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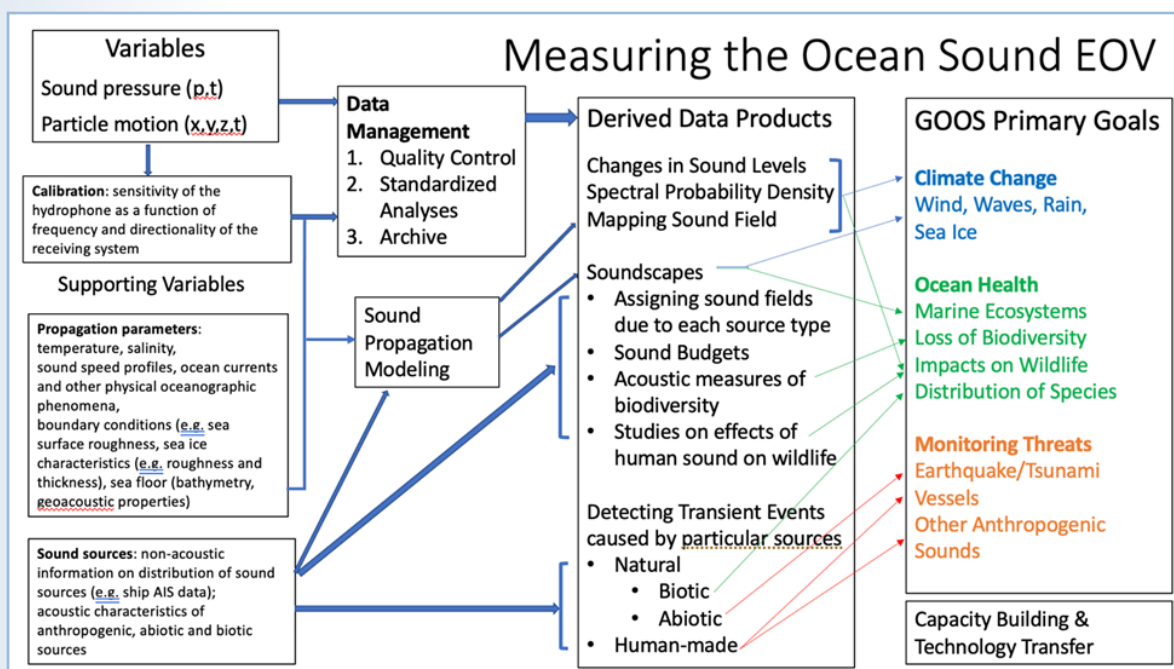
The International Quiet Ocean Experiment (IQOE) is currently scheduled to sunset at the end of 2025. The IQOE Science Committee and others are in discussion about how to continue IQOE work beyond 2025, as a continuing project or by incorporating some IQOE activities in the UN Ocean Decade or other project or organization.

## MEETINGS OF THE IQOE SCIENCE COMMITTEE (SC)

The IQOE SC met virtually on 8 September and 15 December 2022 and reviewed progress of the entire portfolio of IQOE activities. The SC decided to form two task teams to follow up on the low-cost hydrophones workshop, a particular interest of one of IQOE's co-sponsors, the Partnership for Observation of the Global Ocean (see details below). The SC also revised the terms of reference of the IQOE Data Access and Communication Working Group and agreed to form an IQOE working group focused on creating a global hydrophone network. The IQOE SC recommended that the Ocean Sound Essential Ocean Variable Committee create a detailed executive summary for its implementation plan.

The IQOE Working Group on Data Management and Access will be reformed with new members and new terms of reference to focus on drawing together the different data-related IQOE activities (e.g., MANTA, OPUS, GLUBS, hydrophone network) planning synthesis products, and planning for continuation of activities after IQOE sunsets in 2025 as independent activities or under other organizations.

The IQOE SC will meet in person for the first time since 2018 on 26-27 April 2023, in conjunction with a workshop of the Global Library of Underwater Biological Sounds in Woods Hole, Massachusetts, USA (see below).

