Newsletter of the Global Ocean Acidification Observing Network (GOA-ON)
Issue 17, March 2022

GOA-ON news

GOA-ON Secretariat: Farewell, Kerri Dobson! Welcome, Gabby Kitch!

Kerri has officially ended her tenure with NOAA's Ocean Acidification Program, thus leaving the GOA-ON Secretariat. She has accepted a postdoctoral researcher position at the University of North Carolina - Chapel Hill to study cryptic speciation in coralline algae and their functional ecology with Dr. Sophie McCoy.

As a member of the GOA-ON Secretariat, Kerri was responsible for many of the day-to-day functions of GOA-ON: supporting the North American, Pacific Islands and Territories (PI-TOA), Arctic, and Latin American (LAOCA) regional hubs, coordinating meetings, updating the GOA-ON website, and running the Pier2Peer mentorship program.

Additionally, Kerri played a key role in the organization of Ocean Acidification Week 2021. Over the past year, Kerri played an important role in the success and expansion of GOA-ON. As such, the GOA-ON co-chairs, Executive Council, and her fellow Secretariat members, would like to acknowledge all of Kerri's hard work and wish her the very best in all future endeavors!

In turn, we now would like to give a warm welcome to Dr. Gabby Kitch!

Starting this month, February 2022, Dr. Gabby Kitch has become a member of the GOA-ON Secretariat. She is also the new coordinator for the GOA-ON Pier2Peer

Program. Originally from San Diego, CA, Gabby holds a deep love for the ocean and has witnessed local ecosystem change over the years. Inspired to take action, Gabby pursued an undergraduate degree in field-based geology to better understand the carbon cycle and the context for human-induced climate change.

Gabby recently completed her PhD at Northwestern University in paleoceanography. Her dissertation research focused on using chemical tools to understand organismal stress during geologic ocean acidification events. As NOAA's Ocean Acidification Program International Policy Knauss Fellow, she looks forward to supporting global ocean acidification programs, as well as the people and communities that fuel such critical science.

GOA-ON Executive Council Annual Meeting Held Virtually

The GOA-ON Annual Executive Council Meeting was held virtually from 30 November – 2 December 2021. The meeting brought together the GOA-ON co-chairs, executive committee science members, executive program representational members, and the Secretariat to discuss important GOA-ON updates and go over general housekeeping items.

Important takeaways from the meeting included the welcoming of a new regional hub, the South Asia Regional Hub on Ocean Acidification (SAROA), as well as discussing plans to increase communication and connections between hubs. Additionally, the meeting provided an opportunity to discuss the seven OARS outcomes and identify potential co-champions for each outcome. In addition to the Annual Meeting, the Executive Council holds quarterly calls to discuss strategy, upcoming events and membership.

Launch of Pacific Islands Ocean Acidification training course

The OceanTeacher Global Academy (OTGA) launched a free online ocean acidification training course for more than twenty Pacific Islands countries and territories. The OTGA e-learning platform is a project of the Intergovernmental Oceanographic Commission of UNESCO (IOC-UNESCO) and its International Oceanographic Data and Information Exchange (IODE), covering a range of topics related to the IOC programs to deliver customized training for ocean experts, and others with an interest in ocean acidification. The two-month course, hosted by The Ocean Foundation, GOA-ON and regional partners, which opened on Monday, Feb. 21, will help expand ocean acidification knowledge and eventual monitoring capacity in the region. Each week, the participants will view 2-3 hours of pre-recorded lecture material from global OA experts, which are paired with open-access readings, quizzes, and live Q&A discussions to cover topics such as the ocean carbonate system, data quality and management, experiments in the laboratory and the field, and biological observations. GOA-ON members Christina McGraw, Sam Dupont, Christopher Sabine, Adrienne Sutton, Katherina Schoo, Kirsten Isensee, Helen Findlay, and Stephen Widdicombe are providing lecture material and Q&A support.

