GOOD NEWS
Global Ocean Oxygen Decade

Welcome to the first issue of GOOD News, the quarterly newsletter that keeps you up to date on the latest highlights, events, announcements, and opportunities in the Global Ocean Oxygen Network. Compiled by the GO$_2$NE Secretariat at the IOC-UNESCO, the content of GOOD News is provided by the ocean deoxygenation community. We welcome you to get in touch if you wish to promote your work, events, or opportunities, and we hope that you find the content informative, relevant, and useful.

Messages from GO$_2$NE

The Global Ocean Oxygen Network (GO2NE) and the Global Ocean Oxygen Decade (GOOD)

The Global Ocean Oxygen Network (GO$_2$NE), pronounced "gone", is an IOC-UNESCO working group that is committed to providing a global, multidisciplinary view of deoxygenation (decrease of oxygen levels) in the marine environment, with a focus on understanding its multiple aspects and impacts. GO$_2$NE's research, outreach, and capacity building efforts include facilitating communication with other established ocean science and observation networks and programmes. The objectives of GO$_2$NE are to improve observation systems, identify and fill ocean oxygen knowledge gaps, as well as develop and implement capacity building activities worldwide.

After 5 years of successful work, GO$_2$NE developed the framework for the Global Ocean Oxygen Decade (GOOD), a programme within the UN Decade of Ocean Science for Sustainable Development. Within GOOD, GO$_2$NE now invites other scientists, private and public stakeholders, as well as governments to join its efforts to achieve the vision of providing knowledge for action and develop mitigation, and adaptation strategies and solutions to ensure continued provision of ecosystem services. The goal is to minimize the impacts of ocean deoxygenation on marine ecosystem services through local, regional, and global efforts, including transdisciplinary research, innovative outreach, and ocean education and literacy.

If you want to know more about GO$_2$NE and GOOD please contact the GO$_2$NE Secretariat.

– **Kirsten Isensee, IOC-UNESCO**

Call for Nominations for new members of the Global Ocean Oxygen Network committee

The Global Ocean Oxygen Network (GO$_2$NE) is seeking nominations for members to replace a number of incumbent GO$_2$NE committee members that are rotating out in the next 6-12 months. Over a 3-year term, with the possibility to extend to two terms, GO$_2$NE members advise the IOC-UNESCO Secretariat and its Member States on the threat of oxygen loss in the ocean and related science priorities. GO$_2$NE is committed to providing a global and multidisciplinary view of ocean deoxygenation, with a focus on understanding its multiple aspects and impacts. Furthermore, GO$_2$NE developed the framework of the Global Ocean Oxygen Decade (GOOD) as part of the UN Decade of Ocean Science for Sustainable Development, which is working to provide knowledge for action and develop mitigation and adaptation strategies and solutions to ensure continued provision of ecosystem services.

The call is open to anyone that can demonstrate a strong interest in oxygen in the marine environment. Preference will be given to nominees with experience in the biological oceanography, socio-economics, and social science.

To nominate yourself or someone else, please submit your nomination to the GO$_2$NE Secretariat by 4 September 2022 with the following information:

- Name, affiliation & email address

- A statement of expertise and experience pertaining to ocean oxygen (300 words)

- A statement of suitability to sit on an international scientific steering committee (300 words)

The current GO₂NE members will select the best candidate(s) based on the provided information, and inform the nominees about the results of the selection process by the end of September 2022. GO₂NE actively encourages applications from under-represented groups and is committed to diversity and gender balance. For inquires or more information, please contact the GO₂NE Secretariat.
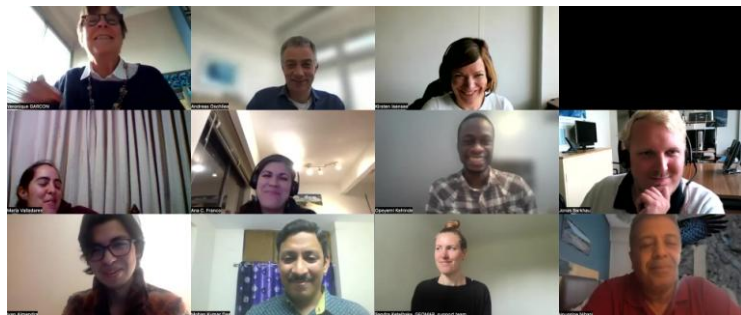
– **Paul Morris, IOC-UNESCO**

Ocean Oxygen Highlights

GO₂DAT Hackathon 2022

The first GO₂DAT Hackathon was held online from May 2-5, 2022, to bring together professionals and students to share data and create multidisciplinary teams that can combine their knowledge, talent, and creativity to develop solutions based on science and technological innovation. These solutions were aimed at providing ideas for the development of a Global Ocean Oxygen Database and ATlas (GO₂DAT).