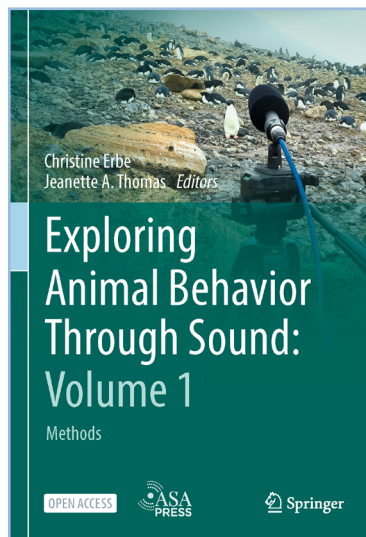


# IMPLEMENTATION PLAN FOR OCEAN SOUND ESSENTIAL OCEAN VARIABLE (EOV)

The draft Implementation Plan for the Ocean Sound EOV is available for [download here](#) for community feedback. Comments should be submitted either through a [Google form](#) or through a [Survey Monkey form](#) by 15 February 2023. The [Ocean Sound EOV Implementation Committee](#) (chaired by Peter Tyack) will consider all review comments in creating the final version of the Plan.

## PUBLICATIONS

**New Book:** A new book edited by Christine Erbe and the late Jeannette Thomas, entitled [Exploring Animal Behavior Through Sound: \(Volume 1\)](#) was published on 23 August 2022 by Springer Nature. The Lounsbery Foundation contributed funding to make the book open access. A second volume is in process. The book has been accessed on-line more than 70,000 times so far.



The Webpage compiling papers regarding the effects of COVID on ocean sound is updated whenever a new paper appears. The total has already reached 17 (see <https://iqoe.org/covid-pause-papers>). Please contact Ed Urban ([ed.urban@scor-int.org](mailto:ed.urban@scor-int.org)) if you know of research papers that should be added to the list. Discussions are underway about whether to host a virtual workshop leading to an overview paper about the COVID pause and ocean soundscapes (see below).

## GLOBAL LIBRARY OF UNDERWATER BIOLOGICAL SOUNDS (GLUBS)

The Global Library of Underwater Biological Sounds (GLUBS) held a workshop on 16 July 2022 in conjunction with the Aquatic Noise 2022 (AN2022) meeting in Berlin, Germany. Although COVID restricted attendance, 7 individuals attended

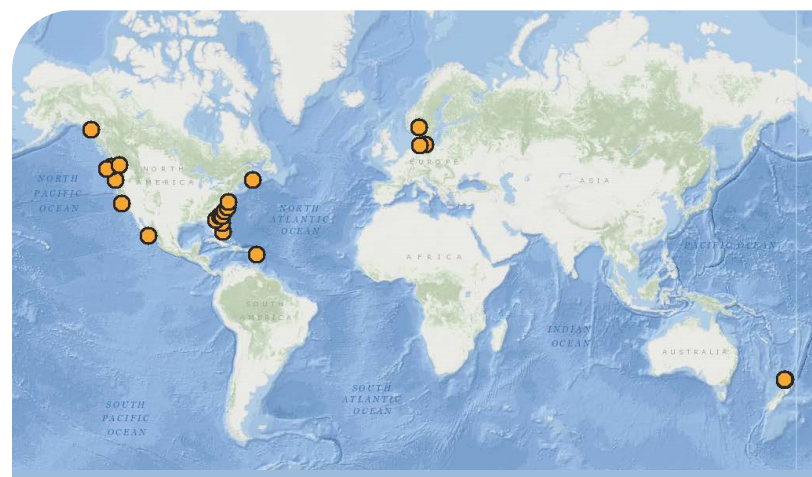
in person, with an additional 13 online participants. The report from the meeting (Miles Parsons, convening author) will appear as part of the planned AN2022 publication now being completed. Meeting participants agreed on the GLUBS structure and focus.



GLUBS received a grant from the Lounsbery Foundation (U. of Perpignan, Lucia Di Iorio, lead PI) and has advertised for a post-doctoral fellow to assist with GLUBS implementation. A search is currently underway to fill this position. Using funding from the Lounsbery Foundation, with additional funding from the Woods Hole Oceanographic Institution (WHOI), a GLUBS workshop will be held at WHOI on 28-29 April 2023.

