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## The IOCCP Conveyor No. 39, March 2018

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## A Word from the Editors

Dear Ocean Carbon & Biogeochemistry Community,

Just as winter is finally giving away to the early signs of spring around our Office headquarters, it's high time to bring you this year's first issue of the IOCCP Conveyor. With a busy end of year 2017, and perhaps an even busier start of year 2018, there is more to report than the pages of this newsletter can hold.

We begin with sharing with you the exciting news that Kim Currie has joined Masao Ishii at the helm of the IOCCP SSG. We take this opportunity to once again publicly thank Toste Tanhua from whom Kim has taken over the IOCCP co-Chairmanship. On this occasion, we devote our "meet IOCCP SSG" series to a profile of Kim. We are also thrilled to announce that Véronique Garçon has agreed to join IOCCP SSG to take the lead on the new IOCCP Oxygen theme. We would like to utilize Véronique's energy and leadership to improve the global coherence of sustained oxygen observations, as part of our ongoing, gradual efforts to expand coordination and communication services onto all Biogeochemistry Essential Ocean Variables.

From deoxygenation we move to ocean acidification with activities around reporting on the progress on developing OA indicators for SDG14.3, and news on the many recent developments in the Latin American Ocean Acidification Network (LAOCA). We also report on the formal kick off of the Surface Ocean CO<sub>2</sub> Global Observing Network, which exists for at least 2 decades but this year marks the development of a structured and hopefully sustained network. These surface ocean observations provide a fundamental element for understanding of several processes including air-sea fluxes and ocean acidification.

We then point your attention to a large international effort aimed at bringing together communities across all ocean disciplines to harmonize their developments with respect to standard operating procedures and best practices documents.

In our Upcoming Events column, you will find information about quite a few major events planned for 2018 with abstract submission and/or registration

deadlines fast approaching. Mark your calendars for those!

We hope that you will find this issue of the Conveyor informative and useful. As always, we look forward to your suggestions on how we can improve.

Happy Easter!

*Maciej Telszewski & Artur Palacz*

## New IOCCP co-Chair: Kim Currie takes over from Toste Tanhua



<https://iStockphoto.com/2174>

We are excited to inform you that **Kim Currie** (NIWA, New Zealand) has joined Masao Ishii at the helm of the IOCCP SSG. In her day job, Kim is a scientist with NIWA and University of Otago in New Zealand, with a focus on marine carbon chemistry. She is responsible for surface ocean carbon programmes and coastal ocean acidification observations in New Zealand, and is actively involved in a number of globally coordinated activities such as SOCAT, GOA-ON and IOCCP. We are confident that IOCCP leadership is now in very capable hands as we march on our road towards sustained marine biogeochemistry observations.



<http://www.school-clipart.com/pages/0511-0710-1112-0653.html>

We would like to take this opportunity to publicly thank **Toste Tanhua** from whom Kim has taken over the IOCCP co-Chairmanship. Toste has enriched IOCCP with his dedicated service for the past decade and we are very grateful for his pro-active attitude and visionary leadership which benefited marine biogeochemistry and ocean observing in general. We are happy to let you know that Toste will continue his community service in his new role as co-Chair of GOOS.

*Maciej Telszewski, Artur Palacz*

## Véronique Garçon joins IOCCP SSG as responsible for the new IOCCP Oxygen Theme



We are very happy to announce that Véronique Garçon has agreed to join IOCCP SSG to take the lead on the new IOCCP Oxygen theme. We would like to utilize Véronique's energy and leadership to improve the global coherence of sustained oxygen observations – a long anticipated expansion of our portfolio driven by our Terms of Reference to gradually expand marine biogeochemistry coordination and communication efforts from carbon-related parameters onto all Biogeochemistry Essential Ocean Variables (EOVs; [www.goosocean.org/eov](http://www.goosocean.org/eov)).

While we are working on launching the new Oxygen page on our IOCCP website, feel free to check out other oxygen-related resources which include reports on activities in which IOCCP has already been strongly involved in, such as [GO<sub>2</sub>NE](#) and [VOICE](#), in close collaboration with and under the excellent leadership of Véronique.

Stay tuned for a detailed profile of Véronique under our 'Meet IOCCP SSG' column in the next issue of the Conveyor. In the meantime, to contact Véronique, please check her contact details on our page [HERE](#).

*Maciej Telszewski, Artur Palacz*

## IOCCP SSG member profile: Kim Currie



Kim is a scientist with NIWA and University of Otago in New Zealand, with almost 25 years research experience in marine carbon chemistry. She works at the collaborative Research Centre for Oceanography, located at the University of Otago, and was part of the team that was awarded the Prime Minister's Science Prize in 2011.

