IQOE News #9
July 2022

IQOE work has proceeded without pause during the COVID travel restrictions, but we are beginning to plan some in-person meetings later this year. Although Zoom meetings have been productive during the past 2+ years, we miss the spontaneity and inter-personal interactions.

Renewal of IQOE Science Committee (SC)

The membership of the IQOE SC has been renewed, with many original members rotated. The new membership includes Steve Simpson (UK) and Peter Tyack (USA), co-chairs, as well as members Christ de Jong (Netherlands), Lise Doksaeter Sivle (Norway), Tess Gridley (Namibia/South Africa), Bruce Martin (Canada), Miles Parsons (Australia), Filipa Samarra (Iceland), Karolin Thomisch (Germany), and Carrie Wall Bell (USA). The SC met virtually on 27 June 2022 to orient new members and update them about ongoing IQOE work. The SC will be working in the coming months to follow up on: topics from the low-cost hydrophone meeting (see below), additional analysis of changes in ocean sound from the COVID pandemic, reviewing IQOE working group activities, and potentially forming a WG to help establish a global hydrophone system. The SC will meet again virtually in a few months, and in person in late 2022 or early 2023.

We thank the following individuals for their service on the SC and contributions to implementing the project: George Frisk (co-chair, USA), Olaf Boebel (Germany), Robert MacCauley (Australia), Jennifer Miksis-Olds (USA), Hanne Sagen (Norway), Jakob Tougaard (Denmark), and Alexander Vedenev (Russia).

Implementation Plan for Ocean Sound Essential Ocean Variable (EOV)

The implementation plan for the Ocean Sound EOV is being reviewed by the IQOE Science Committee before releasing it to the ocean acoustics community for comment by the end of August.

New Book

A new book edited by C. Erbe and J. Thomas, entitled *Exploring Animal Behavior Through Sound*: (Volume 1) is scheduled to be published on 23 August 2022 by Springer Nature. The Lounsbery Foundation contributed funding to make the book open access.

Global Library of Underwater Biological Sounds (GLUBS)

GLUBS is a project of the IQOE WG on Acoustic Measurement of Ocean Biodiversity Hotspots, led by Miles Parsons (AIMS, Australia). Planning for GLUBS has proceeded significantly since IQOE Newsletter #8:

- Grant from Richard Lounsbery Foundation—The Richard Lounsbery Foundation has made a grant of $140,300 to Lucia Di Iorio (Perpignan University, France) and Aran Mooney (Woods Hole Oceanographic Institution, USA) for GLUBS work. Funding is included in the grant to hire an early-career scientist to work on the following activities: (1) follow-up from a GLUBS workshop in Berlin, Germany on 16 July 2022 (see next bullet point), compiling input from the passive acoustic monitoring community on previous acoustic data acquisition and expectations of GLUBS, helping

to build and consolidate partnerships necessary to build core groups for the development of the platform design of GLUBS, contributing to the editorial and review activities of a special journal issue on spatiotemporal patterns of unknown underwater biological sounds, and leading the organization of a two-day hybrid workshop (in the United States) to develop the GLUBS conceptual platform design. The job announcement can be found here.

- Berlin Meeting—GLUBS will convene a workshop in Berlin on 16 July in conjunction with the Aquatic Noise 2022 Meeting to broaden the GLUBS community and to advance planning for the activities mentioned in the previous bullet point.

**Update on COVID-19 Pandemic Noise Observations and Publications**
The list of papers on the IQOE Web site related to COVID-19 impacts on ocean sound has been updated with two 2022 publications: 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. Please contact Ed Urban if you know of research papers that should be added to the list.

