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The International Quiet Ocean Experiment (IQOE) is currently scheduled to sunset at the end of 2025. The IQOE Science Committee and others are discussing how to continue IQOE work beyond 2025, as a separate project or by incorporating some IQOE activities in the UN Ocean Decade or other project or organization. IQOE leaders have conducted a [self-evaluation](#) to track project progress.

WORLD OCEAN PASSIVE ACOUSTIC MONITORING (WOPAM) DAY

The Richard Lounsbery Foundation awarded Cornell University a grant to support a post-doctoral fellow to help analyze data from the first WOPAM day. Isla Davidson was selected to fill the position. The project aims to (1) develop an open-access database of sounds from each of 300+ WOPAM sites around the world; (2) create a WOPAM Day website, populated with information about the project, links to partner web pages and sound levels at sites with calibrated measures, as a shared resource; (3) create online media about the initiative; and (4) develop one or more peer-reviewed journal articles describing WOPAM Day and resulting analyses of data. The project will also help integrate the WOPAM Day activity with GLUBS and IQOE. See <https://twitter.com/DrSteveSimpson/status/1666715093495685121>.

GLOBAL LIBRARY OF UNDERWATER BIOLOGICAL SOUNDS (GLUBS)

GLUBS has made progress in several areas in the past several months:

- Audrey Looby led a group whose paper was recently published in *Scientific Data* about a global inventory of sound-producing species and how this inventory is linked to the World Register of Marine Species (WoRMS) ([Looby et al. 2023 - "Global Inventory](#)

[of Species](#)
[Categorized by](#)
[Known Underwater](#)
[Sonifery](#)").

- A [working group](#) (WG) to pursue GLUBS objectives was approved by the Scientific Committee on Oceanic Research (SCOR) in October 2023. SCOR WGs receive up to 45,000 USD for three to four years of activity related to a specific ocean science topic. The WG is co-chaired by Miles Parsons (AIMS, Australia) and Sierra Jarriel (WHOI, USA).
- GLUBS has been endorsed by the UN Decade of Ocean Science for Sustainable Development (UNDOS). GLUBS submitted an expression of interest to the UNDOS conference in Barcelona, Spain in April 2024, to hold a joint satellite event with other UNDOS projects under the Maritime Acoustic Environment program led by Heather Spence.
- GLUBS work continues under an award from the Richard Lounsbery Foundation, with Sierra Jarriel serving as a post-doctoral fellow for the project.



IMPLEMENTATION PLAN FOR OCEAN SOUND ESSENTIAL OCEAN VARIABLE (EOV)

IQOE is pleased to announce the availability of the [Ocean Sound Essential Ocean Variable \(EOV\) Implementation Plan](#). The plan provides background for the importance of this EOv

and the steps required to implement it. IQOE proposed the Ocean Sound EOV and was assigned responsibility for this EOV when it was approved. The Ocean Sound EOV is a “cross-disciplinary” EOV in the structure of the Global Ocean Observing System because it is relevant to both Biology and Ecosystems and Physics observations and EOVs.



SCOR and POGO thank Peter Tyack (Univ. of St. Andrews/WHOI) for leading the committee that produced the plan and for the many committee members, reviewers, and organizational representatives who contributed their expertise to completing the plan. IQOE also thanks POGO and the Richard Lounsbury Foundation for providing financial support for the implementation committee and staff.

IQOE WIKIPEDIA PAGE

Artash Nash (Canada) developed a Wikipedia page for IQOE:

https://en.wikipedia.org/wiki/International_Quiet_Ocean_Experiment

Anyone is welcome to edit the page, but please remember that any changes should present information objectively and in a neutral tone.