As part of the Ocean-Atmosphere Interactions group, her research focuses on the spatial and temporal variability of the oceanic uptake of CO<sub>2</sub>, and the fate and consequences of the changing marine carbon cycle, including ocean acidification (OA). Kim is responsible for surface ocean carbon programmes including the Munida Time Series, a long-running transect of ocean carbon measurements off the coast of New Zealand, and the open ocean carbon sink quantification project, using the *RV Tangaroa*. Both efforts aim at identifying factors affecting the marine carbon chemistry, including changes in pH. Kim is a part of a multi-disciplinary team working on coastal OA in New Zealand. In collaboration with botanists, ecologists, geologists and zoologists has recently set up a coastal ocean acidification observing network looking (amongst other aspects) at the responses of various species to OA.

Kim is one of the leaders of the Surface Ocean CO<sub>2</sub> Atlas (SOCAT) project, which means that she is involved in all global activities related to utilizing the surface ocean carbon data and knows the needs and challenges of that community first hand.

Although Kim has served on our panel since 2015 as responsible for surface ocean synthesis activities theme, she has gradually been engaging in more and more activities cutting across several of IOCCP themes. We believe that Kim's holistic approach to individual activities will make her a perfect co-Chair, who needs to exercise an internal coordinator role so that individual actions help pull the IOCCP in one pre-determined direction.

To contact Kim, please check her contact details on our page [HERE](#).

*Maciej Telszewski, Artur Palacz*

## Updates on ocean acidification

### Developing ocean acidification indicators for SDG14.3



In 2015, the United Nations adopted the Agenda 2030 for Sustainable Development including a set of 17 Sustainable Development Goals (SDGs,

<https://sustainabledevelopment.un.org/sdgs>). Goal 14: Life Below Water, is to conserve and sustainably use the oceans, seas, and marine resources, and consists of 10 targets. Of particular interest to our community is target 14.3: Minimize and address the impacts of ocean acidification, including through scientific cooperation at all levels.

In order for the global community to meet this target, an international group of experts (including four IOCCP SSG members) was convened under the leadership of IOC-UNESCO to develop a harmonized and agreed indicator framework at the global level, allowing long-term monitoring and data management structures. In order for this activity to be successful all existing efforts by different groups of countries and organizations, including regional and international agencies, regional commissions, academia, civil society and other relevant international organizations have to be taken into account. This is not a trivial task as rigorous assessment of global ecosystem changes due to ocean acidification requires significant technical capacity building in many parts of the planet.

In January 2018 these experts met in Paris at the IOC-UNESCO Headquarters to develop the indicator methodology for target 14.3 (average marine acidity measured at an agreed suite of representative sampling stations). The methodology, similar to a recipe, provides guidance to scientists and countries in terms of what measurements are needed and how often, as well as how to report the collected information so it is transparent and traceable. In this way, the group is leveraging its scientific and policy expertise to develop a guiding vision for how ocean chemistry, and in future biological data, can be collected and shared worldwide in support of the Sustainable Development Agenda.

Once finalized and approved by appropriate partners in the process, the methodology will be implemented by the UN Member states and periodically assessed for its fitness-for-purpose. IOCCP Experts will continue to contribute to this important process.

*Maciej Telszewski*

### Cristian Vargas awarded 2018 SCOR Visiting Scholarship



Earlier this year, SCOR Committee on Capacity Building approved six SCOR Visiting Scholars for 2018. We would like to congratulate all those awarded, especially **Cristian Vargas** from Universidad de Concepción in Chile, a member of IOCCP SSG and Co-Chair in charge of the international connection of the Latin American Ocean Acidification Network (LAOCA).



Cristian's 2018 SCOR Visiting Scholarship is being funded by IOC-UNESCO. The generous scholarship enables Cristian to lead an advanced training course in various aspects of OA research, held at the Charles Darwin Foundation facilities in Puerto Ayora, Galapagos Islands, Ecuador, between 19 and 28 August 2018. The course is a milestone in developing a capacity building program for a long-term experiment in OA and its effects on the Eastern Pacific ecosystems. The course is co-organized by Cristian and Dr. Rafael Bermudez from the Escuela Superior Politécnica del Litoral (ESPOL) and associate researcher at the GMare Joint Program ESPOL-Charles Darwin Research Station in the Galapagos Islands.



*Isla Roca Redonda. Credit: MLRamos Photography*

The Galapagos Islands are a unique natural laboratory, a site where different currents converge, giving origin to an exceptional marine diversity. Roca Redonda, located north of Isabella Island, is an active submarine volcano where CO<sub>2</sub> is released through cold vents, thus the conditions of OA

are naturally simulated. This makes Roca Redonda an exceptional study site of OA effects in the Eastern Pacific.



Location of Isla Roca Redonda, active submarine volcano, relative to the rest of Galapagos Islands archipelago. Credit: Google Maps.