Global Hydrophone Network
The set of hydrophones for which metadata is maintained by IQOE continues to grow. Most recently, sonobuoy deployments by Australian and U.S. agencies have been added. The most recent map of deployments (1999-2022) is shown below. IQOE is seeking additional metadata for locations not yet shown on the map, from stationary hydrophones, drifting hydrophones of various types, and ship-based passive acoustic observations.
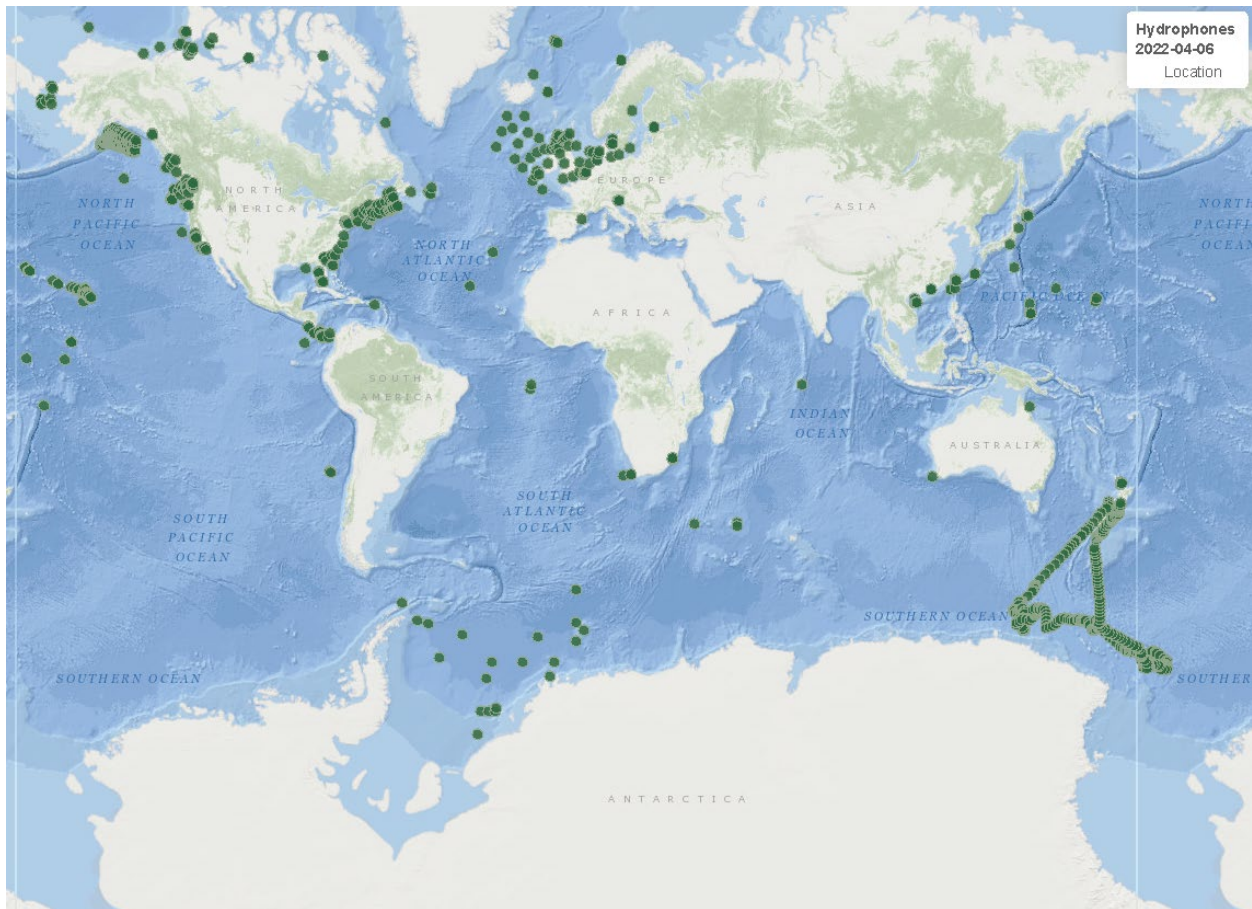
The deployment of hydrophones has increased over time (see figure below). Peaks in 2012 and 2013 resulted from campaigns of sonobuoy deployments.

