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Marine Environment News

The newsletter of the IAEA Marine Environment Laboratories, Monaco
Department of Nuclear Sciences and Applications
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Contents

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Director's column

R Fauzi C Mantoura

Dear Colleagues,

Welcome to Issue 2 of the 4th Volume of our Marine Environment Newsletter.

The Marine Environment Laboratories' (MEL) activities have featured prominently in the Agency's General Conference. The Environment Special Event was inaugurated on 19 September by His Serene Highness Prince Albert II of Monaco and the Director General, Dr M ElBaradei. It was attended by distinguished UN guests including Mr Patricio Bernal, Executive Secretary; Intergovernmental Oceanographic Commission (IOC) of UNESCO, and Mr Malcolm Crick (representing Mr Achim Steiner, Executive Director; UNEP) (see Figures 1 & 2). Their full speeches are available on MEL's website *http://www-naweb.iaea.org/naml/news.asp*. Here, I wish to summarize the key issues and extracts from the speeches.

HSH Prince Albert renewed Monaco's legacy in ocean science and its support to MEL, and expressed concern about climate change impacts some of which he had witnessed during his recent Arctic expeditions to Spitzbergen and to the North Pole.

Dr ElBaradei replied that he was "*proud to note that the IAEA participated in this Expedition...*" and added that the *"Laboratories in Monaco were very important in helping scientists to assess the impact of climate change and to understand how atmospheric carbon dioxide was absorbed into the ocean".*

Mr Bernal then acknowledged 35 years of strategic collaboration between IOC, UNEP and the IAEA-MEL, citing marine reference materials for persistent and toxic organic pollutants, and the unique and emergent applications of isotopic techniques in understanding and protecting the marine environment. As to climate change he highlighted forecasts of ocean acidification and the urgent need *"... to conduct experimental research .... to ascertain the consequences of this massive shift of chemical equilibrium in seawater.... That MEL is starting to do just that ... deserves the support of the whole community ...".*

Mr Steiner's speech emphasized UNEP's central Environment role and applauded the Agency's role to promote (1) radiation safety standards to protect the environment, and (2) the application of nuclear and isotopic techniques for monitoring and assessing the environment. He emphasized the importance of

sound science to underpin environmental assessments, and proposed that the Bali Strategic Plan (2005) for Technology Support and Capacity Building as a new platform for collaboration between the IAEA and UNEP.

In conclusion, Mr Werner Burkart (Deputy Director General, Department of Nuclear Sciences and Applications) noted that with regard to the ocean and climate…*"the oceans are known to play a major part, acting as a sink for the carbon dioxide … and helping to regulate the world's climate. The Agency's Marine Environment Laboratories in Monaco contribute to the global knowledge on these phenomena, through its programmes which use nuclear techniques to track ocean currents, … to measure ocean climate coupling and carbon cycling … to date and reconstruct past temperature, circulation and glacial events … necessary data for the complex predictions that we need today. Our ability to use radionuclides as tracers for oceanic processes is to a large extent driven by recent advances in clean sampling and analytical techniques as well as high precision mass spectrometry measurements. These modern techniques have stimulated many recent research programmes on oceanic cycling of trace elements and their isotopes. It is expected that this programme will significantly boost our understanding of oceanic radionuclide behaviour…"*.

On behalf of the IAEA staff, trainees, visitors and fellows at Monaco, I would like to thank HSH Prince Albert II, the Director General and the DDG, and our valued UN partners for their vote of confidence in supporting the new research and technology transfer programmes of the IAEA's Marine Environment Laboratories.

Figure 1: HSH Prince Albert II of Monaco (left) and the IAEA's Director General, Dr. ElBaradei (right).