The course will engage hundreds of registrants from the Pacific Islands region. Participants that fully complete the course may apply for an OA monitoring equipment kit from "GOA-ON in a Box," delivered by The Ocean Foundation. This course is launched in conjunction with the new Pacific Island Ocean Acidification Centre (PIOAC), which is based in Fiji and jointly led by The Pacific Community (SPC), University of the South Pacific (USP), National Institute of Water and Atmospheric Research (NIWA), and the University of Otago. Both developments fill a recognized gap in global ocean acidification monitoring in Pacific communities vulnerable to the effects of OA.

The OTGA OA course will soon be opened for participants in other regions, watch out for announcements!

Call for Pier2Peer mentors

GOA-ON's Pier2Peer is a scientific mentorship program that matches senior researchers with early career scientists to facilitate an exchange of expertise and to provide a platform for international collaborations. This mentorship program is central to GOA-ON's goal of international collaboration to share data and understand the global impacts of ocean acidification (OA).

To date, the program hosts 89 mentors and 185 mentees from over 60 countries. While some mentors offer to take on multiple mentees, there are still a number of mentees that are interested in being connected to an ocean acidification mentor. We call on interested GOA-ON community members to sign up as a mentor. For more information on what role and responsibilities a Pier2Peer mentor holds visit the Pier2Peer webpage or email the Pier2Peer coordinator Gabby Kitch (gabby.kitch@noaa.gov). Mentors that have experience in biology, coral research, and OA impacts on fisheries are particularly desired.

Establishment of an OA Collaborative hub for the Southern Ocean

Southern Ocean waters are among the most vulnerable to ocean acidification, yet current observations are patchy and lack circumpolar integration. GOA-ON and the Southern Ocean Observing System (SOOS) seek participants to develop a Southern Ocean collaborative hub on ocean acidification. The hub will provide transdisciplinary expertise to coordinate research activities on OA, its drivers and biological responses from local to regional scales, and to communicate research outcomes. The initial effort will be supported as a SOOS task team to identify the core aims and opportunities to coordinate international programs with the aim of transitioning to a joint SOOS and GOA-ON collaborative hub. Expressions of interest are requested by March 18 for team participation across observations, biological impacts, modeling, data management and development of products.

Suggestions for GOA-ON webinar series

After a short hiatus, the GOA-ON webinar series is due to return on April 29, 2022 (registration details to come!). If you are interested in presenting your work, or would like to suggest a specific topic for a webinar, please contact GOA-ON secretariat member Gabby Kitch at gabby.kitch@noaa.gov. We would love to hear from you!

OARS news

OARS Co-Champions Identified

The GOA-ON programme for the UN Decade of Ocean Science for Sustainable Development, OARS – Ocean Acidification Research for Sustainability, provides a vision for ocean acidification research for the next decade which sets out a roadmap that, when implemented in collaboration with multiple partners, will deliver against seven outcomes by 2030. These outcomes are:

1. Enable the scientific community to provide ocean acidification data and evidence of known quality.
2. Identify data and evidence needs for mitigation and adaptation strategies, from local to global, by 2022.
3. Co-design and implementation of observation strategies in collaboration with data/information producers and end-users by 2025.
4. Increase understanding of ocean acidification impacts to protect marine life by 2030.
5. Provide appropriate data and information necessary to the development of societally relevant predictions and projections.
6. Increase public awareness of ocean acidification, its sources and impacts.
7. Develop strategies and solutions to enable countries and regions to include measures to reduce ocean acidification in their respective legislation.

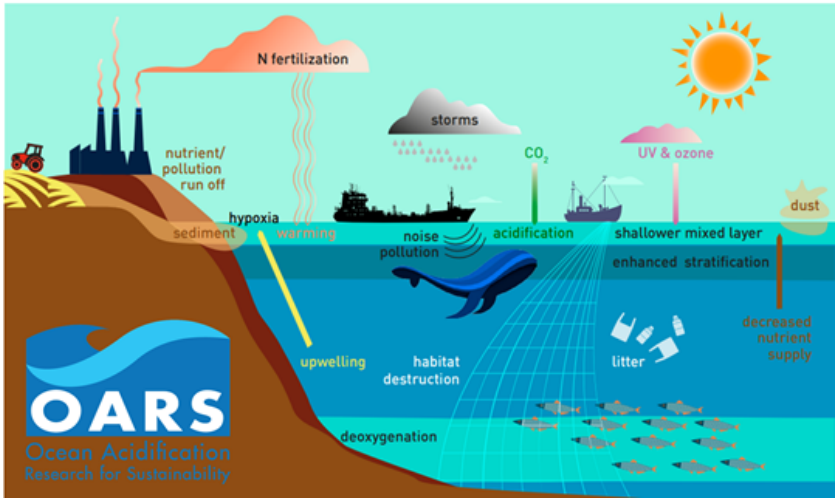
Following the official endorsement of OARS in 2021, GOA-ON and its partners have identified and called upon co-champions for each of these seven outcomes. The co-champions will assemble working groups tasked with finding the path towards achieving the seven outcomes, by identifying the key actions, drivers, and enablers needed.