UPDATE ON COVID-19 PANDEMIC NOISE OBSERVATIONS AND PUBLICATIONS

Since the previous *IQOE Newsletter*, one 2022 paper was added to the list of papers on the effects of the COVID-19 pandemic on ocean sound at <https://iqoe.org/covid-pause-papers>. The IQOE SC is seeking funding to hire a post-doctoral fellow to analyze ocean sound observations to determine if, when, and where the pandemic affected ocean sound. Approximately 150 records in the IQOE Hydrophone Metadatabase span an appropriate time period to conduct such an analysis. The metadata providers and authors of papers related to COVID effects on ocean sound will be involved in this activity. An IQOE working group may be set up to work with the post-doc.

GLOBAL HYDROPHONE NETWORK AND WG

The number of records in the IQOE Hydrophone Metadatabase continues to grow, including about 5,000 recordings of one day to 20 years, and about 100,000 recordings of less than a few hours, taken at multiple locations in the Pacific Ocean. The metadatabase has been used to (1) identify for the Worldwide Soundscape project cabled networks that provided public metadata and (2) connected a Ph.D. student with data sources for a specific area and a specific day, to study acoustic propagation modeling and seismic event detection related to his dissertation research.

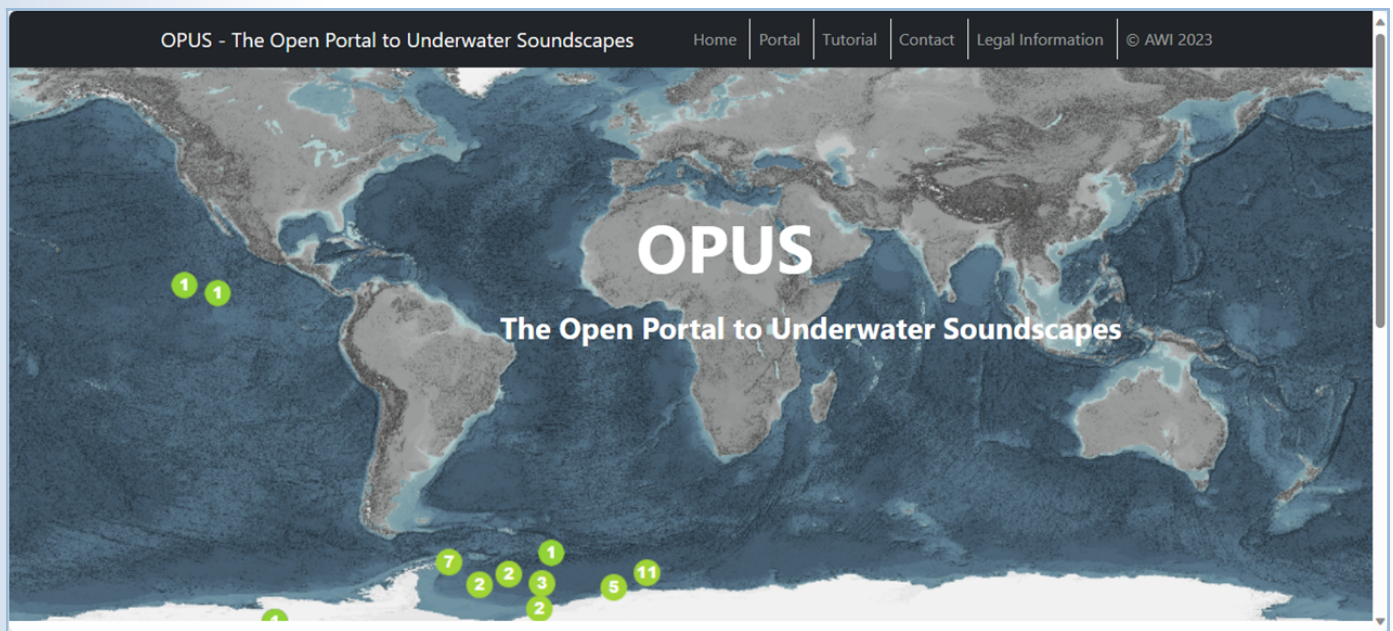
It is expected that several thousand more records could be added in the next year, including recordings made on WOPAM Day 2023. This resource will make possible new cooperation among hydrophone operators, acousticians, and modelers seeking to identify observations within specific areas. The IQOE Working Group on the Global Hydrophone Network will begin its work early in 2024, including discussion of how to incorporate new PAM records and preparing the metadatabase for public access, as well as writing a peer-reviewed publication designed to describe the metadatabase in terms of the distribution of records in time and space, and other characteristics of recordings.