GLUBS is planning a *Frontiers* research topic. Three papers are in development: (1) a list of soniferous species for WoRMS led by Audrey Looby, (2) a paper on categorizing sounds, and (3) a paper specifically on GLUBS. This latter paper will include a series of case studies to explain the utility of GLUBS to provide specific examples.

## UPDATE ON COVID-19 PANDEMIC NOISE OBSERVATIONS AND PUBLICATIONS



Location of observations of COVID-19 pandemic effects on ocean sound, reported in papers at <https://iqoe.org/covid-pause-papers>.

Observations of the changes in ocean sound that resulted from the COVID-19 pandemic will help managers understand the extent to which different changes in human activities—such as decreased shipping and slowing of ships—will impact ocean sound. The IQOE SC has decided to form a working group to address this question and is seeking funding to hire a post-doctoral fellow to help analyze results from the global set of papers documenting various changes, or lack thereof, in ocean sound resulting from the COVID-19 pandemic. The figure above shows the locations where observations on the pandemic were published as of the end of 2022.

## GLOBAL HYDROPHONE NETWORK

IQOE continues to gather hydrophone observation metadata, both current and from the past. Work is ongoing to make this database accessible through the [IQOE Website](#).

The IQOE SC decided to form a working group on the Global Hydrophone Network to help document and network hydrophone operators from around the world. The WG would focus on the following tasks (among others):

- Review the existing set of hydrophones in the database to identify gaps in coverage and contact hydrophone operators not yet in the system.
- Review metadata collected by IQOE from hydrophone operators to determine if any changes need to be made.
- Suggest approaches for data sharing among operators and the public.
- Develop an international organization of hydrophone operators that can help standardize and share observations, serve as a point of contact for the Ocean Sound EOVI, and help expand the hydrophone network.
- Examine the Ocean Sound Essential Ocean Variable Implementation Plan to determine how a hydrophone network could contribute to measuring this EOVI.
- Determine how ocean bottom seismometers could be included in the hydrophone network.

## LOW-COST HYDROPHONES

The IQOE SC has selected two topics to follow-up on its [virtual workshop](#) on Low-Cost, Self-contained Underwater Acoustic Recording Systems held on 13–14 December 2021. The topics were separated because it was recognized that hydrophones for the Global Ocean Observing System (GOOS) should be designed with standardization and ability to calibrate as more important constraints than cost, whereas a class of hydrophones for use in education, citizen science, and some kinds of research may not need to be calibratable, and thus could be less expensive to produce.

1. **Calibratable hydrophones to measure the Ocean Sound Essential Ocean Variable for the Global**

**Ocean Observing System.** This task team will convene online and/or at Acoustical Society of America (ASA) or other meetings to create specifications for calibratable hydrophone systems (hardware and software) that could be widely deployed by scientists, institutions, and nations contributing to GOOS. The task team will focus on minimum technical requirements without specifying low-cost options. The team should consider potential products as identified in the Ocean Sound EOVI Implementation Plan, as well as relevant International Organization for Standardization (ISO) standards, to create hydrophone specifications. The group will also specify methods that could be used to calibrate GOOS hydrophones, with a view to making the methods lower cost and internationally available. It will be helpful to identify currently available calibration methods, as well as make recommendations of research and development directions for better methods.

2. **Low-cost hydrophones for research, citizen science, and education purposes.** This task team would convene online and/or at ASA or other meetings to focus on specifications for low-cost hydrophones, not needing to be calibrated, that could be deployed for a variety of uses, including research, education, and citizen science. The team would also suggest components of DIY 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.

IQOE is currently contacting potential chairs of these task teams. Participants at the workshop specified their interests in these two topics and the task teams will solicit input from additional scientists from the global community.

## OPEN PORTAL TO UNDERWATER SOUND (OPUS)

From Karolin Thomisch: “Over the past few months, OPUS went through a successful test phase with a limited number of users, mainly from the scientific community worldwide, but also including journalists, artists and students. As a next step, the OPUS team is currently preparing an open-access version of OPUS (currently under internal review) which will be released in early 2023.