The aim of the course is to use natural CO<sub>2</sub> gradients around Roca Redonda to conduct *in situ* observations using a wide range of techniques for long term capacity building (carbon chemistry, use of carbon stable isotopes, and biological measurements, etc.) and data collection. The course is planned as a combination of theoretical training and field expedition. It will engage around 10 participants from Ecuador and other Latin American countries with similar CO<sub>2</sub> vent systems, such as Costa Rica and Colombia. During this training course, the participants will be trained in the following aspects of OA research:

- 🌊 standard measurements for carbon system parameters, including analytical chemistry techniques,
- 🌊 the use of stable isotopes as a major tool in food web analysis in the framework of OA research,
- 🌊 in-situ sample collection in a CO<sub>2</sub> vent for chemical and biological analysis, and
- 🌊 the study of benthic community structure under the influence of high CO<sub>2</sub> conditions.

Although the knowledge of the effects of OA in aquatic ecosystems in Latin-American has rapidly increased over the past few years, most of the research has been conducted *in vitro* (laboratories) or in semi-natural conditions (mesocosms), which may hinder responses of natural communities as the organisms are isolated from their environment. Thus, the study of ecosystems at shallow coastal sites, where volcanic CO<sub>2</sub> vents lower the pH of the water column,

offers a more holistic insight into the response of such environments to OA, as well as, the possibility for carrying out long-term experiments with the participation of several researchers from a range of Latin American countries. For more information on the course and associated activities, please contact Cristian.

Artur Palacz, Cristian Vargas

## Latin American Ocean Acidification Network (LAOCA) Symposium



The first Latin American Symposium on Ocean Acidification, Red LAOCA 2017, took place on 24-26 October 2017 at the Cultural Centre for the Sciences of CONICET in Buenos Aires, Argentina. The symposium convoked researchers, students, government and industry representatives from Latin America, but was open to the global community, interested in acquiring a regional and global updated knowledge about the impacts of ocean acidification on marine resources and ecosystems.

This 1<sup>st</sup> LAOCA symposium was an opportunity to share the research results and to explore new opportunities of collaborative research in the region. Main themes included in the meeting were:

- 🌊 OA observing systems and tools for OA research in past, present and the future
- 🌊 Modelling and regional projections on OA, marine biogeochemistry and ecosystems
- 🌊 Physiological and ecological effects of OA: from organisms to ecosystems
- 🌊 Human dimension of the OA

A total of 76 participants from **México, Colombia, Chile, Peru, Argentina, Brazil, Ecuador, Costa Rica**, as well as, **United States and United Kingdom** joined the symposium. A number of plenary speakers including Dr. Silvana Birchenough (CEFAS, UK), Dr. José Martín Hernández-Ayón (UABC-MEXICO), Dr. Diana Ruiz-Pino (LOCEAN-IPSL, FRANCE), Dr. Stefan Gelcich (PUC, CHILE), and our IOCCP member, Dr. Cristian Vargas, were invited to provide high-level updates on specific aspects of the

Symposium. Latin American researchers demonstrated a very advanced understanding regarding the study of the biological responses of local marine species to various OA scenarios that exists in the region. However, the meeting also revealed the need to strengthen observation systems in carbon chemistry on the Latin American coasts.

The Executive Council of LOACA used the symposium occasion to address several other issues, including the nomination of the new Co-Chairs for 2018-2020 term, nominating Dr. Michelle Graco (Instituto del Mar del Peru, PERU) and José Martín Hernández Ayon (Universidad Autónoma de Baja California, MEXICO) to this role. Dr. Cristian Vargas will continue in his role as Co-Chair in charge of connecting LAOCA to international programs (GOA-ON, IOCCP). The next LAOCA symposium will be held in Lima, Peru, in 2020, and will be organized by the Instituto del Mar del Peru.

*Artur Palacz, Cristian Vargas*

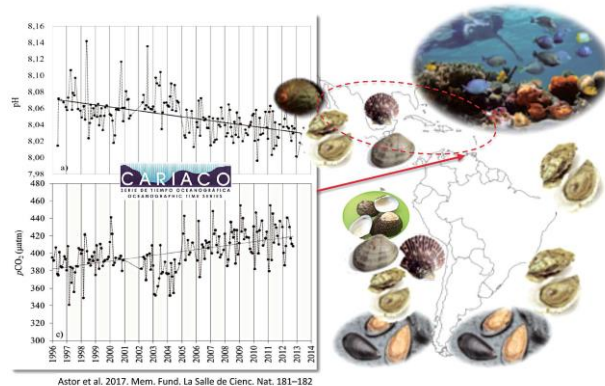
## Ocean Acidification International Reference User Group (OAIRUG) meeting



The Ocean Acidification International Reference User Group (OAIRUG) in partnership with INVEMAR and the International Atomic Energy Agency (IAEA) through the Ocean Acidification International Coordination Center (OA-ICC) organized a Regional Event on Ocean Acidification between 18 and 22 March in Santa Marta, Colombia. **Cristian Vargas** participated at the OAIRUG meeting as an invited speaker to present an overview about carbon chemistry observations along the Chilean coasts.