LOW-COST HYDROPHONES

The [IQOE Task Team on Low-cost Hydrophones for Research, Education and Citizen Science](#) has begun its work to create specifications for low-cost hydrophones that could be deployed for a variety of uses, including research, education, and citizen science. The team will also suggest components of do-it-yourself hydrophone kits that would be globally available and identify what would need to be included in an online tool or online forum/YouTube channel to help individuals build and deploy their own hydrophone systems. The Task Team is chaired by Lucille Chapuis (University of Bristol, UK). The group has released a [request](#) for hydrophone development to meet specifications developed by the WG, with submissions due by 31 January.

OPEN PORTAL TO UNDERWATER SOUND (OPUS)

From Karolin Thomisch: On 1 December 2023, version v1.3.0 of the Open Portal to Underwater Soundscapes (OPUS) was made publicly accessible at <https://opus.aq> by the Ocean Acoustics group of the Alfred Wegener Institute for Polar and Marine Research (AWI). Opus.aq provides open access to



quality-controlled underwater sound recordings, along with synchronized, animated spectrograms of nested resolution (covering annual, monthly, daily, hourly and 10-minute periods) from locations worldwide. OPUS allows navigation within and between various datasets by simply clicking on any recorder in the MapView or at the time of interest in the SpectrogramView, facilitating direct access to sound events and comparison of soundscapes worldwide.

In addition to a graphical and “haptic” overhaul of the site, the new version features password-free, open access to OPUS data products released under CC-BY 4.0, both as an audio-visual online experience or by downloading the corresponding audio and spectrogram files. An improved search functionality allows users to filter datasets by time, data provider and deployment ID. Opus.aq currently features 14 long-term underwater recordings from the Southern Ocean (11 datasets) and from Fram Strait (3 datasets) with more than 100 additional passive acoustic datasets in the pipeline.

Original sound data has and will continue to be published under CC-BY 4.0 through the PANGAEA data repository (Felden et al., 2023), including DOI assignment, while adopting the FAIR principles of data management.

Opus.aq seeks to offer quality-controlled and correspondingly flagged audio and spectrographic data only. It thereby serves as the tool of choice to quality-control these massive amounts of original audio data. To this end, external (non-AWI) data providers may now use their personal, password-protected access, to conveniently review their data and metadata in opus.aq, before consenting to its public release.

While opus.aq cannot host an unlimited number of

recordings, selected external recordings are currently being processed and reviewed, including data from the U.S. National Oceanic and Atmospheric Agency Administration (NOAA), the Australian Institute of Marine Science (AIMS), the Flanders Marine Institute (VLIZ) and the Zurich University of Arts (ZHDK). Collaboration with the SoundCoop project for a passive acoustic monitoring national cyber infrastructure center has resulted in version v1.3.0 of opus.aq being able to integrate and display MANTA-processed hybrid millidecade sound level results at 1-minute resolution (without the associated audio files being provided). The resulting strictly visual experience features navigable annual, monthly and daily spectrograms, allowing users to, for example, quickly identify ship passages or other acoustic events of somewhat longer duration.

The OPUS-related workflow is now provided in form of Standard Operating Procedures (SOPs) on terminology and definitions (Thomisch et al., 2023a, <https://doi.org/10.5281/zenodo.7620763>), data preparation and standardization (Thomisch et al., 2023b, <https://doi.org/10.5281/zenodo.7680028>), as well as on data processing and validation routines (currently under review, to be published in early 2024).