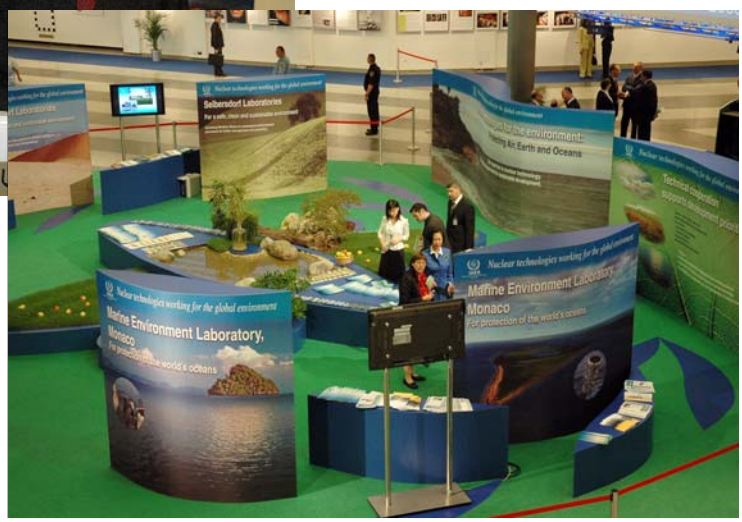

Figure 2: The Environment display at the Agency's General Conference.

Finally, I would like to extend a special welcome to two new Staff Members in Monaco.

Jae Oh, joined MEL in November (see page 3) as our new Section Head for the Marine Environment Studies Laboratory (MESL). His expertise in marine chemistry of contaminants includes persistent organic pollutants, antifoulants, nutrients … and quality assurance programs. He has particular knowledge of Member States needs from the Asia and the Pacific regions. Jae will be leading our new Partnership programmes with UNEP, IOC and our other extrabudgetary initiatives. Jae, you are welcome … which in Korean is 천만에요. !!

James Orr, with his international reputation in ocean climate modelling especially on carbon cycling and ocean acidification, has joined MEL in July (see page 7). He will use marine isotopic databases to validate carbon fluxes and ocean circulation models. He plans to help design new tracer experiments using MEL radio-mesocosms, to investigate effects of ocean acidification. Together with satellite remote sensing specialists, James will also develop marine dispersion models for radionuclides and other land-based contaminants. Welcome to Monaco, Jim.

I hope you enjoy our Newsletter, and remember we appreciate your comments !!

R Fauzi C Mantoura

New MESL Section Head

Jae Ryoung Oh (Figure 3) has recently taken up the position of Laboratory Head, Marine Environmental Studies Laboratory at MEL. Jae was previously employed at the Korea Ocean Research and Development Institute (KORDI), Republic of Korea as the Head of the Marine Environmental Risk Assessment Research Division of the South Sea Institute, KORDI.

He brings with him 25 years of research experience in the field of Environmental Analytical Chemistry and Ecological Risk Assessment. His previous research interests include transport and fate of industrial contaminants and endocrine disruptors in the environment. This includes aspects of intermediate transport, pollution monitoring, degradation processes, human exposure pathways and risk assessment.

Jae has collaborated with the Agency in the UNDP/GEF-sponsored project on the Yellow Sea Large Marine Ecosystem and in the Partnership in Environmental Management for Seas of East Asia (PEMSEA), an GEF/UNDP/IMO sponsored project, and was the National Project Coordinator for the United Nations University Project from 1999 to 2006. He has a track record of running a Marine Environmental Training programme for the Asia-Pacific Economic Cooperation (APEC), the Korea International Cooperation Agency (KOICA) and PEMSEA for 12 years and in establishing a center for that purpose at KORDI called the **A**PEC Marine Environmental Training & Education Center (AMETEC). Jae must leave several national committees but remains on international committees, programmes and action plans that involve marine coastal pollution and risk assessment.

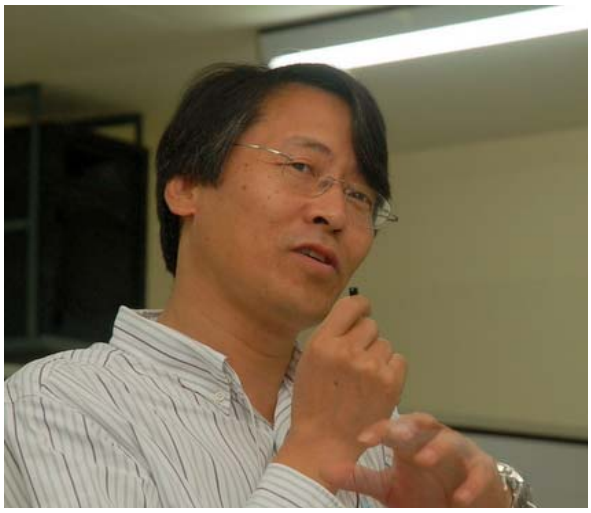

Figure 3: Jae Oh, new section head MESL

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Workshop on measurements of short-lived radium isotopes using RaDeCC delayed coincidence system

MEL hosted a "Workshop on measurements of short-lived radium isotopes using the RaDeCC delayed coincidence system" from 2-10 October 2006. The workshop which was chaired by Willard Moore (University of South Carolina, USA) brought together 27 scientists from eight different countries to discuss the application of the RaDeCC delayed coincidence counting system as well as the uses and constraints of radium isotopes as tracers in coastal environmental studies.

