



OA observing news

issue 2, April 2015

Newsletter of the Global Ocean Acidification Observing Network (GOA-ON)

This e-newsletter is an effort by the GOA-ON Executive Council to keep the community engaged and informed about all the various related activities that are happening around the world. We intend to produce it quarterly. If you have any upcoming activities or any comments or suggestions of items that you would like to see in this newsletter please email Erica Ombres at erica.h.ombres@noaa.gov.

Meet Executive Council member Sam Dupont: “By training, I am a botanist and my first research was on flowering in tomato. Since then, I kept changing direction. My research history includes some work in different biology disciplines (Evo-devo, evolution, -omics, ecology, regeneration, stem cells, taxonomy, etc.) as well as psychiatry or education science. This diversity of research interest was an opportunity to work with researchers in many disciplines and be a constant learner.

When it was time to build my laboratory at one of the two marine stations of the University of Gothenburg in Sweden (Sven Lovén Centre for Marine Sciences – Kristineberg), I decided to focus my research on a new emerging threat: ocean acidification. *Change* is the central part of my work as I am trying to answer a complex question: How physiology, ecology and evolution work together to allow marine organisms to respond to an ever-changing world. I decided to focus on marine invertebrates and larval stages.

Focusing on ocean acidification, I also quickly realized that it was not enough to publish scientific papers anymore. My science could somewhat contribute to society. I had to move out of my comfort zone to communicate. I had to learn how to present my work to kids, citizens, policy makers, economists and whoever is willing to listen. The scientist was slowly moving toward a communicator and sometime an activist.

All this prepared me for GOA-ON. I joined the initiative from the start and joined the Executive Council in 2014. My contribution is to include some biological thinking at all levels from the design of the monitoring initiative (what is the relevant spatio-temporal scale?) to bridging chemistry with biological impacts. We still have a lot of challenges ahead of us but GOA-ON is a needed step toward solutions.” --Sam



If I had to define myself in one word, it would be *change*. If you don't change, you don't grow.
“The only thing constantly changing is change and it comes equipped with a curse” (Lou Reed, 2003)

Future issues of the OA Observing news will provide the opportunity for other GOA-ON Executive Council members to provide introductory remarks. EC members are Richard Bellerby, Fei Chai*, Chen-Tun Arthur Chen, Minhan Dai*, Sam Dupont, Dick Feely, Albert Fisher, Libby Jewett (co-chair), Kitack Lee, Jeremy Mathis, Pedro Monteiro, Jan Newton, David Osborn, Benjamin Pfeil, Maciej Telszewski, Bronte Tilbrook, Luis Valdez and Phil Williamson (co-chair).

*Newly appointed in February 2015

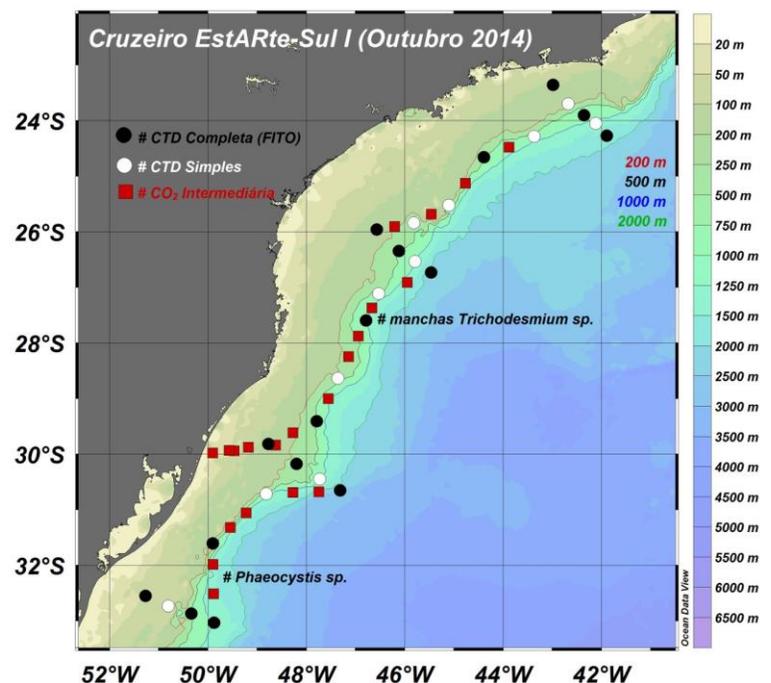
Updates:

The GOA-ON website has a new home! www.goa-on.org. Please share this new website with your networks. If you don't see your data sets represented on the interactive map, please fill out this [new input form for the interactive GOA-ON map](#). This map will be updated quarterly so please check back regularly to ensure your data is accurately represented. Also, the GOA-ON plan is now available in a hard copy version! If you would like a copy, please email Erica Ombres Erica.h.ombres@noaa.gov with your mailing address.