Over the next 12 months, the co-champions and working groups will be drafting implementation plans outlining the delivery of their outcome, following a “Theory of Change'' structure, preparing a draft timeline and indicative budget to support the implementation plan, and seeking funding in order to begin development of key actions and projects. Furthermore, co-champions and their working groups will identify and engage

with key partners and funders, and forge links with other UN Ocean Decade endorsed programmes to support the delivery of the outcomes.
Please visit the OARS webpage to find out more about OARS and its seven outcomes. If you would like to get involved in this community programme on Ocean Acidification Research for Sustainability, or wish to join a particular working group for an OARS outcome, please contact the GOA-ON Secretariat: secretariat@goa-on.org!

OARS satellite activity at the UN Ocean Decade Laboratory

On March 11, GOA-ON Executive Committee member and OARS co-champion Sam Dupont, together with Kirsten Isensee from IOC-UNESCO, led a satellite activity as part of the Ocean Decade Laboratories "A Healthy and Resilient ocean" event. The satellite activity, titled "Ocean Acidification and Multiple Stressors," provided the opportunity to present concepts and tools, highlight classic misconceptions and discuss the science we need to successfully implement solutions.



IOC-UNESCO, 2022: Multiple Ocean Stressors: A Scientific Summary for Policy Makers. Inf Series 1404: https://unesdoc.unesco.org/ark:/48223/pf0000380891

Sam Dupont pointed out that a healthy and resilient ocean relies on mitigating and adapting to multiple environmental stressors such as ocean acidification in the context of other global and local stressors. At present, these stressors are often addressed individually using a classic ecotoxicological approach: monitoring of the stressor and its sources, identification of thresholds based on standardized tests, followed by the development and implementation of mitigation and adaptation solutions. While this approach is helpful in addressing some stressors, it has its limitations when applied in the context of multiple global stressors.

Jan Newton and Steve Widdicombe, GOA-ON co-chairs, also spoke to participants about the role of GOA-ON and OARS in the international community in addressing multiple stressors.

If you missed the workshop and would like to view the recording, you can access it on the GOA-ON Youtube Channel.

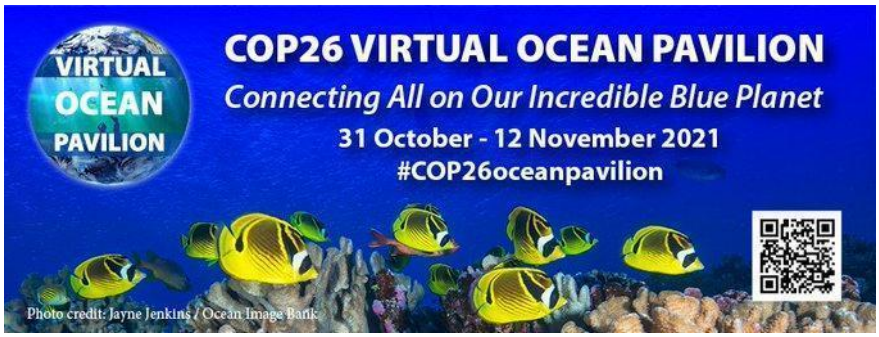
Ocean acidification news

COP26: the 26th UN Climate Change Conference of the Parties

The 26th UN Climate Change Conference of the Parties (COP)was held from 31 October to12 November 2021 in Glasgow, Scotland. COP 26 brought together government officials, international organizations, scientists, businesses and citizens, with the goal of accelerating action towards the goals outlined in the Paris Agreement and the UN Framework Convention on Climate Change.