Within the MareHub as part of the DataHub initiative supported by the Information Infrastructure for Integrated Earth System Research 2019-2020/2025 of the Helmholtz Association’s Research Field Earth and Environment, opus.aq is now embedded in the Marine Data Portal (<https://marine-data.de>) of the German Marine Research Alliance (DAM). The Marine Data Portal provides a centralized access point to German marine research data as well as data services to national and international research data infrastructures.

Opus.aq was programmed by Lewin Probst, emirror-de (<https://emirror.de/>), a software company located in Syke, Germany. Currently, emirror and AWI are discussing options to create a local version of opus.aq (including data processing, data server, and local web server) which can be licensed to interested parties to visualize, access, and manage their own data in a private setting, potentially including cloud-based data storage solutions, without having to transfer their data to AWI.

Interested users are welcome to explore the new release of opus.aq and share any feedback on its performance and functionality with us at opus-info@awi.de. To get started in the world of underwater soundscapes, opus.aq provides a .csv file for download and subsequent import into opus.aq containing a list of selected sounds from the polar oceans. Users are invited to download this list of primer sounds from <https://opus.aq/content.html#tutorial>.

References

Felden, J., Möller, L., Schindler, U., Huber, R., Schumacher, S., Koppe, R., Diepenbroek, M., and Glöckner, F. O. (2023). "PANGAEA - Data Publisher for Earth & Environmental Science," Scientific Data 10, 347.

Thomisch, K., Spiesecke, S., and Boebel, O. (2023a). "Standard operating procedures: Featuring Passive Acoustic Data by The Open Portal to Underwater Soundscapes (OPUS). Glossary. Version 1.0.1," (Zenodo). <https://doi.org/10.5281/zenodo.7620763>.

Thomisch, K., Spiesecke, S., and Boebel, O. (2023b). "Standard operating procedures: Featuring Passive Acoustic Data by The Open Portal to Underwater Soundscapes (OPUS). Part I: Data preparation and standardization," (Zenodo). <https://doi.org/10.5281/zenodo.7680028>.

Original passive acoustic data sets

1. Thomisch, Karolin; Spiesecke, Stefanie; Boebel, Olaf (2023): Passive acoustic monitoring data recorded by the Perennial Acoustic Observatory in the Antarctic Ocean (PALAOA), Antarctica, in 2022. PANGAEA, <https://doi.org/10.1594/PANGAEA.962533>

2. Thomisch, Karolin; Spiesecke, Stefanie; Filun, Diego; Mattmüller, Ramona; Meister, Marlene; Zwicker, Sarah; Boebel, Olaf (2023): Passive acoustic monitoring data recorded by recorder SV1009 at mooring AWI208-8 in the Weddell Sea, Southern Ocean, in 2017/2018. PANGAEA, <https://doi.org/10.1594/PANGAEA.961737>.

3. Thomisch, Karolin; Spiesecke, Stefanie; Boebel, Olaf (2023): Passive acoustic monitoring data recorded by recorder SV1088 at mooring F5-17 in Fram Strait in 2016/2017. PANGAEA, <https://doi.org/10.1594/PANGAEA.956286>.