The objective of the workshop was to explore the impacts and implication of OA alongside other major changes to the ocean across Latin America and the Caribbean. A selected group of stakeholders, including global and regional experts, representatives from key industries, marine managers, NGOs and policy makers were invited to participate. The final outcome of this event was the preparation of a Regional Action Plan to understand and best cope

with this significant challenge to ocean health. Moreover, during the same event, a new OA guide for Latin America and the Caribbean was released. The guide provides an overview of why OA is an issue, how it will impact ecosystems, and gives examples of actions to address it.



*From: Laffoley, D., Baxter, J.M., Turley, C. and Lagos, N.A., (editors). 2017. An introduction to ocean acidification:*

The OAIRUG was launched as part of the European Project on Ocean Acidification (EPOCA) in 2008 as a key means of conveying the scientific results from the project to non-scientific audiences and science end-users, in particular policy and decision makers. The concept behind OAIRUG is to bring together scientists and stakeholders from various backgrounds such as industry and governmental and non-governmental organizations, to facilitate networking and the presentation of key findings to interested non-scientific parties.

*Cristian Vargas, Artur Palacz*

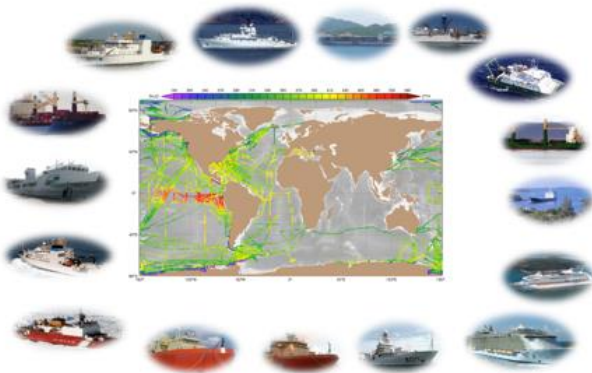
## Surface Ocean CO<sub>2</sub> Global Observing Network (SOCOGON)

The idea of coordinating surface water CO<sub>2</sub> observations has had a long history with incremental implementation of certain aspects of the network such as data collation and distribution through SOCAT along with an independent effort of the LDEO database, or development of globally accepted standards and best practices for measurements and their metadata. However, there are still numerous aspects like quality of measurements themselves, collaboration with ship operators, design of the

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observing network globally, collaboration with other observing networks and more, which can only be improved or achieved globally through a coordinated structure.

As most of the global efforts in this field have been facilitated under aegis of IOCCP, the network was decided to be formed under auspices of IOCCP through a global partnership of investigators involved in ongoing efforts, both on ships of opportunity (SOOP-CO<sub>2</sub>) and fixed-platforms (mooring-CO<sub>2</sub>). To this end, IOCCP and US NOAA held the kick-off meeting of the Surface Ocean CO<sub>2</sub> Global Observing Network (SOCOGON) on February 11, 2018, just prior to the Ocean Sciences Meeting in Portland, OR, USA. The meeting was attended by invited participants who represented the largest operators of surface water CO<sub>2</sub> operations and/or activities relevant for network development.



Establishment of SOCOGON responds to the need to provide the high-quality data to constrain global and regional air-sea CO<sub>2</sub> fluxes on seasonal timescales, to determine trends and patterns in surface water CO<sub>2</sub> levels, and to elucidate the factors influencing the patterns on daily to decadal time scales and to provide important element of an OA monitoring system.

The participants of the kick-off meeting decided that specific targets and metrics need to be developed to assess the efficacy of the network and its performance. The network participants will develop such network-wide set of targets and metrics, which will aid in network's management and coordination. These targets and metrics will lead to deliverables that, to some extent, will mimic the successful ARGO network. They will include: real time transmission and dissemination of all data in the network, real-time

tracking of assets, delayed mode quality controlled data including uncertainty estimates, and biannual releases of all data in the network in the form of collated data and maps. Participants of the network will confer at regular basis to discuss data products and publications resulting from the data obtained in the network.

