

# OA-ICC HIGHLIGHTS

*The latest news and updates from the OA-ICC and its partners*

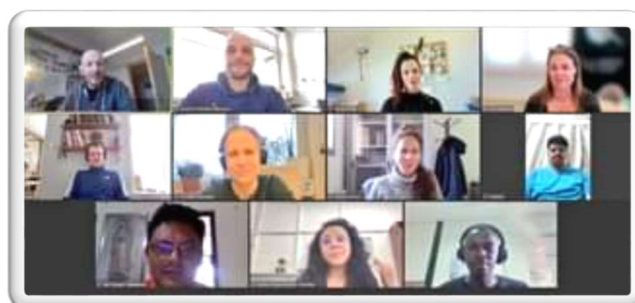
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### *Technical Meeting: Meta-Analyses Using the Ocean Acidification International Coordination Centre (OA-ICC) Bibliographic Database and Other Data Resources .....*

Over the course of its existence, the OA-ICC has enriched the ocean acidification community (and beyond) with a number of unique resources aiming to support and enhance research, knowledge building and dissemination, as well as foster collaboration and consolidate best practices. Its bibliographic database (counting, at present, more than 10,000 references) and data compilation on the biological response to ocean acidification (currently containing over 1,300 data sets from more than 1,100 scientific papers) serve as pertinent examples of OA-ICC's contribution to the continued growth of the field.

To encourage and optimize the use of these resources, the OA-ICC organized a week-long meeting centred around syntheses and meta-analyses, emphasising the importance of using existing knowledge to test new hypotheses, reveal new and promising research avenues, and support research teams in developing countries with limited laboratory infrastructure and



*Photo courtesy of S. Dupont, OA-ICC*

constrained field activities. Held online on 13-17 February 2023, the training brought together 10 early-career scientists representing nine IAEA Member States (Belize, Chile, Croatia, Iceland, India, Mozambique, New Zealand, Oman, Sweden). Through lectures and practical exercises led by Iris Hendriks (IMEDEA, Mediterranean Institute for Advanced Studies, Mallorca, Spain), Abed El Rahman Hassoun (GEOMAR Helmholtz Centre for Ocean Research, Kiel, Germany), Fred Gazeau (LOV, Laboratoire d'Océanographie de Villefranche, France) and Sam Dupont (IAEA/OA-ICC), participants learnt about synthesis and meta-analysis methodologies using the OA-ICC-curated resources, how to formulate new



research questions and test new scientific hypothesis in their specific areas of interest, while exchanging ideas and practices with peers.

Participants had the opportunity to start their individual research projects, significantly improve their data extraction, analysis and scientific writing skills, while benefiting from consistent guidance provided by established experts in the field through a one-to-one mentoring program. The expected end-result is the successful completion of the

projects translated into published meta-analysis articles addressing specific ocean acidification aspects.

A very important outcome of the training course was the increased networking among ocean acidification researchers, including through the means of international collaboration networks such as the Global Ocean Acidification Observing Network ([GOA-ON](#)).

### **Consultancy Meeting of the SCOR-COBS Working Group .....**

Among its diverse activities in science, the OA-ICC has been supporting international efforts to develop a standardized methodology for ocean acidification research with the aim of ensuring a high quality and comparability of results. The production of research guidelines and protocols, as well as the establishment and dissemination of best practices across the OA science community has since long become a tradition of collaborative endeavours connecting the OA-ICC and the Scientific Committee on Oceanic Research (SCOR).

On 12-14 April 2023, the OA-ICC hosted a consultancy meeting of the Changing Ocean Biological Systems ([COBS](#)) project. COBS has evolved from the SCOR's Working Group 149 tackling biota's response to global ocean changes. Since its inception, COBS has primarily focused upon multiple stressors and the promotion of best practices for resolving the combined effects of multiple environmental factors on individual organisms, communities and ecosystems.



