera fish poisoning" to assess potential synergistic effects with temperature, pH or salinity, and to produce toxin standards through bioaccumulation and biotransformation in fish. In order to quantify toxins in fish tissues, I am using a procedure developed at NOAA (USA) called "Radioligand Receptor Binding Assay", known as RBA. The concept of this methodology is to use radiolabeled toxins that compete with the same molecular site as the natural toxins; consequently, it is possible to detect and quantify toxin levels in the exposed fish. I believe that understanding the effect of environmental factors on toxicity will help to have a better picture of transfer of HABs on fish and the development of the method should facilitate the reduction of the number of poisonings caused by this marine toxin."

Contributed by Isa Luis Gomes, intern.

Integration of interns to practical laboratory teamwork
(Photo: J.L.Teyssie/IAEA)

This edition of Environment Laboratories Newsletter was coordinated by Mr. Laval Liong Wee Kwong, assisted by Mr. David Martini.

Upcoming Events

10-16 Sept 2014	Participation in collection of marine samples	Fukushima, Japan
6-17 Oct 2014	Training Course on the Theory and Practical Application of RESRAD-BIOTA and Other Codes in the RESRAD Family for the Determination of Dose, Risk and Authorized Limits at Radioactively Contaminated Sites	Argonne National Laboratory, United States of America
7-10 Oct 2014	11th Coordination Meeting of the IAEA's Network of Analytical Laboratories for the Measurement of Environmental Radioactivity (ALMERA)	Vienna, Austria
13-17 Oct 2014	Regional Training Course on Socioeconomic Impact of Ocean Acidification and HABs (RAF7012)	NAEL, Monaco
20-21 Oct 2014	2nd Research Coordinated Meeting of the CRP K41012 "Ocean Acidification and the Economic Impact on Fisheries and Coastal Society"	NAEL, Monaco
22-24 Oct 2014	Consultancy Meeting "Aquaculture in a changing world: the barriers to expansion" (K4-CS-49740)	NAEL, Monaco
3-7 Nov 2014	Participation in seawater sampling mission for interlaboratory comparison	Fukushima, Japan
3-7 Nov 2014	1st Consultancy Meeting for the Preparation of an IAEA Technical Report on the Environmental Behaviour of Uranium	Vienna, Austria
3-7 Nov 2014	ALMERA Practical Training Course on Rapid Determination of Radiostrontium in Milk Using Cerenkov and Scintillation Counting; Korea Institute of Nuclear Safety	Korea Institute of Nuclear Safety, Republic of Korea
3-14 Nov 2014	MEDPOL Training Course on Analytical Techniques for the Determination of Trace Elements in Marine Samples	NAEL, Monaco
3-14 Nov 2014	MEDPOL Training Course on the Analysis of Organochlorine Pesticides and Polychlorinated Biphenyls in Environmental Samples	NAEL, Monaco
8-12 Dec 2014	Workshop on Supporting Nuclear and Isotopic Techniques to Assess Climate Change for Sustainable Marine Ecosystem Management	NAEL, Monaco

You & NAEL

Reference Materials (RMs)

NAEL provides reference materials to laboratories world-wide to assist them in the quality of the results they produce by nuclear analytical techniques.

Each of the RM is characterised for analytes belonging to one of the following groups: Radionuclides, Trace Elements and Methyl Mercury, Organic Compounds, Stable Isotopes. IAEA is the world's largest supplier of matrix reference materials characterised for radionuclides, some of the IAEA reference materials characterized for isotope ratios are at the highest metrological level as international measurement standards.

For further information, please contact: EL@iaea.org and visit http://nucleus.iaea.org/rpst/ReferenceProducts/About/index.htm

Interlaboratory Comparisons (ILCs) and Proficiency Tests (PTs)

The implementation of accepted quality assurance practices to analytical chemistry is recognized as a prerequisite to producing data with known metrological qualities. Regardless of the target analyte or sample type, quality assurance and quality control are the cornerstones to analytical data validation and the results from ILCs or PTs are of crucial interest for laboratories as these provide clear information of its measurement capabilities. NAEL organizes more than three IC and PT exercises annually, one each for radionuclide, organic and inorganic contaminants. The inorganic study also includes the determination of methyl mercury.

For further information, please contact: EL@iaea.org and visit http://nucleus.iaea.org/rpst/ReferenceProducts/Proficiency_Tests/index.htm

The ALMERA network

The ALMERA network (Analytical Laboratories for the Measurement of Environmental Radioactivity) is a cooperative effort of analytical laboratories world-wide. Members of the network are nominated by their respective IAEA Member States as those laboratories which would be expected to provide reliable and timely analysis of environmental samples in the event of an accidental or intentional release of radioactivity. NAEL in Seibersdorf and Monaco are additional members of the network and are the central coordinator of the ALMERA network's activities.

NAEL helps the ALMERA network of laboratories to maintain their readiness by coordination activities including organization of meetings, development of standardized methods for sample collection and analysis, and organization of interlaboratory comparison exercises and proficiency tests as a tool for external quality control.

For further information, please contact: almera @iaea.org and visit http://nucleus.iaea.org/rpst/ReferenceProducts/ALMERA/index.htm

Ocean Acidification-International Coordination Centre (OA-ICC)

The OA-ICC news stream (news-oceanacidification-icc.org) provides daily information on ocean acidification (scientific papers, media coverage, jobs and meeting announcements). The OA-ICC data compilation on the biological response to ocean acidification gives easy access to ocean acidification experimental data through a user-friendly data portal *(http://www.iaea.org/ocean-acidification/page.php?page=2203).*

The OA-ICC bibliographic database is regularly updated on Mendelay. The database currently has more than 2000 references and includes citations, abstracts and allocated keywords that can be used for statistical analysis. (*http://www.mendeley.com/groups/4333941/ocean-acidification-oa-icc/)*.

Impressum

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