Short-lived radium isotopes (^{223}Ra, ^{224}Ra) have been shown to provide valuable information on estuarine/ocean mixing, submarine groundwater discharge, and water/soil interactions (Figure 4).

The ability to use these isotopes as tracers is largely driven by the RaDeCC delayed coincidence counting system. Although this system has become the state-of-the-art technique, there are still contentious open questions on the appropriate sampling and measurement procedures, calibration of the system as well as on the interpretation and modelling of the results.

The workshop discussed three main topics:

(I) The RaDeCC system: Radium sampling, measurements, verification techniques and suggested improvements.

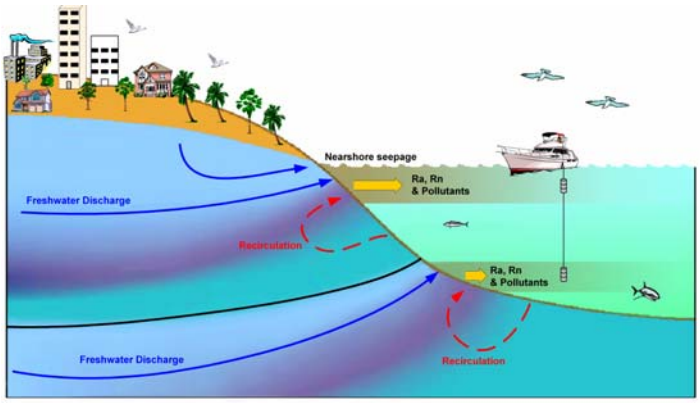

Figure 4: Waters circulating through coastal sediments and flowing into the coastal waters are enriched in radium isotopes. Thus, radium isotopes can be used as tracers for groundwater discharge and can help to understand its impact on the coastal environment.

(II) Interpretation and modeling of results: What does radium tell us? What are the problems and future applications?
(III) Other applications of the RaDeCC system and future developments.

Session (I) summarized the current status of sampling and measurement techniques with special emphasis on the appropriate data corrections. One major outcome was that participants agreed on the necessity to conduct intercomparison studies for short-lived radium isotopes. It was recommended that this exercise should be ideally organized by the Marine Environment Laboratories in Monaco and should include as many laboratories applying the RaDeCC system as possible.

In Session (II) an overview of the models was presented which, based on the distribution of radium isotopes, are used to estimate coastal mixing and benthic exchange rates. This Session was complimented by presentations of participants showing the potential of radium isotopes as tracers for coastal process studies.

The use of the RaDeCC system for measurements of ^{227}Ac and ^{228}Th as well as the uncertainties associated with the delayed coincidence counting was discussed during Session (III).

A report summarizing the major outcomes of the workshop will be prepared and an article presenting an overview will be published in EOS. It is intended to publish the talks presented during the workshop in a special issue of *Marine Chemistry* (guest editors: Matt Charette, Woods Hole Oceanographic Institution, and Jan Scholten, IAEA Marine Environment Laboratories). A further workshop is planned for 2008 (Woods Hole, USA or Venice, Italy).

Figure 5: Participants in the RaDeCC Workshop at Monaco.

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Study of submarine groundwater discharges near Monaco (Cabbé)

Submarine groundwater discharge (SGD), i.e. any subsurface flow of water from the coastline to the open ocean is now recognized to be a significant source of input of material from the continent to the sea. As SGD may be associated with the flux of nutrients and pollutants, it is potentially important to the coastal environment. For instance, the occurrences of harmful algae plumes as well as hypoxia (low oxygen concentrations in coastal waters) have been associated with SGD. On the other hand, freshwater submarine groundwater discharges may be an important freshwater source for islands and arid regions.

The Mediterranean Sea and especially the European coasts are well known for SGD. For example, on the coast between Nice and the Italian border, freshwater SGD estimates based on hydrological water mass balances arrived at a discharge rate of up to 600 L/sec. Such water mass balances are, however, associated with considerable uncertainties and in most cases do not agree well with direct measurements of SDG discharge rates based on e.g. radioisotopes.