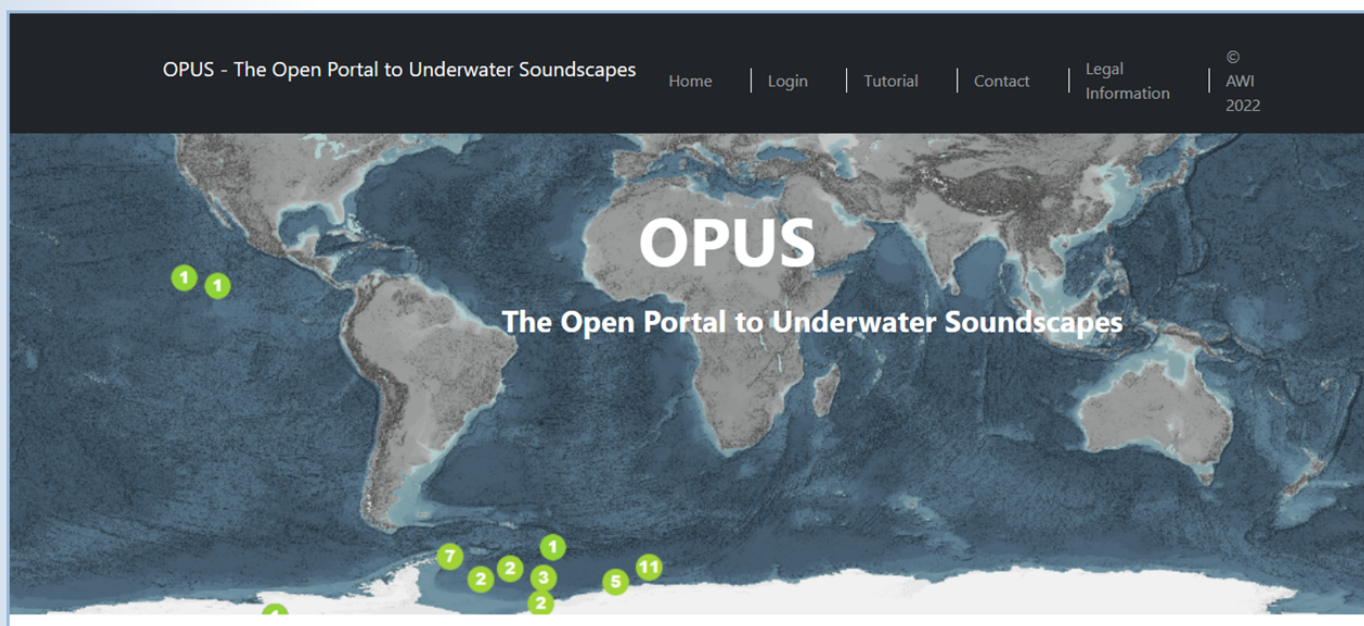
This open-access version of OPUS will initially feature 6 passive acoustic monitoring data sets from the Southern Ocean and Fram Strait. OPUS’ internal database currently comprises 96 passive acoustic data sets, which will sequentially be featured publicly on OPUS after quality control. Furthermore, to facilitate data ingestion and quality control



by an increasing number of data providers, a user management system is currently in preparation. Documentation of the OPUS-related workflow, including data management, processing and validation routines, is advanced by writing and providing Standard Operating Procedures (currently under review, to be published in 2023) as well as templates for data processing reports and metadata compilation.

OPUS' medium-term goals include establishing and advancing an efficient workflow to feature external data and associated metadata and facilitate quality review by external data providers via several case studies, including the possibility to feature MANTA-processed data of 1-minute resolution, as well as further advancing ways of hosting OPUS data and webservices outside AWI via cloud services. To this end, the OPUS team is currently collaborating with different data providers from NCEI/NOAA, the Flanders Marine Institute (VLIZ) and AWI. Further, OPUS is in the process of networking with GLUBS and the JOMOPANS project.