From a network and consistent data delivery perspective, it is desirable to have a single operator and uniform instrumentation, or at least strong top-down control to implement an observing system. However, this is seldom feasible for global ocean networks since the ocean is the global commons with many different independent observers and stakeholders. To this end, SOCOGON kick-off meeting participants decided to develop a framework that will use existing platforms and operations with specific focus on:

- Well-quantified accuracy and precision of measurements following established recommendations
- Rapid and consistent data delivery including near real-time and delayed-mode data
- Inter-comparison and verification of different operations
- Recommendations on expansion of parameters that would be incorporated across the network
- Initial focus on entraining the major groups with successful programs into the network and working with current multi-institutional efforts such as the marine element of the pan-European Research Infrastructure: Integrated Carbon Observation System - Ocean Thematic Center (ICOS-OTC), NOAA SOOP-CO<sub>2</sub> and mooring CO<sub>2</sub>
- Addressing data gaps
- Mutual aid in maintaining operations and advocacy for sustained resources
- Assessing evolving needs of operators and stakeholders

The development of this effort will rely heavily on implementation strategies, standard operating procedures and lessons learned of the smaller national and multi-national entities (e.g. ICOS-OTC in Europe, NOAA in the USA or NIES in Japan). In design and execution, it will look at protocols and

procedures of other established networks such as ARGO, GO-SHIP, the CMDL Atmospheric CO<sub>2</sub> network, and the Advanced Global Atmospheric Gases Experiment (AGAGE). At the same time, SOCOGON is envisioned to become part of JCOMM-SOT (Ships Observation Team) and report to the JCOMM OCG (Observation Coordination Group). These are the relevant operational entities charged with implementing the Global Ocean Observing System (GOOS).

The data-based products from the network will be used for scientific analyses, development of indicators of the variability in ocean ecosystems, and allowing biogeochemical and socio-economic assessments. In particular, the products will be critical for determining the effects of OA on marine ecosystem health, and quantification of anthropogenic carbon uptake on variety of scales.

Therefore, the successful development of SOCOGON as a sustained global ocean observing network should be considered critical to execute the GOOS mandates in climate and marine ecosystem health.

*Maciej Telszewski, Rik Wanninkhof*

## Best practices for ocean observing systems



National, regional, and international observing networks have developed and adopted a tremendous amount of methodologies as their so-called best practices. However, despite the quality of these efforts, the discoverability and sustainability of high-quality methodology is still limited by fragmented reporting and archiving. To address this issue, a new process, centred at the Ocean Best Practices repository (OBP; <https://www.oceanbestpractices.net/>) has been vigorously launched over the past 6 months.

The OBP is a large scale effort bringing together a number of international research communities, global observing system coordinating bodies, funding agencies and research projects. The final goal is to provide the ocean observing community with a

structured, sustainable compendium of peer-reviewed best practices in ocean observing that can be used in training new oceanographers and data scientists, and also in providing references for experts. One important prerequisite in the process is reaching across science communities and networks to support multi-disciplinary applications.

In this context, a **community best practice** is “a methodology that has repeatedly produced superior results relative to other methodologies with the same objective.” To be fully elevated to a best practice, a promising method will have been adopted and employed by multiple organizations. Best practices may come in any of a number of format types - best practices, standard operating procedures, manuals, operating instructions, etc. - with the understanding that the document content is put forth by the provider as a community best practice.

The ever-growing number of contributors to this effort have jointly undertaken a series of actions that constitute complementary efforts leading to the realization of the long-term objective. Below we summarize a few of the key efforts in which IOCCP is directly involved and will continue to contribute over the next months and years.

## AtlantOS Best Practice for Observing Systems

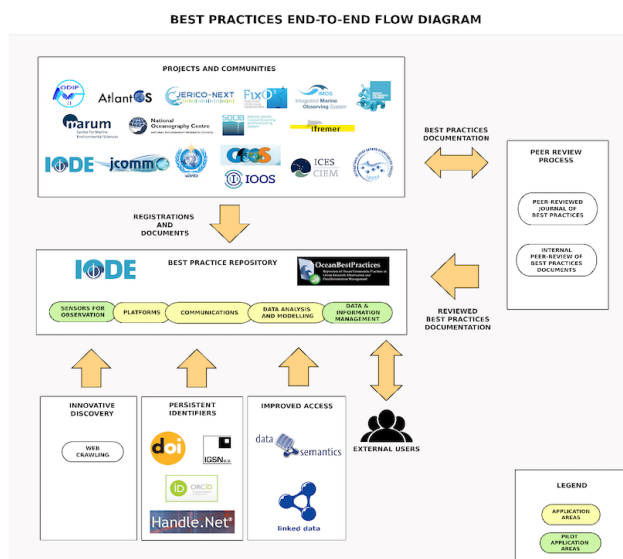


The AtlantOS Project, with support from the ODIP II project ([www.odip.eu](http://www.odip.eu)), has a Best Practices Work Group (BPWG), which is coordinating its activities with international and national agencies and which aims to improve access to documented best practices for ocean observations (<https://www.atlantos-h2020.eu/project-information/best-practices>).