Out of the more than 30 registered participants, two teams (Ziphius & PacificO2) actively participated in the hackathon and worked for 48 hours on prototypes for data exploitation and integration of coastal and open ocean oxygen data. Participants were introduced to the data sets through presentations by data providers and with the GO₂DAT Hackathon Participant Guide, which contained information about the 13 data sets and providers.

Results from both teams highlighted common problems and limitations of using data from different datasets with different quality control, flagging, units, and formats, and emphasized the need for more structured datasets. Team PacificO2 created a database of oxygen data for the open ocean and coastal regions of the Humboldt Current System, as well as a toolbox to analyze this database and combined it with biological data to be able to define, for example, at what point the combination of low oxygen and high temperature might pose a stress to marine organisms. Plans exist to publish PacificO2's products under FAIR principles (**F**indability, **A**ccessibility, **I**nteroperability, and **R**euse).

In summary, the first GO₂DAT hackathon successfully brought together international teams from different disciplines and facilitated the exchange of creative ideas. It has highlighted the existing difficulties in using different oxygen databases and provided the first approaches towards the elaboration of a single and comprehensive data entry point for ocean oxygen data, and highlighted the great potential of GO₂DAT for the ocean science community.

Building on this experience, challenges related to GO₂DAT have been submitted for the Brest, France and Santiago, Chile venues of the Ocean Hackathon 2022, which will take place from 2 - 4 December 2022.

– **Jonas Barkhau, IOC-UNESCO**

Liège Colloquium – May 2022

The 53rd International Colloquium on Ocean Dynamics - 3rd GO₂NE Oxygen Conference took place in Liège, Belgium on 15-20 May 2022. The colloquium was organized by the IOC-UNESCO Global Ocean Oxygen Network (GO₂NE) and was a contribution to the Global Ocean Oxygen Decade (GOOD) program of the UN Ocean Decade. It was a hybrid event involving 183 persons on-site and 80 online participants. Contributions from the Liège Colloquium will be published in a Special Issue of Biogeosciences.

"The science is clear for ocean, land and human society: Any further delay in concerted global action will miss a brief and rapidly closing window to secure a liveable future. This report offers solutions to the world. It is over to you now!" With these words, Prof. Dr. Hans Otto Pörtner, head of the section Integrated Ecophysiology at the Alfred Wegener Institute, concluded his opening speech and gave the start to a full week of discussion on ocean deoxygenation. We had 13 keynotes, 89 talks, and 60 posters on new developments and insights related to deoxygenation in open and coastal waters across 10 thematic sessions. The colloquium also involved mentoring activities and 4 panels on "Science to policy", "Citizen Science", "Diversity and Equity in Stems", and "Communication to the media".

Key messages included the following:

- The EU Mission for Oceans offers a fantastic opportunity to connect, align and harmonize efforts on deoxygenation to ensure a healthy ocean by 2030. For instance, many national alliances have taken place in the Atlantic – demonstrating collaborative advantages by aligning resources and combining expertise.

- Take any opportunity to augment our observational capacity and data collection while ensuring data are properly processed, quality controlled/flagged and archived in international data bases respecting the FAIR principles (Findability, Accessibility, Interoperability, and Reuse). The building of data synthesis products will help to support the deployment of a sustainable Blue Economy that meets EU policy objectives. The EU Digital Twin will allow visualization of ocean problems and stimulate initiatives on ocean observation to support the policy making process.

The organisation of data hackathons fosters collaboration and rapid development among data scientists.

- A crucial challenge is to efficiently and effectively communicate about the threat of ocean deoxygenation. The community needs strong communicators to bring the issue and its urgency to politicians. To get the topic of oxygen into policy requires capturing interest of policy makers at global, regional, national and local scales. Currently, Oxygen is not part of the planetary boundaries (Rockström et al 2009; Steffen et al., 2015). To have it as a 10th planetary boundary can provide motivation.

- The philanthropic and private sectors have much to contribute in bringing science to action, with opportunity via companies that have made net zero carbon commitments; however, they often don't have the direction for action. The UN Ocean Decade, and in particular the GOOD program, provides an opportunity to activate blue sectors of the economy and connect with wider interests in ocean health.

- The young generation can contribute to the worldwide data collection, and share efforts around oxygen and other biogeochemical variables. The emerging EarlyGOOD network will play this vector role.