The Radiometrics Laboratory conducted a SGD study near Monaco (Cabbé). At the source of the groundwater discharge at the beach of Cabbé, measurements of several parameters (radon, radium isotopes, δ^{18}O, δ^{2}H, $^{87/86}$Sr, uranium isotopes, nutrients, total dissolved inorganic carbon, salinity, and tidal range) were conducted over about 24 hours (Figure 6).

These measurements will allow a quantification of

the SGD and will further give information on the importance of SGD for the local coastal environment.

This enterprise was conducted in cooperation with the Alfred-Wegener Institut, Bremerhaven (Germany), the Centre for Environmental Research, Leipzig (Germany) and the Service de la Marine, Monaco.

Figure 6: Submarine groundwater discharge at Cabbé, near Monaco. The bulge indicates the upwelling of groundwater.

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TC Project GUA/7/002 "Strengthening the National Environmental Monitoring System in the Marine Ecosystem": Training course in Puerto Quetzal, Guatemala

The objective of TC Project "Strengthening the National Environmental Monitoring System in the Marine Ecosystem" (GUA/7/002) is to improve the capacity for, and expertise in, the management of marine environmental risks in Guatemala. The national counterpart of this project is the Guatemalan Government's "Empresa Portuaria Quetzal (Puerto Quetzal)" which is one of the most important harbours on the Central American Pacific coast. As part of this project, an expert mission was organized in Puerto Quetzal from 14 to 25 August 2006 to install a new low-energy gamma-spectrometer, purchased for this purpose by the IAEA, and to provide specific training in the theoretical background and practical applications of isotopic and nuclear applications for integrated management of the coastal zone and harbour environment.

Installation of the complete gamma-spectrometer and its one-ton lead shielding was successfully carried out and the new system is now fully operational at the OBIMAR Department of Puerto Quetzal (see Figure 7).

Figure 7: OBIMAR's new gamma spectrometer acquired under GUA/7/002.

Both the theoretical lectures and practical field sessions met with great success and were attended by 23 persons from several national institutions (Puerto Quetzal, the Ministry of Energy and Mines, San Carlos University and the Guatemalan Navy).

Figure 8: Puerto Quezal (coal terminal)

Figure 9: Puerto Quezal (power plant)

Lectures encompassed a broad range of fields dealing with e.g., sampling strategies and methodologies, radioanalytical techniques, radiation protection and safety, the use of radiotracers for sediment dating and flux assessment, integrated coastal management, harbour ecology and ecotoxicology, environmental management systems and harbour ecosystem management.

Field sessions were held at sea in Puerto Quetzal (Figures 8 & 9) and the surrounding area. These sessions focused on sediment sampling techniques using a Van Veen grab and sediment multi-corer and sample preparation for ecotoxicological assessment and sediment dating using gamma-spectrometry.

The outcomes of TC Project GUA/7/002 are perfectly in line with the approach currently developed by Puerto Quetzal to build an "Environmental Management System" that could lead to an ISO-14001 certification. Such an achievement would represent a major step towards good management practice and environmental awareness. Hence, the expert mission has clearly attracted the attention of local authorities as demonstrated during the closing session of the training course which was attended by the Minister of Energy and Mines of Guatemala, the General Manager of Puerto Quetzal and a dozen journalists.

The hospitality and support provided by the Puerto Quetzal Authorities and staff and the active implication of the participants in the training course led to its success in meeting its objectives of transfer of knowledge and promotion of interaction between national institutions. This transfer of knowledge is expected to provide both theoretical and practical backgrounds that will help Guatemalan institutions to substantially improve their capacity for the management of their marine coastal zone. Guatemala has excellent scientific potential and Puerto Quetzal is well placed to promote synergy and technical cooperation among Guatemalan institutions throughout the country owing to both its status as a leading government institution and its capacity and expertise (including the scientific equipment and technical expertise acquired under GUA/7/002).