The BPWG is collaborating with AtlantOS partners in diverse ocean disciplines to populate the OBP repository and to address the utility of the best practices process for their communities. The AtlantOS partners in this effort currently include: EuroGOOS/GOOS, GEOMAR, Ifremer, IOCCP/IOPAN, Marum, PML, UPMC; with a number of international projects being involved as well.



The OBP is hosted and managed by International Oceanographic Data and Information Exchange (IODE) of the Intergovernmental Oceanographic Commission (IOC) of UNESCO for its partners: JCOMM, WMO and ICES. Any ocean-related best practice can be deposited by the community and the upgraded infrastructure will support all attributes of the flow process summarized in the diagram below.



## JCOMM OCG Standards and Best Practices Task Team

 Promoting the creation and timely updating of JCOMM best practice documentation is a key priority for JCOMM Observations Coordination Group (OCG). The rationale for JCOMM OCG Standards and Best Practices (SBP) task team is that many of the observing networks have a focus on the development of best practices for their network (i.e. Argo, GO-SHIP). However, driven by the need to be able to deliver ocean observations by Essential Ocean Variables (EOVs), there is a need to be able to characterize and quantify the observational approaches and uncertainties across the networks, and there are also opportunities to capitalize on the best practice efforts of the individual networks to the benefit of the broader observing system. Therefore, many of the actions in this area are focused on the development and sharing of network best practice activities, and the coordination of best practice development and inter-comparison activities by EOV.

## Ocean Best Practices Workshop, November 2017, Paris, France

The Best Practices Workshop, held in Paris, in November 2017, was organized by the AtlantOS OBP WG in collaboration with the ODIP II project and the OceanObs RCN (<http://sites.ieee.org/oceanrcn/>) to better understand the needs of the ocean observing community in supporting the creation and dissemination of best practices. Over two and a half days, thirty-seven participants representing a wide range of international organizations contributed insightful recommendations for the structure, processes and implementation of the OBP system.



Thirty of the thirty-seven experts attending the Paris OBP workshop.

The ocean carbon and biogeochemistry perspective were presented by IOCCP's Rik Wanninkhof and Maciej Telszewski. Rik spoke about observation networks, focusing on GO-SHIP. He reviewed the elements of an observing network, which include having clear needs, sustained funding, common protocols and standards, data/metadata documentation, clear accuracy & precision requirements, and robust data management & distribution system. Rik noted that there is a subtle difference between a GO-SHIP-required standard operating procedure (SOP) and a community best practice. Maintaining and updating SOPs as a volunteer effort is a challenge for GO-SHIP, and this challenge constituted a key discussion point at the workshop.

A wide range of challenges in moving forward with respect to Biogeochemistry OBPs were discussed, among which is the diversity of types of methodology documents (manuals, guides, standard operating procedures, standards & reference materials) as well as multiple steps and procedures often described in separate documents (best practices for deployment and sampling; data retrieval and formatting; calibration/validation; reference materials and standards; primary quality control and (near) real-time and delayed mode; secondary quality control).

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Moreover, completeness of documentation is rarely achieved and the mix of sensors with platforms may require different methods or practices.




In his presentation, Maciej proposed a structure allowing to organize the different types of best practices according to EOVs and observing network on the one hand, and various observing steps/procedures involved in any ocean measurement on the other.

Observing Approach <sup>IOCCP</sup>			Ship-based Repeat Hydrography	Ship-based Underway Observations	Profiling Floats	Moored Fixed-point Observatories	Giders	Ship-based Fixed-point Observatories	Satellite Remote Sensing	...
EOV	Sub-variable	Procedure								
I N C O R A R Y O B S E R V I N G		Measurement technique <sup>IOCCP</sup>								
		Deployment & sampling								
		Data retrieval & formatting								
		Calibration / validation								
	pCO <sub>2</sub>	Reference materials & standards								
		Primary quality control (Near) real-time								
		Delayed-mode								
		Secondary quality control								
		DIC								
		Total Alkalinity								
	pH									
	OXYGEN									
	NUTRIENTS									
	TRANSIENT TRACERS									
	PARTICULATE MATTER									
	NITROUS OXIDE									
	STABLE CARBON ISOTOPES									
	DISSOLVED ORGANIC MATTER									
	OCEAN COLOUR									

**Standard  
Operating  
Procedures &  
Guides for Best  
Practices**

GOOS Biogeochemistry Panel proposed scheme for organizing best practices documents according to EOVs, observing networks and observing procedures. Source: Meeting materials - <https://www.oceandocs.org/handle/1834/10981>

Finally, Maciej made several practical recommendations for tackling the complexity in the ocean best practices realm:

-  agree upon and implement a structured, searchable and updatable database for existing web-based documentation;
-  develop a BP registration scheme;
-  develop multilingual media resources allowing new users to follow practical and theoretical steps across vertical and horizontal categories in the proposed structure.