NEWS FROM ENDORSED PROJECTS

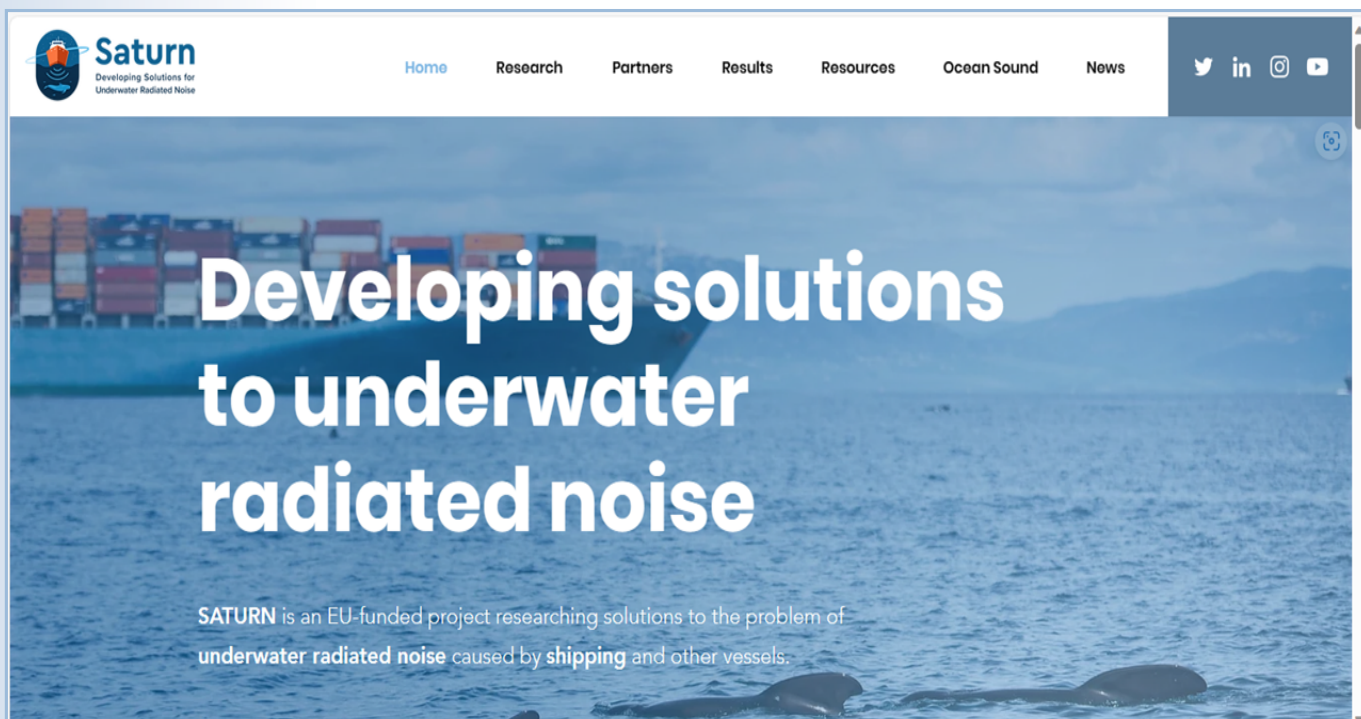
Development and Evaluation of noise Management Strategies to Keep the North Sea healthy (DEMASK)—

The DEMASK project was recently approved as part of the EU Interreg North Sea program as a follow-on to the IQOE-endorsed JOMOPANS project. DEMASK aims to bring together policy makers, non-governmental organizations, and the maritime industry in the management of the underwater soundscape in the North Sea. The project will enable stakeholders to take measures that contribute to a well-managed soundscape and strengthen the marine ecosystem. DEMASK will develop an approach to define policy scenarios for underwater noise management and a method to quantify the effectiveness of those scenarios to mitigate noise pollution and its effects on marine life. DEMASK will (1) develop policy scenarios for a well-managed soundscape, (2) evaluate these all the way through effects on marine biodiversity, and (3) select an appropriate noise management strategy.

Solutions At Underwater Radiated Noise (SATURN)—

News from the SATURN project can be found at <https://www.saturnh2020.eu/news>, including achievements since *IQOE Newsletter* #11:

- [New animated video on the effects of vessel slowing on ocean sound](#)— This video is based on recent research conducted within the SATURN project on the effectiveness of vessel slowdowns.
- [New paper on harbour porpoise exposure to shipping noise](#)—Research related to SATURN was recently published: Frankish, C.K. et al. 2023. Ship noise causes tagged harbour porpoises to change direction or dive deeper. *Marine Pollution Bulletin* 197:115755, <https://doi.org/10.1016/j.marpolbul.2023.115755>.
- [Downloadable Poster for Students and Classrooms on Ocean Sound](#)—SATURN created a poster explaining ocean sound for students and others. The poster can be downloaded for printing.
- [Testing a New Propeller Design in France](#)—SATURN partners in France tested a new trochoidal propeller design to reduce underwater noise, using a model ship (see video at link). Results will be announced when available.
- [Testing Educational Materials About Vessel Noise with Students](#)—In October, SATURN tested a prototype 6-hour classroom unit for teaching about vessel noise using model ships with different propeller types, and exploring the effects of ship speed on vessel noise and efficiency. The unit will be developed in multiple languages to encourage use in schools throughout Europe.