# of non-military hydrophones deployed worldwide
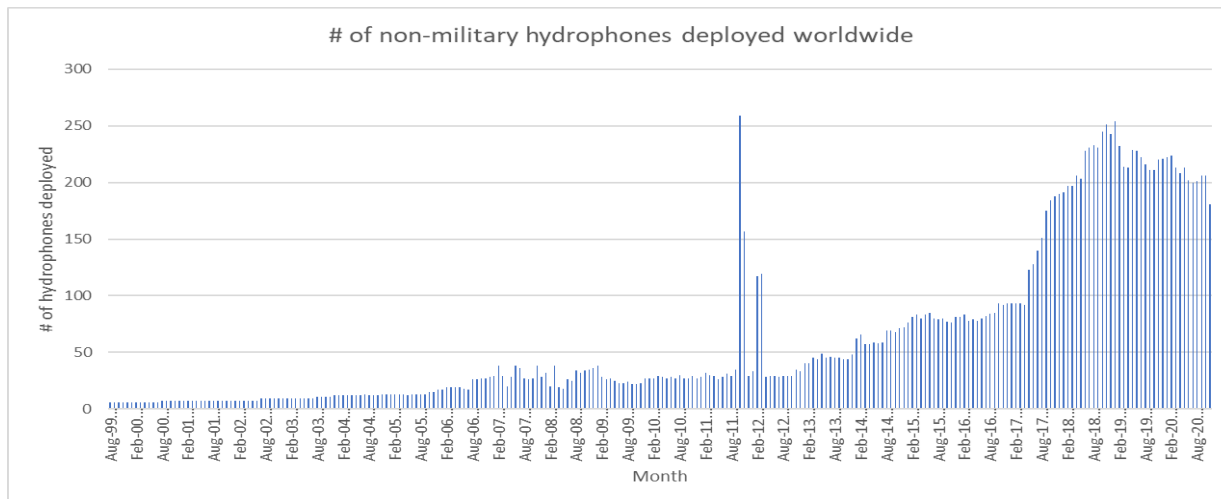
Low-Cost Hydrophones

IQOE and the Partnership for Observation of the Global Ocean (POGO) convened a virtual workshop on Low-Cost, Self-contained Underwater Acoustic Recording Systems on 13-14 December 2021. Following the workshop, a SurveyMonkey questionnaire was used to determine the interest of participants in a set of potential tasks teams to follow-up on important topics identified during the workshop. IQOE will be selecting some of the topics in the coming months for further development.

Software and Databases

SonoScape (Peng Li & Almo Farina)—open-source software to process acoustic data with the Acoustic Complexity Index (ACI) is available through https://github.com/pliphd/SonoScape. The manual published by Springer (Methods in Ecoacoustics - The Acoustic Complexity Indices: Almo Farina & Peng Li) is available at https://link.springer.com/book/10.1007/978-3-030-82177-7?sap-outbound-id=013C40C30AEEA65854384BB79EA0E4AF3CC5E788.

MANTA—A new version of MANTA has been released (see https://bitbucket.org/CLO-BRP/manta-wiki/wiki/Home), for processing ocean acoustic data according to ISO standards and making it possible to compare observations made by different equipment at different locations.

PAM2Py—The JONAS software PAM2Py has been updated following discovery of a bug in the original PAMGuide MatLab code. Download from JONAS at https://www.jonasproject.eu/pam-for-python/.

Open Portal to Underwater Sound (OPUS)

From Karolin Thomisch: "OPUS, the Open Portal to Underwater Soundscapes, is intended to be an expeditious discovery tool of archived, quality-controlled, passive acoustic monitoring data to promote public recognition of underwater sound and to further our understanding of its ecological function, by making underwater soundscapes experienceable by anybody, from artist to researcher. OPUS is being developed at the Alfred Wegener Institute Helmholtz Centre for Polar and Marine Research (AWI) and is available at https://opus.aq with login credentials received upon request to opus-info@awi.de.

A test version of OPUS currently features 6 passive acoustic monitoring datasets from the Southern Ocean and the Fram Strait. Recordings are communicated by means of nested spectrograms of various temporal resolutions (with resulting spectrogram durations of 10 minutes, 1 hour, 1 day, 1 month and 1 year) and the associated stream of audio data. However, the internal database comprises 79 passive acoustic datasets, which will be featured publicly on OPUS after their data quality in reviewed. The latest functions added to OPUS include a download option for the current 10 min audio file and/or associated spectrograms as well as a speed-up functionality to accelerate the playback rate.

Over the past few months, a steadily increasing number of users from the scientific community worldwide have accessed the test version of OPUS and provided feedback. Overall, OPUS has been well received and its functionality seems to serve most users well. However, the test phase revealed that the opus.aq website was not accessible from every location around the world. Disconnecting potential institutional VPN services enabled OPUS access for some, but not all, users who reported accessibility issues. By intervention of internet administrators, the issue has hopefully been resolved now and anybody who had encountered this problem is kindly invited to retry and share their experience with OPUS."