New OA Monitoring Network in New Zealand. NIWA and the University of Otago are setting up a coastal measurement network to determine local conditions, and to provide a baseline against which to measure future change – the New Zealand Ocean Acidification Observing Network, NZOA-ON. There will be 14 sites throughout the country, including pristine and impacted sites, sites of interest to the aquaculture industry, and sites that are important as wild shellfish habitats. This network will be linked into the GOA-ON, with additional parameters being measured at two of the sites, in line with GOA-ON Goal one Level one recommendations. The data will be available via a website, and outreach activities help sampling partners use this data for their own management strategies. For more information on this effort please contact Kim Currie Kimc@chemistry.otago.ac.nz

OSPAR-ICES Study Group on Ocean Acidification (SGOA). The third (and final) meeting of this working group was held in Copenhagen, 6-9 October. SGOA's main task was to develop recommendations to monitor ocean acidification and its impacts in the north-east Atlantic. Three GOA-ON EC members (Feely, Pfeil and Williamson) served on the group, and helped to establish close congruence between this initiative and GOA-ON. Reports of the 3rd meeting and for the project as a whole are now available [here](#). The first two links on this website are to the reports; the second two links are for their executive summaries.

Monitoring the carbonate system at the S-SE Brazilian shelf break and slope: The first EstARte-Sul (Biogeochemistry, Acidification and Anthropogenic Carbon at the SW Atlantic shelf break) cruise was executed on board the Brazilian Navy ship *NHo Cruzeiro do Sul*, from 22-30 October 2014 (see map at right). A team of 15 researchers from the Federal University of Rio Grande (FURG) and the State University of Rio de Janeiro (UERJ), including the chief scientists and BrOA (Brazilian ocean Acidification group - www.broa.furg.br) leaders Rodrigo Kerr (FURG) and Letícia C. da Cunha (UERJ), collected the following data: u-ADCP, vertical CTD + rosette profiles at 27 stations, underway pCO₂ measurements along cruise track with the General Oceanics "ferry box" system, dissolved oxygen, pH, total alkalinity, DIC, DOC, POC/PN, nutrients, pigments, biological samples for flux cytometry, δ13C and δ15N



(suspended matter), and cetacean survey (sight). The cruise sailed through an extended *Trichodesmium* sp. bloom off Santa Catarina state, Brazil. The ongoing project EstARte-Sul recently had additional funding granted by the Brazilian agency CNPq. This grant will allow the repeat of the EstARte-Sul track over the S-SE Brazilian shelf break and slope in 2015. The project contributes to GOA-ON and aims to: i) model carbon fluxes at the ocean-atmosphere interface along the S-SE Brazilian shelf break; ii) improve current knowledge on physical and biogeochemical processes controlling the carbon fluxes in the region; iii) quantify and characterize the distribution of anthropogenic carbon (C_{ant}) in the region; iv) investigate the role of the biological CO_2 pump in the area (identifying the main plankton groups) and the role of physical processes (e.g. eddies, fronts, vertical mixing, turbulence) in the C_{ant} distribution, v) monitor CO_2 system parameters in the region in order to understand ocean acidification effects; and vi) capacity building for marine carbon fluxes, and ocean acidification in Brazil. For more information, please contact Rodrigo Kerr rodrigokerr@hotmail.com

The **WESTPAC Workshop on Research and Monitoring of the Ecological Impacts of Ocean Acidification on Coral Reef Ecosystems** took place in Phuket, Thailand, 19-21 January 2015 hosted by the Phuket Marine Biological Center, Thailand. A total of 42 participants from Bangladesh, Cambodia, China, Indonesia, Japan, Korea, Malaysia, Philippines, Thailand,



United States of America and Vietnam attended the workshop. The workshop brought together regional experts on ocean acidification research and monitoring to discuss approaches and methods for regional and national applications.