*Photo courtesy of S. Dupont, OA-ICC*

Recently gathered on the premises of the IAEA Marine Environment Laboratories in Monaco, this interdisciplinary group of international experts (Australia, Chile, France, Germany, India, Ireland, Luxembourg, Sweden, UK, USA) addressed a number of priority areas, including: the enhancement of open-access teaching and learning resources, for both educators and researchers, in multiple-driver research; the alignment and harmonisation of experimental, observation and modeling protocols, with the purpose of allowing for valid inter-comparison exercises; and the linkages with broader societal challenges such as food security and human health, within the wider



scope of the UN Decade of Ocean Science for Sustainable Development.

Active discussions allowed for an inventory of current multiple-stressors research efforts, while pointing out the main challenges faced by the science community and the need for enhanced synergies across themes and regions. In this context, the outline of a “multi-stressor map” was discussed as an additional tool to catalogue relevant past and present research around the world.

As another result of the meeting, participants laid the grounds for new strategies to diversify their activities and increase their visibility on an international scale for the purpose of enlarging the size and expertise of COBS and advance its work through sustainable financing. Moreover, the group defined the framework of a dedicated global forum that would expand outreach via a number of popular science tools and outlets.

### *Technical Meeting on Ocean Acidification for Scientists from the Mediterranean Region .....*

As part of its science-supporting activities, the OA-ICC has been closely cooperating with the Global Ocean Acidification Observing Network (GOA-ON) since its launch in 2013. This international collaboration network brings together scientists across regions and continents in an effort to improve understanding of global ocean acidification conditions and ecosystem responses to ocean changes, as well as to effectively collect, analyse and exchange data for optimal modelling exercises.

GOA-ON has encouraged and amply supported initiatives to establish regional hubs and develop communities of good practices based on geographic, chemical, physical and biological affinities, thus facilitating inter-comparability of studies and foster the search for regional adaptation and mitigation strategies.

A first in-person technical meeting of the GOA-ON Mediterranean Ocean Acidification Hub (OA Med-Hub) Steering Committee was held on



*Photo courtesy of A. E. R. Hassoun, GEOMAR*

18-20 April 2023 in Mersin, Turkey, in partnership with IAEA’s OA-ICC. An experienced and motivated group of researchers representing nine IAEA Member States (Egypt, France, Greece, Italy, Lebanon, Morocco, Slovenia, Spain, Turkey). It was convened on the premises of the Institute of Marine Science (METU-IMS) of the Middle East Technical University to discuss the status of ocean

acidification research in the Mediterranean region with its challenges and prospects beyond 2023, to enhance joint knowledge management and dissemination, and to explore opportunities for new effective projects and collaborations.

The meeting was structured around both theoretical and practical, hands-on activities seeking to consolidate the community of best practices across the region and to plan for future robust capacity building activities for early-career scientists entering the field of ocean acidification. Furthermore, the group worked on the tailoring of targeted communication on physical, biological and

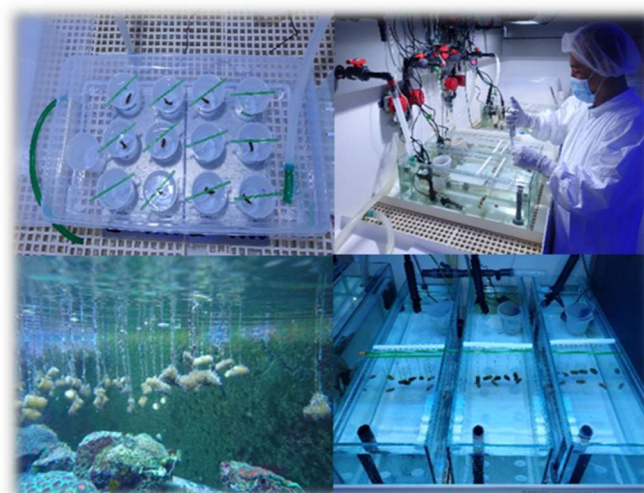
social impacts of ocean acidification for diverse audiences, from policy makers to media and the general public.