News from Endorsed Projects

JOMOPAN
JOMOPANS is completing is work after 4.5 years. The final report of the project is available at https://northsearegion.eu/media/17501/interreg_jomopans_10-years-of-north-sea-soundscape-monitoring_final.pdf and a policy brief is available at https://jomopanspolicybrief.myportfolio.com/. JOMPANS held a joint meeting with JONAS on 8-9 June (see next item).

Joint Framework for Ocean Noise in the Atlantic Seas (JONAS) (https://www.jonasproject.eu/)--
From Amy Dozier: "On 8-9 June, the JONAS and JOMOPANS projects held a joint hybrid conference in Cork, Ireland with 169 attendees from across Europe. The conference celebrated the conclusion of both projects and their excellent technical contributions on underwater noise research in the Atlantic and North Sea regions. Maud Casier of DG Environment and Chair of TG-NOISE, Frank Thomsen (DHI Denmark), delivered keynote speeches and set the tone for fruitful discussions among the attendees. The conference highlighted the outputs and achievements of JONAS and JOMOPANS and covered topics such as standardisation, measuring and modelling sound, risk mapping and threshold setting, and communicating about the issue of underwater noise. Additionally, researchers from the two projects presented the technical solutions and outputs that were delivered over the projects' timelines, including the JOMOPANS support tool for reaching Good Environmental Status under the Marine Strategy Framework Directive, and the JONAS open-source tool for passive acoustic monitoring developed within JONAS, called PAM2PY. This tool makes it possible for users to process underwater acoustic observations in Python and encourages and facilitates the exchange of acoustic data between institutions to promote collaborative ocean sound monitoring. All of the presentations from the two-day conference can be viewed on the JONAS YouTube account at https://www.youtube.com/watch?v=bbIeKsLi1RQ&list=PLSZys88soLuqc2KV2V8TG6iy7Vuv4KfuD."

Ports, Humpbacks, Y Soundscapes In Colombia (PHySIC)—From Kerri Seger: "Laura Valentina Huertas Amaya defended her undergraduate thesis that used modeling to predict the noise footprint from ships if there were to be a port built in the Gulf of Tribugá, Colombia. Last month, Maria Paula Rey Baquero passed her master's qualifying exam to bring the terrestrial methodology of environmental connectivity to the underwater acoustics world. She will also identify the most pertinent acoustic index for measuring biodiversity in the Gulf using PHySIC data collected since 2018. Both of these students, as well as Astarte Brown, will be presenting on PHySIC projects at the AN2022 conference in Berlin. PHySIC is planning to do a deployment this year at Morro Mico and Piedra Bonita again, for about three weeks in July/August."

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.

WG Progress

Acoustic Measurement of Ocean Biodiversity Hotspots—As mentioned above, a major activity of this working group is the Global Library on Underwater Biological Sounds (GLUBS). WG members are focused on this activity for now.

Arctic Acoustic Environment—The WG postponed a planned June 2022 hybrid meeting due to scheduling conflicts. The group is working to reschedule this meeting and may convene a virtual conference later this year to repeat its November 2020 conference, which participants found to be very useful.

Standardization—WG members are focused on related ISO activities for now.

National/Regional Activities
Several national 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 3rd African Bioacoustics Community Conference will be held on 2-7 October 2022 in Kruger National Park in South Africa (see https://africanbioacoustic.wixsite.com/abcommunity). The deadline for abstract submissions and early registration have passed, but regular registration is still open.

Canada
MERIDIAN—From Romina Gehrmann: "The Marine Environmental Research Infrastructure for Data Integration and Application Network (MERIDIAN) is a research group housed at Dalhousie University in Halifax, Nova Scotia, Canada. Their work applies computer science techniques to marine research issues, resulting in products such as the Ketos to support the development of deep learning models for solving detection and classification problems in underwater acoustics.