UN CLIMATE CHANGE CONFERENCE UK 2021
IN PARTNERSHIP WITH ITALY

GOA-ON was well represented at the Conference, with co-chair Professor Steve Widdicombe attending in person, speaking on behalf of GOA-ON at several different side events and highlighting the problem of ocean acidification whenever possible. GOA-ON was also represented by several GOA-ON Executive Committee members (see below for a list of all events).



In addition, GOA-ON was able to secure a booth in the Virtual Ocean Pavillion thanks to GOA-ON Executive Committee member, Dr. Carol Turley at the Plymouth Marine Laboratory. The Pavillion provided live and on-demand access to COP26 ocean events and included a GOA-ON booth that provided visitors with the latest GOA-ON news, access to information and flyers, and a place to ask questions.

Presented by GOA-ON EC members, ocean acidification featured prominently at several side-events during COP26, most of which have been recorded:

- **Regional Ocean Acidification - North Sea and wider NE Atlantic**. Cryosphere Pavilion, Blue Zone; Helen Findlay (event co-lead and speaker), Carol Turley (moderator), Richard Bellerby (speaker). Re-play: https://www.youtube.com/channel/UCr_TPYUAyh13kVbQjzVKh0g

- **Nature-Climate-People: tales from across the ocean**. WWF Pavilion, Blue Zone; Carol Turley (moderator), Steve Widdicombe (speaker). Re-play: https://www.youtube.com/watch?v=gcJiydfSB2Y

- **Inclusive Ocean Acidification Action: Science to Society** (IOC & GOA-ON event). Commonwealth Pavilion, Blue Zone; Kumiko Azetsu-Scott (speaker), Steve Widdicombe (speaker): https://youtu.be/FwqfJpibt-c

- **Ocean Acidification in the North East Atlantic, Arctic and Baltic Waters**. Nordic Pavilion, Blue Zone; Carol Turley (moderator), Richard Bellerby (panel), Melissa Chierici (panel), Helen Finlay (panel): https://youtu.be/lstkN8R0K0M

- **Ocean solutions: Coordination and collaboration for ocean-based mitigation and adaptation**. Forth Room, Blue zone; Helen Findlay (speaker): https://youtu.be/9CB8a-kamRE

- **High-level Marrakesh Partnership Global Climate Action (HL MP-GCA), Ocean Action Day.** Steve Widdicombe (speaker): https://unfccc-cop26.streamworld.de/webcast/mpgca-ocean-and-coastal-zones-action-event-ocean-s

- **Arctic Sea Ice**. Cryosphere Pavilion, Blue Zone; Helen Findlay (speaker). Replay: https://www.youtube.com/channel/UCr_TPYUAyh13kVbQjzVKh0g

- **Polar Oceans: Acidification, Warming and Freshening**. Cryosphere Pavilion, Blue Zone; Helen Findlay (event co-lead). Replay: https://www.youtube.com/channel/UCr_TPYUAyh13kVbQjzVKh0g

- **Ocean Decade in the Asia Pacific** - panel on key ocean knowledge challenges in the region, with a focus on ocean acidification. Japanese Pavilion, Blue Zone; Steve Widdicombe (speaker): https://youtu.be/SVzgG1lTiRQ

- **Raising ambition at COP26 to deliver SDG14.3 to minimise and address the impacts of ocean acidification**. Commonwealth Pavilion. Carol Turley (moderator), Steve Widdicombe (speaker): https://youtu.be/xO3v5XZ1njg

- **Expanding ocean acidification observing capacity to take action**. SDG Pavilion, Blue Zone; Kirsten Isensee (moderator), Peter Thompson (speaker), Steve Widdicombe (speaker): https://fb.me/e/2syiOX7vg

Intergovernmental Panel on Climate Change Report

The latest Intergovernmental Panel on Climate Change (IPCC) report was released February 28, 2022. GOA-ON members Dr. Libby Jewett and Dr. Sam Dupont contributed to the document in which OA is prominently featured. To hear more about ocean acidification and the IPCC report, you can attend our GOA-ON webinar on April 29. For registration details, panelists information, and more, please visit the GOA-ON webpage from April 1.