- [Webinar on Marine Mammals and Vessel Noise with DOSITS](#): SATURN and DOSITS collaborated to offer a webinar on “Marine mammals and vessel noise: exposure, impacts, and potential solutions” (see <https://dosits.org/decision-makers/webinar-series/2023-webinar/marine-mammals-vessel/>).

Ports, Humpbacks, y Soundscapes In Colombia (PHySIC)—From Kerri Seger: “PHySIC collected 5 weeks of data from two locations (Morro Mico and Piedra Bonita, Colombia) in 2023 and the data have been retrieved from the autonomous recorders, doubling the data collected in previous years. Natalia Botero Acosta, our colleague at Fundación Macuáticos Colombia who runs the field site, will be at University of California Santa Cruz doing a post-doc with Ari Friedleander for the next two years and will be focusing on hormone analysis from all our biopsies taken while we have concurrent soundscape recordings. Two more chapters from the Aquatic Noise conference have gone through peer review to be included in this year’s edition.”

Get Your Project Endorsed

IQOE would like to endorse any research project or observation activities that are relevant to IQOE. Information about the endorsement process and endorsed projects can be found at <http://www.iqoe.org/projects>. The benefits of endorsement include increased international visibility of endorsed projects, which are usually national or regional, and the potential for joint activities with other endorsed projects and with other IQOE-involved scientists.

NATIONAL/REGIONAL ACTIVITIES

Several national and regional efforts beyond endorsed activities are directly relevant to IQOE. If you have news of national scientific projects or meetings related to IQOE, please email them to [Ed Urban](#).

Africa

The latest African Bioacoustics Community [newsletter](#) has just been issued. It highlights bioacoustics research on the continent, publications from this research, and information about events and opportunities in the region. The Lounsbery Foundation is supporting continued development of the African Bioacoustics Community.

United States

NCEI 2023 Passive Acoustic Archive Workshop—The 2023 NCEI Passive Acoustic Data Archive Workshop was held on 26 October 2023. This hybrid event brought together partners and stakeholders from the government, academia, industry, and the international community (Alfred Wegener Institute). The meeting reported on the growth and development of the archive, updates on several projects in which NCEI staff are involved, and plans for 2024. The archive has grown by 383 TB in the past two years and downloads have increased significantly, with a total of 110 TB downloaded between 11 June and 7 November 2023. A next-generation [NCEI Passive Acoustic Data Archive Map Viewer](#) has been launched. NCEI is cooperating with Google to develop tools for ocean bioacoustics. The Passive Acoustic Monitoring National Cyberinfrastructure Center (also known as SoundCoop) is a multi-agency effort to advance the

community's ability to "create and compare standardized sound level metrics using freeware; connect data from separate repositories; visualize and integrate the acoustic data with environmental sensor data; and provide new tools for the community to easily adapt the project's approaches with their own data." From Carrie Wall Bell.

IQOE EMAIL LIST

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SPONSORED BY



IQOE is supported and overseen by these organizational sponsors and makes regular reports to them. IQOE reported to the SCOR Annual Meeting on 18 Oct. 2023 and will lead a special session at the POGO Annual Meeting on 22–26 January 2024 to discuss implementation of the Ocean Sound Essential Ocean Variable as part of the Global Ocean Observing System.

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Endorsed projects (4): DEMASK, NRS, PHYSIC, SATURN

Publications in Aquatic Acoustic Archive: 7,115

IQOE Email List: 418

X Followers: 189