One of their latest endeavors is FishSounds, a public website that presents a compilation of acoustic recordings and published information on sound production across all extant fish species globally. The project combines: the results of a systematic review of relevant research completed by Audrey Looby (UFlorida), with support from Dr. Kieran Cox (UVic, Hakai Institute) and Santiago Bravo (Universidade de São Paulo); the fish taxonomical data of FishBase; sound recordings contributed by the research community as collected and processed by Amalis Riera (UVic); and a data management system constructed by MERIDIAN.

The website has been well received since its launch and has had over 10,000 users and over 50,000 page views in its first 9 months. It has received global media attention from outlets such as The Washington Post, CBC News, and National Geographic Polska. The team behind the project has also been invited to participate in an upcoming workshop as part of the Global Library of Underwater Biological Sounds (GLUBS) initiative.

Currently on version 1.1, the website hosts data on 1,214 examined fish species, 269 sound recordings, and 923 summarized references. In version 2, expected to be released this Fall, data submission functionality will be added, allowing users to submit additional references and recordings for inclusion in the dataset."

The latest MERIDIAN newsletter can be found at https://meridian.cs.dal.ca/2022/06/17/meridian-e-newsletter-may-2022/.

<u>USA</u>
National Centers for Environmental Information (NCEI) Passive Acoustic Archive—From Carrie Wall Bell: "The Passive Acoustic Archive continues to make progress in archiving data from NRS, SanctSound, ADEON, and other sources. Data volume archived now exceeds 200 terabytes. The Archive has served about 50 TB, not including data accessed through Google Cloud. The Archive is participating in a Passive Acoustic Monitoring National Cyberinfrastructure Center (PAMNaCC), which is being overseen by a recently established steering committee. Four case studies are being developed to guide the project's focus and produce tangible results that touch numerous aspects of the passive acoustic community. The case studies will focus on 1) federal datasets; 2) IOOS regional partner datasets; 3) offshore energy datasets, and 4) international datasets. The latter case study involves international partners from the IQOE community."

Consortium for Ocean Leadership—From Kristen Yarincik: "On April 29, 2022, the Consortium for Ocean Leadership held a workshop focused on building collaboration for ocean sound research and acoustic monitoring under the UN Decade of Ocean Science for Sustainable Development. The U.S. federal Interagency Working Group on Ocean Sound and Marine Life has an endorsed UN Ocean Decade Program entitled the UN Programme on Maritime Acoustic Environment (UN-MAE). UN-MAE's goals are broadly focused on increasing the representation and inclusion of ocean sound/acoustics in discussions and groups related to ocean observing and the sustainable blue economy, building literacy/education on ocean acoustic science, and improving global capacity as a community to measure, understand, predict, and manage the ocean soundscape. This workshop was a first step toward collaborative actions across the ocean sound community in the areas of building ocean sound literacy and partnerships for capacity building and outreach. The ocean literacy discussion centered on the development of "sound bites" or short, catchy taglines that could form the basis of outreach and engagement campaigns that would resonate with audiences (e.g., public, students, innovators, future workforce, researchers). The partnership discussions identified new collaborations to explore to advance the goals of UN-MAE and the global ocean sound community in terms of public engagement, data collection and technology, and data archiving and access. The workshop report is in development and should be available mid-July.

Following the workshop, an exciting development was announced that resulted from this breakout discussion involving a commitment of partnership from Amazon and Spear AI, brokered by John McGunnigle of Saildrone. Spear AI will centralize, store, and curate publicly available data sets that contain acoustic data generated from academic institutions and industry partners. Partnering with Amazon Web Services, Spear AI will provide this at no cost to the community for a period of one year. The goal is to create a central repository of acoustic data that will allow researchers and others to access the data in a user-friendly cloud-native manner. Specifically, Spear AI will provide cataloging and archiving of the data and provide guidance on how to access and make use of the data in the cloud. There is tremendous potential to grow this initial pilot into larger efforts, including building Application Programming Interfaces (APIs) that will allow broader access to the data, introducing academic institutions and organizations to large amounts of computing power and providing a highly-detailed global catalog of acoustic data collected from the world ocean."

Endorsed projects (8): JOMOPANS, JONAS, NRS, PHYSIC, QUIETSEAS, SanctSound, SATURN, TANGO

Publications in Aquatic Acoustic Archive: 6,831

IQOE Email List: 390

Twitter Followers: 138