– **Marilaure Grégoire, University of Liège**

Arctic cruise on icebreaker "Le Commandant Charcot", 3 June – 8 July 2022

As an operator of tourist expedition cruises, PONANT offered 4 berths on their new vessel specially designed for extreme polar conditions, "Le Commandant Charcot", as a "Ship of Opportunity" platform to collect scientific measurements and data (Figure 1). Andreas Oschlies and Veronique Garçon led the proposal to measure oxygen, bulk organic matter properties, microplastic and zooplankton distributions, and were joined by scientists from GEOMAR Helmholtz Centre for Ocean Research Kiel, LEGOS (Laboratory of Space Geophysical and Oceanographic Studies), and Dr. Jean-Philippe Savy from the University of Bordeaux. On the first leg the ship sailed from Reykjavik, Iceland along the eastern coast of Greenland with unusually intense sea ice cover and then crossed the Fram Strait to reach Longyearbyen, Svalbard, Norway. Three successive legs were operating in waters around Svalbard. The 3rd leg was chartered by HSH Prince Albert II of Monaco for the centenary of Prince Albert 1st's demise and the Charcot track followed his pioneering oceanographic expeditions around Svalbard (Figure 2).

Figure 1: Le Commandant Charcot in the ice east of Greenland at 74.5° N, 14.5° W, 9th June 2022

Figure 2: Itinerary of the 3rd leg in memory of Prince Albert I of Monaco.

With extraordinary support from the ship's crew, 1-2 stations could typically be carried out per day, often on the shelf, but with a several off-shelf deep water stations covering the southward flowing East Greenland Current and the northward flowing West Spitsbergen Current. Data are currently being analyzed and will be used to better constrain models of marine oxygen dynamics in the region. An improved understanding of oxygen dynamics in polar waters that source large parts of the deep ocean could help to resolve the discrepancies between relatively low rates of deoxygenation in current climate models and considerably higher rates in observations.

After this year's successful pilot cruise, we have already applied for a continuation of this collaboration with PONANT to further develop an annual monitoring program of oxygen, microplastic and planktonic ecosystems in the Atlantic sector of the rapidly changing Arctic during the UN Ocean Decade. We warmly thank PONANT, HSH Prince Albert II of Monaco, and our respective institutions (CNRS/LEGOS, GEOMAR and University of Bordeaux) for the opportunity to participate in this cruise into a most wonderful and vulnerable region of our planet, and the excellent crew for the absolutely fantastic support we received during this exciting endeavour.

– **Andreas Oschlies, GEOMAR & Veronique Garçon, LEGOS**

Follow the GO$_2$NE webinar series to learn more about ocean deoxygenation

To learn more about the extent, trends and impacts of deoxygenation, follow the GO$_2$NE webinar series. This regular online seminar series focuses on deoxygenation in the marine environment. Organised and hosted by IOC-UNESCO, this one-hour webinar is run by a guest moderator and two invited speakers. To support the next generation of researchers, each edition features an early-career scientist and a more senior scientist, and aims for an equal gender balance. Each speaker is given 20 minutes to present their work and then has 10 minutes to answer questions from the audience. The webinar is open-access but attendees must register in advance via the webinar announcement, which is distributed via email and social media channels. The webinars are made available via the UNESCO YouTube channel. For the speakers, the webinar offers an excellent opportunity to present their work to

a world-wide audience, with on average 150 participants from more than 60 countries. The objective of this series is to include many different fields of science addressing ocean deoxygenation, therefore you are invited you to contact GO$_2$NE at the IOC-UNESCO Secretariat if you would like to present at or moderate a future webinar. Don't want to miss the next edition? Please sign up here to receive the GO$_2$NE webinar email announcements.

– **Paul Morris, IOC-UNESCO**

Events & Announcements

23 August 2022, 23:00 CEST. The next session of the GO$_2$NE webinar continues in August to explore and report on ocean deoxygenation. To attend be sure to register for the webinar when the announcement is circulated.

19-23 September 2022, Open Science Conference on Eastern Boundary Upwelling Systems (EBUS): Past, Present and Future & Second International Conference on the Humboldt Current System, **Lima, Peru**. Early bird registration is open and check out Session 5 on Deoxygenation in EBUS

2-4 December 2022, Ocean Hackathon 2022. The ocean deoxygenation community submitted two challenges for the Ocean Hackathon 2022 in **Brest, France**, and **Santiago, Chile**. The Brest challenge has been accepted and the Santiago challenge is under review. Look out for opportunities in the near future to become involved with the Ocean Hackathon 2022.

17-21 April 2023, Effects of Climate Change on the World's Oceans (ECCWO5) symposium, **Bergen, Norway**. Early registration is open and check out Session S11 on ocean deoxygenation

Opportunities

- Positions advertised on ocean-oxygen.org

- Employment opportunities at IOC-UNESCO

- To advertise your open vacancies & opportunities send them to the GO2NE Secretariat