The workshop establishes an ocean acidification community network in the Western Pacific and its adjacent region. In an effort to foster high-level policy and stakeholder interest in the region, a task force was designated to formulate communication materials on ocean acidification and its social-economic impacts for the region. The US NOAA National Coral Reef Monitoring Program was cited as an example of monitoring the ecological impacts of ocean acidification within coral reef ecosystems which adopts the proposed GOA-ON criteria. Workshop participants identified a need to build on existing monitoring initiatives and establish a joint long-term coral reef ocean acidification monitoring program in the region. To this end, the workshop participants selected several pilot sites and began evaluating regional monitoring capacity, inter-comparability and cost-effectiveness. All participants expressed their great appreciation to NOAA and IOC-UNESCO for their assistance in organizing this workshop.

MEOPAR focuses Ocean Acidification efforts in Canada: The Canadian Marine Environmental Observation Prediction and Response Network (MEOPAR) hosted an Expert Forum (18-19 February), preceded by a public Ocean Acidification Town Hall (17 February) in Victoria, British Columbia. While many research projects focus on ocean acidification in Canada, there is no national coordinated effort for ocean acidification. The Expert Forum began a coordinated approach for Canada and to address the future issues of ocean acidification in Canadian waters. The Expert Forum focused on **six ocean acidification themes:** global issues, fisheries and aquaculture, Arctic, experimental research, monitoring, and policy. MEOPAR invited Dr. Jan Newton to present GOA-ON guidance for observations and Dr. Jean-Pierre Gattuso to present international biological experimental research at both events. The guidance from the [GOA-ON Plan](#) was appreciated as providing a strong basis for the Canadian effort. The objectives of the Expert Forum were to: Review international ocean acidification research and policy, and its relevance to Canada's situation; Identify and prioritize ocean acidification research needs, in terms of experimental research, monitoring and policy; Establish the way forward

for a Canadian effort to address and respond to the impacts of ocean acidification; and Produce a white paper to guide research efforts across multiple sectors, within Canada and internationally. More details can be found at

<http://meopar.ca/news-events/meoparoa/>

ASLO 2015 in Granada, Spain, nets strong international OA focus: The Association for the Sciences of Limnology & Oceanography (ASLO) held its 2015 Aquatic Sciences Meeting: Global and Regional Perspectives – North meets South in Granada, Spain, on 22-27 February. Numerous sessions on ocean acidification were held throughout the meeting. Matching its title, the meeting was an excellent opportunity for OA exchanges between nations and hemispheres, with both global and regional perspectives. Sessions included a full two-day contribution “Responses of marine organisms to ocean acidification, interactions with other stressors and biogeochemistry,” which featured a talk by GOA-ON Co Chair Libby Jewett on how to approach biological monitoring through GOA-ON. Additional sessions included: “Advances in our Global Understanding of Ocean Acidification,” organized by GOA-ON participants Kim Currie, Pedro Monteiro, and Jan Newton and featuring talks by many GOA-ON participants; “Global climate change: ocean acidification experiments at CO₂ vents” and “Climate Change in the Baltic Sea: impacts of warming, desalination, eutrophication and acidification” both co-organized by GOA-ON ExComm member Sam Dupont; “In situ studies of the impacts of ocean acidification: observations, CO₂ vents, and FOCE experiments” co-chaired by GOA-ON participant Jean-Pierre Gattuso; “Global climate change: ocean acidification experiments at CO₂ vents” and “Ocean Acidification and Lower Trophic Levels: Identifying the Knowledge Gaps.” To view abstracts for these numerous OA sessions, visit <http://sgmeet.com/aslo/granada2015/>.

1st Brazilian Ocean Acidification Research Workshop was held jointly with the *Third International Symposium on the Effects of Climate Change on the World's Oceans* in Santos, Brazil, 23-27 March 2015. The workshop occurred prior to the symposium, 21-22 March 2015. The workshop evaluated the progress and direct the actions in the near future of the Brazilian Ocean Acidification Research Group (BrOA; www.broa.furg.br). Conference program, key dates and registration are available at the conference [website](#).

Australian researchers complete the first polar Free Ocean Carbon Enrichment experiment: The first polar Free Ocean Carbon Enrichment (antFOCE) was completed in early March 2015 near Casey Base, Antarctica. The experiment was led by scientists from the Australian Antarctic Division and involved many collaborators from the Monterey Bay Aquarium Research Institute and Australian research institutes.