Interested users are very welcome to test the current OPUS version and to share any feedback on its performance and functionalities with us at [opus-info@awi.de](mailto:opus-info@awi.de)."



## UPCOMING MEETINGS

[Underwater Acoustics International Conference and Exhibition](#) (UACE2023)—25-30 June 2023—Kalamata, Greece

## NEWS FROM ENDORSED PROJECTS

Congratulations to **JOMOPANS** for completing its five-year project (see [final newsletter](#)). The project's final report was well received by the project sponsor, the Interreg North Sea Region program of the European Union. Plans are being developed for a follow-on project, Defining and Evaluating Management Scenarios to Keep the North Sea soundscape healthy (DEMASK). If you are interested in this project, please send an email to [damask@rws.nl](mailto:damask@rws.nl) to be added to the DEMASK mailing list.

The **QUIETSEAS** project "aims to support Member States

authorities for the practical development of the Marine Strategy Framework Directive by providing tools and methods to facilitate underwater noise assessment and management in the Mediterranean Sea and the Black Sea regions." QUIETSEAS members participated in the MARBLUE 2022 conference on 26-28 October 2022, in Constanta, Romania. Two papers were presented on QUIETSEAS results in the Black Sea.

**QUIETSEAS** has announced a two-day training session on practical tools for assessment of the environmental impact of underwater noise. The session will take place on 15-16 March 2023 in Fuente Álamo, Spain. The training session will focus on Competent Authorities of EU member states and non-EU countries of the Mediterranean and Black Sea Marine regions. During the session, QUIETSEAS experts will show practical tools and methodologies for the assessment of the environmental impact of underwater noise. Before the training session, on 14 March, a summit on environmental impact of underwater noise will be held. The summit will bring together representatives of the most relevant initiatives on the issue, such as TG Noise members, competent

authorities, QUIETSEAS partners, and other international research projects. The official agenda will be available in the next few weeks.

## 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.

### Canada

MERIDIAN—The MERIDIAN project and Ocean Networks Canada (ONC) co-sponsored a workshop on 1–3 November 2022 on “Machine Learning Advances for Marine Acoustics and Imagery Data”. The workshop was held in webinar format with technical panel discussions over three days on the topics of (1) machine learning (ML) applications for underwater acoustic data, (2) ML applications for ocean imagery and aerial/satellite imagery data, and (3) co-located acoustic and imagery data for ocean science applications. Other recent actions of MERIDIAN include the following:

- release of a [North Atlantic Right Whale \(NARW\) call detector tool](#)
- release of [tools to track ships and detect fishing activity](#)
- and continued develop of [FishSounds](#), which is a partner in the IQOE GLUBS project.

Also from Canada, a remarkably talented high school student named Artash Nash has been doing notable work on creating access to ocean acoustic data. He created the site <http://www.MonitorMyOcean.com> to help study the impact of the COVID-19 pandemic on ocean acoustics. Nash’s project was shortlisted for top recognition for the Ocean Changemakers Challenge 2022 from the Economist magazine’s Ocean Impact Initiative (see <https://youtu.be/ytCsjNFuTtQ>).

### USA

The National Centers for Environmental Information (NCEI) of the U.S. National Oceanic and Atmospheric Administration

continues to grow its [Passive Acoustic Data Archive](#), which is designed to archive and serve data from U.S. government-funded observations, including several projects endorsed by IQOE (ADEON, NRS, SanctSound). The archive has exceeded 400 TB of uncompressed data (discoverable [here](#)), almost one-third of which was archived in the past 6 months. NCEI has launched a new portal with new features to help search through the archive collections.

## IQOE EMAIL LIST

IQOE maintains an email list containing your first name, surname, and email address. We do not collect or store any additional information or share our email list with other organizations. If you wish to unsubscribe from the IQOE email list at any time, please click the “Unsubscribe” link at the bottom of any email from IQOE.

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**Endorsed projects (6):** NRS, PHYSIC, QUIETSEAS, SanctSound, SATURN, TANGO

**Publications in Aquatic Acoustic Archive:** 7,115

**IQOE Email List:** 392

**Twitter Followers:** 140