Important OA highlights from the report include:

- Ocean surface pH has declined globally over the past four decades and this trend was due to rising carbon dioxide levels (virtually certain)
- Ocean surface pH will continue to decrease through the 21st century, except for the lower-emission scenarios SSP1-1.9 and SSP1-2.6 (high confidence)
- Ocean acidification is also developing in the ocean interior due to the transport of anthropogenic CO2 to depth by ocean currents and mixing (very high confidence)
- Since AR5, the observing network in coastal oceans has expanded substantially, improving understanding of both the drivers and amplitude of observed variability
- Mean open-ocean surface pH is projected to decline by 0.08 ± 0.003 (very likely range), 0.17 ± 0.003, 0.27 ± 0.005 and 0.37 ± 0.007 pH units in 2081–2100 relative to 1995–2014, for SSP1-2.6, SSP2-4.5, SSP3-7.0 and SSP5-8.5, respectively
- For calcifying primary producers, including phytoplankton and coralline algae, ocean acidification has different, often opposing effects, for example, decreasing calcification while photosynthetic rates increase (high confidence)
- Warming and ocean acidification appear to jointly favor the proliferation and toxicity of harmful algal bloom (HAB) species (limited evidence, high agreement)
- Multiple lines of evidence find that foundational calcifying organisms such as mussels are at high risk of decline due to both the individual and synergistic effects of warming, acidification and hypoxia (high confidence)
- The effects of ocean acidification on growth, metabolic rates or elemental composition of primary producers changes with nutrient availability and light conditions (high confidence)
- Ocean acidification reduces biodiversity and the calcification rate of corals (high confidence) while at the same time increasing the rate of dissolution of the reef framework (medium confidence)
- Ocean acidification is also expected to drive large global economic impacts (medium confidence)
- Ocean acidification is having negative impacts on the sustainability of mariculture production (high confidence)

To download and read the full report with more regional and organism specific summaries, visit the IPCC Sixth Assessment Report webpage.

Success Stories!

In the spotlight

Punyasloke Bhadury is a Professor of Biological Sciences and also heads the Centre for Climate and Environmental Studies at the Indian Institute of Science Education and Research Kolkata (IISER Kolkata).

Punyasloke is studying the changes in carbonate chemistry and effects on biological communities including bacteria and diatoms across coastal biotopes such as mangroves and estuaries. He has set up the first mangrove time series site in India and possibly all of South Asia - Sundarbans Biological Observatory Time Series (SBOTS). Sundarbans is the world's largest contiguous mangrove and is a UNESCO World Heritage Site and a RAMSAR Site. The broad purpose of SBOTS is to understand the effects of multiple stressors including changing carbonate chemistry on coastal biological communities and resulting consequences for key ecosystem processes such as cycling of carbon and nitrogen. Punyasloke and his team (Integrative Taxonomy and Microbial Ecology Research Group) at IISER Kolkata use an array of techniques including high-throughput sequencing to address questions concerning the health of coastal oceans and conservation of lesser-known fauna such as the mangrove horseshoe crab.

Punyasloke, through the support of GOA-ON, has been instrumental in establishing the South Asia Regional Hub on Ocean Acidification (SAROA). He is also actively involved in undertaking capacity building exercises in areas of marine biodiversity and quantifying effects of anthropogenic stressors on coastal biota catered to early career researchers in South and SouthEast Asia. He works very closely with coastal communities and uses existing traditional knowledge for NbS based approaches to mangrove habitat restoration.

Regional updates

Announcing the newly formed South Asia Regional Hub on Ocean Acidification

SAROA was established to cover the countries surrounded by regional seas and oceans across South Asia. Oceans in South Asia are critical in sustaining livelihoods of millions of coastal communities and contributing to the GDP in countries across the region. Participating countries include India, Sri Lanka, Bangladesh, Myanmar, Malaysia, Maldives, Pakistan and Oman. SAROA was established following encouragement and support

from GOA-ON to promote the practice of collection of geographically distributed data on ocean acidification encompassing South Asian waters including from vulnerable yet ecologically important coastal biotopes such as mangroves, estuaries, salt marshes, lagoons and coral reefs.