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The Radiometrics Laboratory welcomes new staff member, James Orr

James Orr (Figure 10) came to MEL in July 2006. He earned his Ph.D. in chemical oceanography from Texas A&M University in 1988, while using radon and radium isotopes to track the evolution of Gulf Stream eddies, which transport heat and chemicals across this major ocean current that plays a key role in climate and ocean carbon uptake. Subsequently, he worked for 4 years as a research scientist at Princeton University, where he designed geochemical applications for numerical ocean circulation models in order to quantify recent and future changes in ocean CO_2 uptake. During the last 14 years, he worked first as research scientist then as research director at the *Laboratoire des Sciences du Climat et de l'Environnement* of the French *Commissariat à l'Energie Atomique* (LSCE/CEA) part of the Institute Pierre Simon Laplace (IPSL) in Paris. During the last decade, he has led the Ocean Carbon-Cycle Model Intercomparison Project (OCMIP), an

effort of the International Geosphere-Biosphere Program (IGBP) to identify the major deficiencies, understand differences, and accelerate development of three-dimensional, global ocean, carbon-cycle models (Figure 11). Within this framework, he also coordinated two related EU projects that funded European participants and provided structure to the international effort. His current research activities focus on the variability in the exchange of CO_2 between the atmosphere and ocean, the transport of carbon and radionuclides within the ocean, and the impact of increasing atmospheric CO_2 concentrations on ocean chemistry and biology (ocean acidification). While at MEL, James' expertise will contribute to MEL's work on ocean climate coupling and carbon cycling (Subprogramme H.3) by combining his expertise in ocean modeling with MEL's long established use of radionuclides as tracers of marine processes.

Figure 10: James Orr, Ocean Climate Modeller.

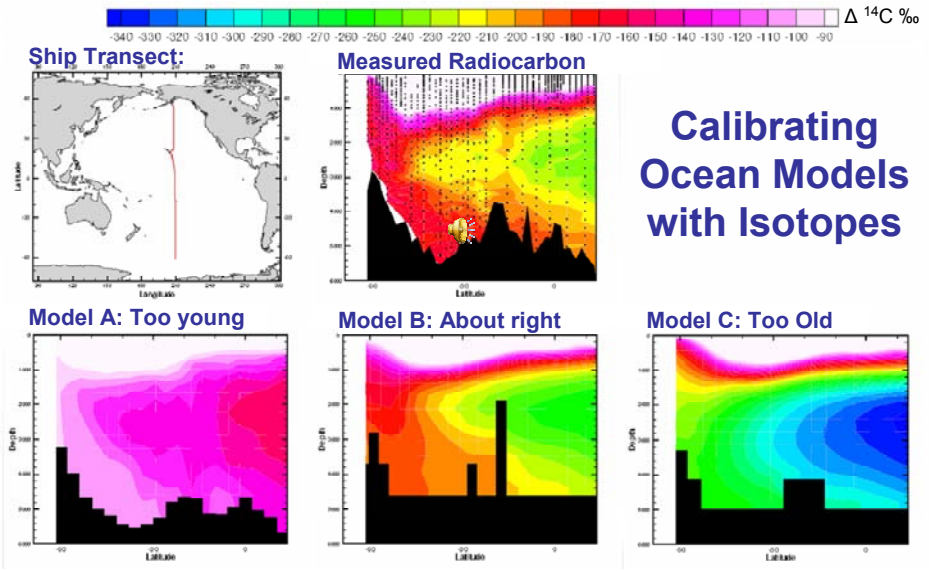

Figure 11: Comparison of observed vs. modelled natural radiocarbon along the World Ocean Circulation Experiment (WOCE) ship track P16 in the central Pacific. The top left slide shows this north-to-south sampling line down the middle of the Pacific Ocean. Just to the right, is the corresponding latitude-depth section of radiocarbon data from the Antarctic to the Alaska. In the bottom row are three ocean circulation model simulations: model A is too young, model B is about right, and model C is too old relative to the Pacific radiocarbon data.

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IAEA-MEL cruise to the Barents Sea (80°N)

Most of the man-made radioactivity observed in the Arctic Ocean originates from atmospheric fall-out and/or advection water masses which spread the radionuclides released from power plants and dumped nuclear wastes. For the protection of the Arctic environment it is of interest to understand the sources and sinks of radioactive pollutants, their transport as well as their distribution processes. In this respect the Barents Sea is a key area, because it is a transit region of Atlantic water masses which enter the Arctic Ocean, and dump sites of nuclear fuels are also found in this region.