For more information on the workshop goals and outcomes, please see the workshop report at: [https://www.oceanbestpractices.net/bitstream/handle/11329/410/BP\\_Workshop\\_Paris\\_2017\\_Proceedings.pdf?sequence=4&isAllowed=y](https://www.oceanbestpractices.net/bitstream/handle/11329/410/BP_Workshop_Paris_2017_Proceedings.pdf?sequence=4&isAllowed=y)

## Peer-review of best practices in ocean observing – Frontiers in Marine Science Research Topic

The OBP initiative encourages all BP methods to go through peer review, either in their originating community or through a journal peer review system. To this end, members of the AtlantOS BPWG and JCOMM OCG SBP Task Team led to the successful establishment of the Frontiers in Marine Science Research Topic on Best Practices in Ocean Observing: <https://www.frontiersin.org/research-topics/7173/best-practices-in-ocean-observing>

Lack of a forum to allow BP creators to describe and disseminate their developments was identified as a gap. This Research Topic is an opportunity for BP developers to expose their methods to the ocean community, and for that community to discover sustainably-managed BPs to enable further progress in ocean observation.



Research Topic

### Best Practices in Ocean Observing

Submit your abstract

Submit your manuscript

In this Research Topic, the editors (see below) primarily solicit papers describing robust and high quality methodologies over the entire range of ocean observing and addressing the challenges of improving observation capabilities (including data management) and interoperability. Papers can be linked to one or more fully documented protocols archived in a repository maintained by the International Oceanographic Data and Information Exchange (IODE; [www.iode.org](http://www.iode.org)). The Topic will also accept related submissions such as recommendations to expand the usage and reporting of methods and descriptions of major obstacles to their implementation.

The deadline for the current round of submissions to the Research Topic is **15 April 2018**. So far, 24 authors have confirmed their intended submission.

For more information please contact one of the Topic Editors: Johannes Karstensen (GEOMAR, Germany),


Pier Luigi Buttigieg (AWI, Germany), Jay Pearlman (IEEE France, France), Juliet Hermes (SAEON, South Africa), Marion Gehlen (LSCE, France).

Artur Palacz

## A user's guide for selected autonomous biogeochemical sensors








Continuing in the spirit of disseminating well-tested methodologies to the community of marine observers, we would like

to point your attention to IOCCP's "**A user's guide for selected autonomous biogeochemical sensors**" –a document which presents a final outcome of the 1<sup>st</sup> International IOCCP Sensors Summer Course held in 2015 in Kristineberg, Sweden. This user's guide provides easy-to-follow steps on the usage (including preparation, deployment, recovery and basic data processing) of selected autonomous biogeochemical sensors which measure oxygen, nitrate, pCO<sub>2</sub> and pH. The user's guide is available for download as PDF from our website  [HERE](#).

### The User's Guide

The user's guide was put together by the course participants which included 27 trainees, 13 lecturers and 4 manufacturer representatives. In the document you will find:

-  Essential instrument know-how (instrument communication, sensor data quality control (QC), biofouling prevention, etc.)
-  User recommendations
-  Site-specific recommendations (preference of one type/model of instrument depending on location)
-  Troubleshooting guidelines for commonly encountered problems
-  Data management, quality and reporting.

We hope that you will find the user's guide a useful resource.

Artur Palacz

## New global datasets published

### Global Nutrients Dataset 2013 (GND13)

The Global Nutrients Dataset 2013 (GND13), a new dataset for nutrients in sea water, was published recently. The data in the dataset are traceable to the SI. The GND13 has been well quality-controlled based on data collected during CLIVAR and subsequent GO-SHIP cruises, mainly by the R/V Mirai, where reference materials for nutrients in seawater were used. GND13 is available online at JAMSTEC web site:

[http://www.godac.jamstec.go.jp/catalog/data\\_catalog/metadataDisp/GND13?lang=en](http://www.godac.jamstec.go.jp/catalog/data_catalog/metadataDisp/GND13?lang=en).

The dataset should be cited as:

*Aoyama, M. (2017). Global Nutrients Dataset 2013, JAMSTEC, doi: 10.17596/0000001.*

If you have any questions, please contact Michio Aoyama.

### LDEOv2017 global surface water pCO<sub>2</sub> database published at NCEI

Regarding information products pertaining to the Inorganic Carbon EOv, the new LDEOv2017 Database was published recently at OCADS NCEI (Ocean Carbon Data System - a data management project operated by the NOAA National Centers for Environmental Information):

[https://www.nodc.noaa.gov/ocads/oceans/LDEO\\_Underway\\_Database/](https://www.nodc.noaa.gov/ocads/oceans/LDEO_Underway_Database/).