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Announcements & Reminders

5th International Symposium on the Ocean in a High-CO_2 World Announces Hybrid Format

The 5th International Symposium on the Ocean in a High CO_2 World has officially been rescheduled for 13-16 September 2022 in Lima, Peru. This will officially be held as a hybrid event to increase global participation. The new format, registration costs, and registration details will be shortly reflected on the High-CO_2 website.

Previously submitted abstracts are still valid. The deadline for any new submissions or alterations is currently **24 April 2022**. New or modified abstracts should follow the abstract template .doc template (MS Word or compatible) and must be submitted electronically to: abstract@highco2-lima.org. For more information visit the symposium's abstract submission page. If you need help locating your original text, please search your inbox for exchanges with abstract@highco2-lima.org. If you wish to withdraw your abstract or update your contact information, you can also email abstract@highco2-lima.org.

The deadline to submit applications for travel support is also 24 April 2022. Authors will be notified of abstract decisions and travel awards by May 8, 2022. For more information on the Symposium themes and details, please visit the Symposium website.

There will be a number of side events hosted both before an after the symposium, including the GOA-ON Regional Hub Coordination Workshop sponsored by IAEA. Visit the webpage for the full list of side events.

GOA-ON data portal support requested

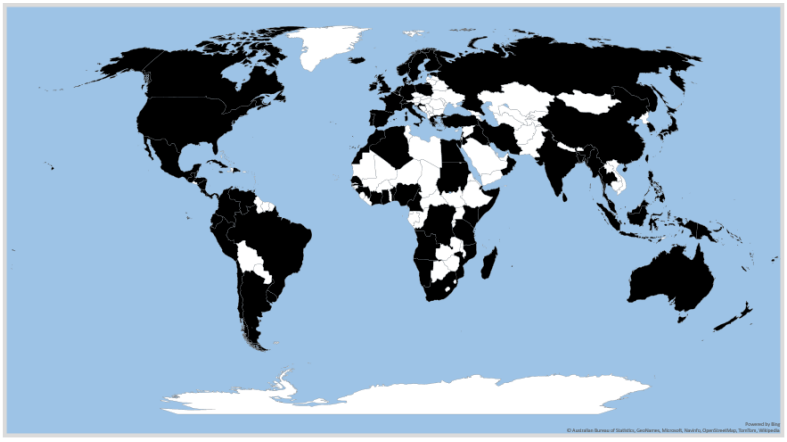
The GOA-ON data explorer contains over 800 assets and counting, and is one of the key services provided by GOA-ON. This portal is community owned and maintained; we rely on scientists to submit entries when new OA observations and monitoring activities take place, such as cruises and surveys. If you have data to submit to a portal or new updates to share about an existing asset please do so here. We work hard to maintain the portal and make it more comprehensive and up to date. If you have past experience managing data portals or large spatial datasets or just have ideas to contribute please get in touch at secretariat@goa-on.org; we would be interested in working with you.

Subscribe to the OA-ICC news stream for daily posts with new OA publications, media coverage, upcoming events, job postings, etc.

- Use the OA-ICC portal for ocean acidification biological response data to access over 1100 data sets.
- Access over 8,600 ocean acidification publications from the OA-ICC bibliographic database.

GOA-ON keeps growing

GOA-ON is a network currently composed of almost 950 members from 105 countries! We appreciate the interest and look forward to facilitating new and exciting collaborations together. A full list of GOA-ON members is available online on the GOA-ON website. If you wish to change your affiliation as it is presented online, please email the GOA-ON Secretariat (secretariat@goa-on.org).



Are you involved in OA work that you would like to have included in future newsletters? Contact the GOA-ON Secretariat: secretariat@goa-on.org

GOA-ON Secretariat

Ashley Bantelman, IAEA Ocean Acidification International Coordination Centre
Gabby Kitch, NOAA Ocean Acidification Program
Katherina Schoo, Intergovernmental Oceanographic Commission of UNESCO

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