The hydrography of the Barents Sea is characterised by the Norwegian Coastal Current and the Atlantic Water Masses branch in the Barents Sea. One flow is

Figure 12: MEL staff on board the Walther Herwig III.

along the Bear Islands and the North Cape, the other is located west of Svalbard flowing towards the Arctic. In the area off Hopen Islands, Arctic Ocean Surface Waters advect towards the west. In the Storfjord and sometimes near the Central Bank, deep water mass formation occurs which influences the deep waters west of Svalbard.

Along the flow path of these water masses IAEA-MEL conducted water sampling during the Walter Herwig III Cruise No. 289 (14.06-10.07.06) (see Figure 12). This cruise was organized jointly by the Bundesforschungsanstalt für Fischerei, Institute für Fischereiökologie (IFO) and the Institute für Fischreitechnik und Fischqualität (IFF), Hamburg. Large volume water sampling at 10 stations between 70°9'N and 80°0'N was conducted for the determination of plutonium isotopes, ^{3}H, ^{14}C, ^{99}Tc, ^{129}I and ^{241}Am. Further, sediment cores were obtained by using a Gemini twin corer. The measurements of the samples will allow evaluating the spreading of anthropogenic radionuclides in this region, and by comparison with previous studies, how the concentrations of these radionuclides have changed over time.

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Nutrient analyses and quality assurance/quality control: training course in the Philippines

AMETEC (**A**PEC **M**arine **E**nvironmental **T**raining & **E**ducation **C**enter) situated at the scenic Geoje island of the Republic of Korea has recently (Oct.14-28, 2006) completed a training course on "Nutrient Analysis and Quality Assurance/Quality Control: Enhancing reliability and comparability of data for the Integrated Environmental Monitoring program" in University of Philippines at Diliman, Quezon, Philippines. This programme was co-sponsored by GEF/UNDP/IMO Regional Programme on Partnership in Environmental Management for Seas of East Asia (PEMSEA); National Science Research Institute (NSRI) and Marine Science Institute (MSI), University of the Philippines in Diliman, Philippines. For the first time in AMETEC's history such a programme was conducted outside their campus in the Republic of Korea. Twenty participants, mostly from the developing nations of the Asia Pacific Economic Cooperation (APEC) region joined the course.

QA/QC tools were effectively implemented in solving problems/issues that were encountered: **program design** – location, time of collection (tidal variation), and number of samples that represent the water body, etc.; **sampling** – contamination issues, appropriate sampling techniques, containers, sample handling, sample identification and subsequent processing, sample storage; **analysis** – values of quality control samples (blanks, duplicates, spike, IHRMs (in house reference materials)), control charts, acceptance criteria; **method validation** – repeatability, reproducibility, method detection limits, report limits, accuracy and uncertainty. These were especially useful in establishing a new laboratory environment in a developing nation. While utilizing the basic laboratory facilities available at NSRI and MSI in the Philippines, additional laboratory supplies and some equipment were shipped from the Republic of Korea and Australia.

To minimize issues relating to language, the trainers had to prepare well ahead and develop templates for each day's activities. Trainers identified problems/issues for each particular participant or group and engaged constructively during the training to ensure everyone had a thorough understanding of what was required. Assistance provided at the right time avoided issues that could have unfortunate negative results in terms of data quality, knowledge and participant enthusiasm. Thus, for all parameters, at least one of the four groups performed extremely well. Significant improvement in participants' capabilities was demonstrated over the period of the workshop e.g. use of pipettes and correlation coefficients approaching 1.000. In essence, the training realistically reflected individual participant needs and circumstances and therefore key issues/problems were identified and addressed adequately.

AMETEC through grants from the Korean Ministry of Maritime Affairs and Fisheries (MOMAF) supported the workshop, participants travel and accommodation and other expenses. APEC supported the expenses of two Australian and two Korean experts. PEMSEA took care of travel arrangement and overall management of the workshop in Philippines. NSRI and MSI gave their research facilities and staff for the benefit of the workshop. The participants and experts had a chance to visit the Spanish artifacts in Manila and the volcanic Lake Taal nearby during the week-ends of the two-weeks long workshop in the Philippines.

Contributed by Narayanan Kannan, South Sea Institute of KORDI and Jae Oh of MEL
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International experts review new Coordinated Research Project on seafood safety

In September the Radioecology Laboratory hosted a three-day meeting of a group of international experts on contaminants in seafoods to review a new Coordinated Research Project (CRP) related to the management of contaminants in seafoods.