Approximately 13.0 million measurements of surface water pCO<sub>2</sub> made over the global oceans during 1957-2017 have been processed to make a uniform data file in this Version 2017. Measurements made in open oceans as well as in coastal waters are included. The data assembled include only those measured using equilibrator-CO<sub>2</sub> analyzer systems, and have been quality-controlled based upon the stability of the system performance, the reliability of calibrations for CO<sub>2</sub> analysis and the internal consistency of data.

LDEOv2017 should be cited as:


*Takahashi, T.; Sutherland, S.C.; Kozyr, A. (2018). Global Ocean Surface Water Partial Pressure of*

*CO<sub>2</sub> Database: Measurements Performed During 1957-2017 (LDEO Database Version 2017) (NCEI Accession 0160492). Version 4.4. NOAA National Centers for Environmental Information. Dataset. doi:10.3334/CDIAC/OTG.NDP088(V2015) [access date].*

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## Upcoming Events

-  European Geosciences Union (EGU) General Assembly 2018, 8-13 April 2018, Vienna, Austria, <https://www.egu2018.eu/>; abstract submission closed.
-  TPOS 2020 workshop on Bridging Sustained Observations & Data Assimilation, 1-3 May 2018, Boulder, CO, USA, <https://usclivar.org/meetings/tpos-2020-workshop/>; abstract submission closed.
-  50<sup>th</sup> International Liege Colloquium on Ocean Dynamics, 28 May – 1 June 2018, Liege, Belgium; <http://labos.ulg.ac.be/gher/home/colloquium/>; abstract submission closed.
-  9<sup>th</sup> Session of the JCOMM Observations Coordination Group (OCG), 14-18 May, Brest, France; [http://www.jcomm.info/index.php?option=com\\_oe&task=viewEventRecord&eventID=2120](http://www.jcomm.info/index.php?option=com_oe&task=viewEventRecord&eventID=2120;); by invitation only.
-  Global Ocean Acidification Network Executive Council, 28-30 May, Sopot, Poland; by invitation only.
-  4<sup>th</sup> International Symposium on the Effects of Climate Change on the World's Oceans, 4-8 June 2018, Washington D.C., USA, <http://meetings.pices.int/meetings/international/2018/climate-change/scope/>; abstract submission closed.
-  7<sup>th</sup> Global Ocean Observing System Steering Committee Meeting, 13-15 June, Santa Marta, Colombia; by invitation only.
-  2018 Ocean Carbon & Biogeochemistry Summer Workshop, 25-28 June 2018, Woods Hole, MA, USA, <http://web.whoi.edu/ocb-workshop/>; poster abstract submission will be available in May.
-  Gordon Research Conference on Biogeochemistry of Marine Interfaces, 8-13 July 2018, Hong-Kong, China; <https://www.grc.org/ocean-biogeochemistry-conference/2018/>; applications close 10 June 2018 (limited availability).
-  US OCB Biogeochemical Profiling Float Workshop, 9-13 July 2018, Seattle, WA, USA, <https://web.whoi.edu/floats-workshop/>; registration open: first come, first serve.
-  7<sup>th</sup> SOLAS International SOLAS Summer School, 23 July - 4 August 2018, Cargèse, Corsica, France, <http://www.solas-int.org/solas-summer-school-18.html>; applications closed.
-  IMBeR ClimEco6 Summer School, 1-8 August 2018, Yogyakarta, Indonesia, <http://www.imber.info/en/events/climeco-imber-summer-schools/interdisciplinary-approaches-for-sustainable-oceans/>; application deadline: 26 March 2018.
-  2018 SCOR Annual Meeting, September 4-6, 2018, Plymouth, United Kingdom; [http://scor-int.org/Annual%20Meetings/2018\\_SCOR\\_Meeting/2018\\_SCOR\\_Annual\\_Meeting.htm](http://scor-int.org/Annual%20Meetings/2018_SCOR_Meeting/2018_SCOR_Annual_Meeting.htm); by invitation only.
-  SFB 754 International Conference on 'Ocean Deoxygenation: Drivers and Consequences – Past, Present and Future', 3-7 September 2018, Kiel, Germany, <https://www.sfb754.de/o2conference2018/>; abstract submission deadline: 31 March 2018, registration deadlines: 31 May – 24 August 2018.
-  13<sup>th</sup> Session of the IOCCP SSG, 24 – 26 October 2018, Tokyo, Japan; by invitation only.

 US OCB Oceanic Methane & Nitrous Oxide Workshop, 28-31 October 2018, Lake Arrowhead Conference Center, CA, USA, <https://web.who.edu/methane-workshop/>; application deadline: 1 June 2018.

 International Conference on Marine Data and Information Systems (IMDIS), 5-7 November 2018, Barcelona, Spain; <https://imdis.seadatanet.org/>; abstract submission deadline: 30 April 2018