GOA-ON's OA Med-Hub currently counts more than 100 members from nine countries in the Mediterranean region (Algeria, Egypt, France, Greece, Italy, Lebanon, Morocco, Spain, Turkey) and continues to gradually expand, aiming to consolidate a shared vision and approach, strengthen coordination and collaboration, and foster inclusion and diversity in the field of ocean acidification research.

### *Under the lens: Nuclear techniques in the study of ocean acidification .....*

Isotopes are “species” of atoms, the tiniest units of matter able to preserve all the chemical properties of elements found in Mendeleev’s periodic table. Also called “nuclides”, isotopes of one chemical element have identical numbers of protons and electrons, but different number of neutrons in their nuclei, which results in distinct physical properties. The term has its origins in the Greek “isos” (“equal”) and “topos” (“place”), suggesting that distinct isotopes of the same element occupy the same place in the periodic table.

Isotopic techniques represent a robust instrument largely used in ocean acidification research over the past decades. Nuclear techniques traditionally implemented at the IAEA Marine Environment Laboratories (NAML) in Monaco measure the number and proportion of isotopes in various types of matter, seeking to trace their history and map past and present processes and interactions in organisms and ecosystems. Corals, for instance,



*Photos courtesy of F. Oberhaensli, REL*

assimilate specific chemical compounds in the process of skeleton formation. The abundance of two naturally occurring boron isotopes, B-10 and B-11, is modulated by the level of seawater acidity. This allows for reconstruction of historical ocean pH based on the presence and quantum of these isotopes in coral skeletons formed over the course of millennia.





The measurement of calcium and carbon isotopes are nuclear techniques used in research conducted by NAML's Radioecology Section (REL), in cooperation with the OA-ICC, for the past 10 years. A range of biological processes in marine organisms, affecting ecosystems and food chains, can be studied using Ca-45 (e.g., calcification in molluscs and corals) and C-14 (e.g., phytoplankton growth).

Coral calcification (i.e., the rate at which corals grow their skeletons) has been systematically measured by REL scientists using the Ca-45 isotope, with the purpose of estimating the overall health of the ecosystems they host and their resilience to various stressors and overarching ocean changes. One of the advantages of this method is its high

sensitivity that enables researchers to assess short-term variations in calcification rates and to determine the health of these ecosystems, as well as their response to major environmental changes such as ocean warming and acidification.

Other aspects of the biological response of marine organisms to changing seawater chemistry, conducted by the REL research team at the IAEA Marine Environment Laboratories (NAML) in Monaco, include photosynthesis, physiology (e.g., overall metabolism, lipid and carbohydrate content regulation), uptake of toxicants (e.g., microplastics), reproduction, feeding and behaviour, among others.

#### Upcoming events:

- ❖ In-person meeting of the Global Ocean Acidification Observing Network (GOA-ON) Executive Council, 10-11 June 2023, Palma de Mallorca, Spain
- ❖ Consultancy Meeting: Designing Climate Adaptation Pathways for Atoll Islands, Part 2, 13-15 June 2023, IAEA Marine Environment Laboratories, Monaco
- ❖ Ocean Acidification 2.0 – From Chemistry to Society, 7 June 2023, in the framework of ASLO Aquatic Sciences Meeting 2023, Palma de Mallorca, Spain
- ❖ Workshop on Ocean Change and Blue Carbon, 28 August – 8 September 2023, IAEA Marine Environment Laboratories, Monaco
- ❖ Basic Training Course on Ocean Acidification, 17-23 September 2023, Monrovia, Liberia

#### OA-ICC online resources:

- **OA-ICC News Stream** – recent publications, media coverage, events, jobs etc.
- **Twitter page** – tweets of the latest news stream posts, shared daily
- **OA-ICC website** – relevant information and resources for different audiences / languages
- **OA-ICC bibliographic database** – over 10,000 references with citations, abstracts, and keywords
- **OA-ICC data compilation and portal** – on the biological response to ocean acidification: access to experimental data from more than 1,100 scientific papers on a user-friendly portal

*The IAEA OA-ICC promotes global collaboration and activities to advance ocean acidification science, capacity building, and communication*

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