This CRP is joint IAEA/FAO initiative that will bring together research laboratories to apply radioassay and radiotracer techniques to evaluate and generate information on the biokinetics and food-chain transfer of metals and toxins in marine organisms, especially those that are valued as seafoods.

It will endeavour to facilitate the consideration of the CRP results within international bodies concerned with the standardization of contaminant levels in seafoods, such as Codex Almentarius, and expert bodies such as the Joint Expert Committee on Food Additives (JECFA).

The broad objective of the CRP will be to generate data on priority contaminants in seafood organisms with regard to human consumption, sale and export, and to assess the application and relevance of these experimentally-derived and field-based data to the management of these contaminants in seafoods.

The experts recommended a focus on the following contaminants:

- harmful algal bloom paralytic shellfish poisoning toxin (PSP) and ciguatoxin
- Cadmium in oysters, scallops and cephalopods (see Figure 13)
- where there is an urgent need for further scientific information and nuclear applications can play a leading role.

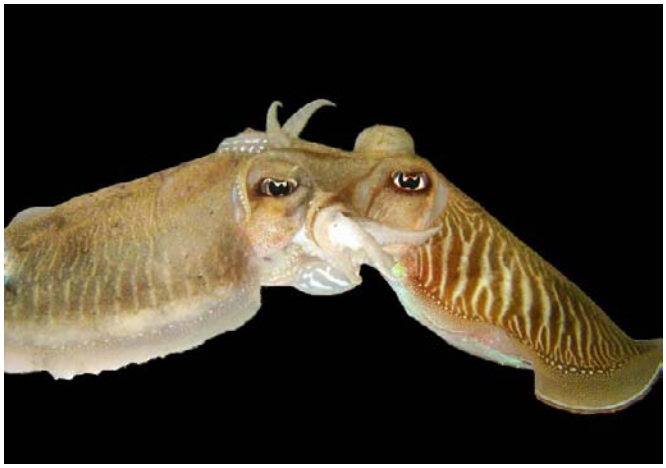

Figure 13: Cephalopod Sepia officinalis *(cuttlefish).*

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Students corner

Does our washing machine affect marine biota?

by Florent Renaud (PhD student)

Surfactants (abbreviation of **Surf**ace **act**ive **a**g**ents)** have been used for a long time in detergents and cleaning products to improve stain removal. Nowadays soap-based detergents have been replaced by a variety of synthetic surfactants. In compliance with the regulatory requirements in force in the major markets around the world, these surfactants have to be rapidly biodegradable. Linear alkylbenzene sulfonate (LAS) is one of the surfactants used in household detergents. Its annual global production is over 3 million tonnes.

Most LAS is used in cleaning products and is disposed of with the municipal wastewater. In Europe, USA, or Japan, the major part enters the sewage treatment plants and is efficiently removed by biodegradation and by sorption on sludge. As for any substance used in household products, a fraction ends up in rivers and in coastal areas. Usually, LAS concentrations in coastal marine waters are below 10 $\mu g\ l^{-1}$. In places where mandatory wastewater treatment is not implemented, LAS concentrations can reach up to 1-1.5 $mg\ l^{-1}$ in locations close to direct, untreated wastewater discharges. LAS being readily degraded, its concentrations rapidly drop below 1 $\mu g\ l^{-1}$ within a few miles, even if directly discharged down the drain. These concentrations are below the marine LAS Predicted No Effect Concentration (PNEC) of 31 $\mu g\ l^{-1}$. Whereas risk assessment studies are well documented in freshwater ecosystems, available information on toxicity tests and bioaccumulation studies in marine

organisms is quite limited. More data are thus needed in order to assess the fate of LAS released into coastal marine areas (Figure 14).

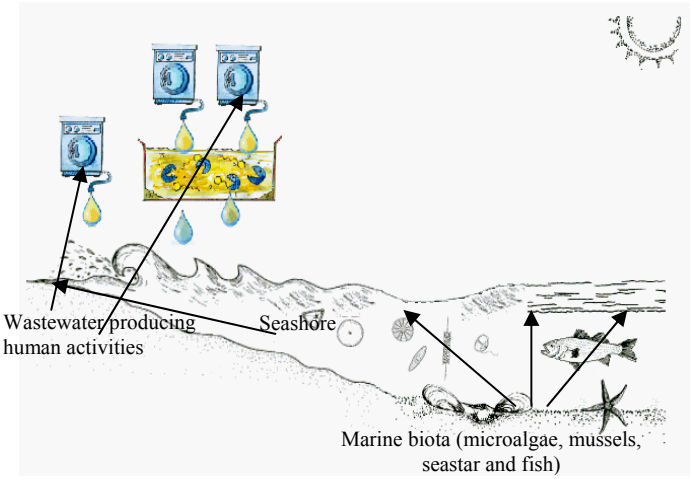

Figure 14: Discharge of LAS-containing treated and untreated wastewater in the coastal marine environment.