The experiment site was in 14 m of water and was covered by permanent ice with diver access through holes drilled into the 2.6 m thick ice. Acrylic chambers (2 m x 0.5 m x 0.5 m) were deployed to the sea floor and a series of pipes and pumps were used to draw seawater to the surface, where it was saturated with CO₂ (and thus was very acidic), before being pumped back down under the sea ice and into 40 m long ducts that were used to mix the CO₂-enriched water with surrounding seawater and regulate the levels of ocean acidification in the chambers. Observations and measurements were made to determine how benthic marine habitats respond to decreased seawater pH. These include changes in benthic invertebrate community, biodiversity and composition in sediments and on hard substrata, effects on nutrient cycling in sediments, and changes in communities of bacteria, phytoplankton and sediment meiofauna, and the effect on bioturbation.

The immense effort came together and after many frozen sandwiches and blocks of chocolate, the team returned to Hobart 11 March on the last flight out of the base. The next phase of the research has commenced to analyze samples returned to Hobart and data collected in the field. For more information, please contact the project leader: Dr Jonny Stark, Australian Antarctic Division (jonny.stark@aad.gov.au)

Upcoming events:

Abstracts are due 30th April for an OA theme session at the International Council for Exploration of the Sea (ICES) Annual Science Conference September 2015. Copenhagen, Denmark. The ICES Annual Science Conference 21-25 September 2015 will be hosting an OA theme session co-sponsored by PICES in Copenhagen, Denmark. The session entitled Ocean acidification: Understanding chemical, biological and biochemical responses in marine ecosystems, welcomes all papers that relate to the projected decrease in efficiency of the ocean carbon pump and the consequences for organisms, ecosystems, and the society perspective. Conveners: Silvana Birchenough (UK), Pamela Walsham (UK), Klaas Kagg (the Netherlands) & Tsuneo Ono (PICES). For full details visit the meeting website: <http://www.ices.dk/news-and-events/asc/ASC2015/Pages/ASC2015.aspx>

We welcome papers on the following topics:

- monitoring perspectives on ocean acidification including potential approaches to monitor effects
 - changes in ocean chemistry
 - modeling approaches to understand ocean acidification effects
 - experimental approaches (*in situ* and under laboratory conditions)
 - ecosystems sensitivity/resilience
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OA-ICC/GOA-ON Data Portal Workshop, 1-2 June 2015, Monaco: The IAEA Ocean Acidification International Coordination Centre (OA-ICC; <http://www.iaea.org/ocean-acidification>) will organize a small expert workshop to investigate possibilities to create a portal for ocean acidification observing data as part of GOA-ON. The workshop is organized in response to recommendations by the OA-ICC Advisory Board and the GOA-ON Executive Council and will take place at the IAEA Environment Laboratories in Monaco, 1-2 June 2015.

The goals of the workshop will include:

- Discuss the development of a web data portal allowing optimal data discovery, access, integration, and data visualization from collection- to granular- level OA data and data products using common inter-operable web data services. This web portal would build on current capacity and capabilities, accept data streams from relevant data centers, provide visual and data link capabilities, and synthesis data products for the ocean scale.
 - Explore options for providing coordinated scientific data management and data flow framework that builds on existing infra-structure and scientific requirements over the long-term.
 - Develop requirements for best practice metadata procedures/protocols following international standards (e.g., ISO) to facilitate data discovery, use of DOIs or similar identifiers to provide clear data provenance and attribution.
 - Investigate how to best coordinate with international ocean-carbon long-term archival centers for OA observational, biological, model data, and data products. These centers would provide data integration where possible using interoperable online data services consistent with the proposed web data portal.
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The IOC Sub-Commission for the Western Pacific (WESTPAC) aims to establish regional study and monitoring networks on Ocean Acidification in the Western Pacific and its adjacent regions, and develop a regional program, as one regional component of the GOA-ON, to monitor the impacts of ocean acidification on coral reef ecosystems, mainly through a series of regional workshops & trainings, selection of pilot areas, and transfer of knowledge and technology among experts, institutions within and outside the region. **The second regional workshop is tentatively scheduled for late August or early September of 2015.** For more information please contact Rusty Brainard rusty.brainard@noaa.gov.

Recruitment: Do you know someone who should be a part of the Global Ocean Acidification Observing Network? Please have them email erica.h.ombres@noaa.gov for more information about GOA-ON and how to join. Feel free to share this newsletter as well.

If you no longer wish to receive these emails or participate in the GOA-ON, please email erica.h.ombres@noaa.gov with the heading UNSUBSCRIBE GOAON.