As a PhD student specialising in marine sciences, I am concerned about the protection of marine ecosystems and fascinated by how life can adapt to environmental changes due to anthropogenic activities. This interest comes from my childhood, when I was brought from one place to another, due to my father's job. Thanks to my parents, I had the opportunity to discover many coastal regions, some of them being still wild, and I lived part of my first years with a diving mask on my face. Several years later, I went to university and, not that surprisingly, decided to study marine biology and eventually obtained my Master degree in Oceanography in 2004.

A few months later, I applied for, and obtained, a PhD scholarship focusing on the bioaccumulation and fate of LAS in the marine coastal environment at MEL, Monaco in collaboration with La Rochelle University, France and the European Technical Center of the Procter & Gamble Company, Belgium. The interest and originality of this project is to apply radio-ecological techniques to trace the sorption, uptake, and loss of a xenobiotic by marine organisms in a risk assessment context. Thanks to the state-of-the-art facilities and the location of the Radioecology Laboratory, I have been able to perform a series of experiments on different marine biota exposed to a ^{14}C-radiolabelled homologue of LAS. So far, our results indicate that LAS can sorb on phytoplankton cells and be taken up by mussel soft tissues when exposed to waterborne LAS. Both groups of organisms rapidly depurate LAS. Whereas phytoplankton mainly depurate through desorption, mussels appear to metabolise LAS, leading predominantly to the formation of more polar, less toxic compounds (Sulfophenyl Carboxylates, SPCs) and, secondly, to another class of less polar metabolites. The production of the latter metabolites has still to be verified and their ecological significance in marine food chains to be assessed. This work has established the ground to further characterize a Mediterranean food chain with primary producers (algae) being filtered by primary consumers (mussels), themselves being eaten by predators (e.g., seastars or seabreams).

On-going work is assessing the transfer of carbon from xenobiotic origin, measuring dietary and waterborne uptake and comparing elimination kinetics of LAS along a selected marine trophic chain model.

Universal Children's Day

In 1998, the Worldwide Federation of Young Leaders and Entrepreneurs sought to put forward a motion to the UNO making each 20th of November the Universal Children's Day. To support this motion, Monaco's "Jeune Chambre Economique" devised various projects including the "No Finish Line" (NFL) event, the 1st edition of which took place in November 1999. The principle behind NFL is simple: running or walking on a circuit that is open 24 hours per day for 8 days, non-stop. For every kilometre associations pay €1 to projects for children. This year this event saw more than 3000 participants who ran 84080 km. The IAEA-MEL team (see Figure 15) supported this event with 418 km.

Figure 15: MEL participants in the No Finish Line event

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Brief news and announcements

Co-ordinated Research Projects (CRPs), meetings, cruises and training courses

A Consultants Meeting under the CRP "Benchmarking calibration for low-level gamma spectrometric measurements of environmental samples" was held by RML on 4 and 5 December 2006.

Upcoming (Feb. 6-20, 2007) METEOR expedition to the Black Sea to study the influence of cold seeps on the geochemical budget of the Black Sea. Sea water samples will be collected for measurements of radium isotopes, caesium-137 and lead-210.

Upcoming MESL 2007 training courses in The Gulf, each for a two-week duration on the measurement of petroleum hydrocarbons and POPs. They will take place in Bahrain, Islamic Republic of Iran, Kuwait, Qatar, Saudi Arabia, the Sultanate of Oman and the United Arab Emirates. MESL will also organize a training course organo-metallic compounds in Kuwait. Two of the regular MESL MEDPOL training courses will be held in MEL, one on organic contaminants and on trace metals.

The Radiometrics Laboratory will be organizing the 2nd Workshop of the SHOTS (Southern Hemisphere Ocean Tracer Studies) project in Monaco, from 4 to 8 June 2007.

This edition of Marine Environment News was edited by Carol Gustavsen and Jan Scholten.

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