

INTERNATIONAL COMMISSION FOR ACOUSTICS OBSERVES INTERNATIONAL YEAR OF SOUND – 2020

The International Commission for Acoustics (ICA), part of the International Science Council, is promoting 2020 as the International Year of Sound (IYS 2020). According to the IYS Website (<https://sound2020.org/>),



“The International Year of Sound is a global initiative to highlight the importance of sound and related sciences and technologies for all in society. The International Year of Sound will consist of coordinated activities on regional, national and international levels. These activities will aim to stimulate the understanding throughout the world of the important role that sound plays in all aspects of our society. As well, these activities will also encourage an understanding of the need for the control of noise in nature, in the built environment, and in the workplace.”

The IYS Website provides the opportunity to submit events to be included on the IYS calendar (see <https://sound2020.org/event/>). IQOE will add relevant events to this calendar as meetings are scheduled.

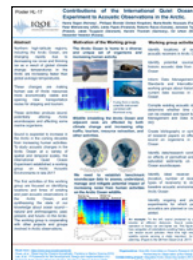
IQOE DATA OFFICE

In an effort to encourage the distribution and use of “big data”, as well as to help achieve the goals of the International Quiet Ocean Experiment (IQOE), the Alfred Wegener Institute (AWI) advertised two positions to conceive, implement, and operate a data portal that will allow easy access to acoustic data and basic data products. These positions are part of an AWI effort to build data portals for bathymetric, biological (benthic video surveys), and oceanographic data in close

collaboration with AWI’s computing center, supporting a team of 8 full-time professionals to jointly achieve these goals. It is intended to transform these positions into tenure-track positions, to sustain this data management and accessibility effort in the long run. A programmer has been hired and the deadline for applications for the data scientist position closed on 30 November. With regard to the acoustic positions, a close collaboration with the IQOE WG on Data Management and Access and the WG on Standardization is intended and will actively be sought and maintained by the data scientist and curator.

OCEANOBS’19

IQOE was represented at the OceanObs’19 conference in September 2019 by Jesse Ausubel, Jennifer Miksis-Olds, Hanne Sagen, and Ed Urban. There were two IQOE-related meetings on the Sunday before conference started, to discuss U.S. involvement in IQOE, and to discuss progress in the international aspects of the project and plans to represent acoustics at the OceanObs conference. Discussions of acoustics as a means to observe the ocean were scattered throughout the conference.



IQOE WG on Arctic Acoustic Environment



IQOE



Community White Paper

Three IQOE-related posters were presented:

OCEAN SOUND ESSENTIAL OCEAN VARIABLE (EOV)

IQOE has been given responsibility for progressing the Ocean Sound EOV by the Global Ocean Observing System (GOOS). The next step in the implementation of this EOV is to convene an implementation workshop to develop more details about how observing system operators worldwide could work to install more hydrophones on existing systems, install new systems, and handle the resulting data. Reports available from EOV Implementation Workshops for [Plankton](#), [Macroalgae](#), and [Mangroves and Seagrass](#) can serve as models for the Ocean Sound EOV. IQOE is seeking funding for the Ocean Sound EOV Implementation Workshop and is working to identify individuals who would like to participate in the workshop, which will be held in 2020. Please contact [Ed Urban](#) if you are interested in participating.

OCEAN SCIENCES 2020

The Ocean Sciences Meetings are biennial events sponsored by the American Geophysical Union, The Oceanography Society, and the Association for the Sciences of Limnology and Oceanography. These conferences provide one of the widest representations of ocean scientists internationally. The 2020 Ocean Sciences meeting will be held in San Diego, California, USA on 17-21 February 2020. Several sessions related to acoustics and bioacoustics will be held at the meeting and will provide an opportunity for acoustics-related communities to interact with other ocean scientists:

- Session IS24B: [Development and Application of Acoustical Remote Sensing Methods to Measure Ocean Parameters and Processes II Posters](#)
Session chairs—John Anthony Colosi, Timothy F. Duda, Andone C. Lavery, Thomas C. Weber, and Megan S. Ballard
- Session ME51A: [Exploring and Characterizing Deep- and Coastal Ocean Soundscapes I](#)
Session Chairs—Adrienne Copeland, Robert P. Dziak, Ana Sirovic, and Delwayne R. Bohnenstiehl
- Session ME34B: [Exploring and Characterizing Deep- and Coastal Ocean Soundscapes II Posters](#)
Session Chairs—Adrienne Copeland, Robert P. Dziak, Ana Sirovic, and Delwayne R. Bohnenstiehl

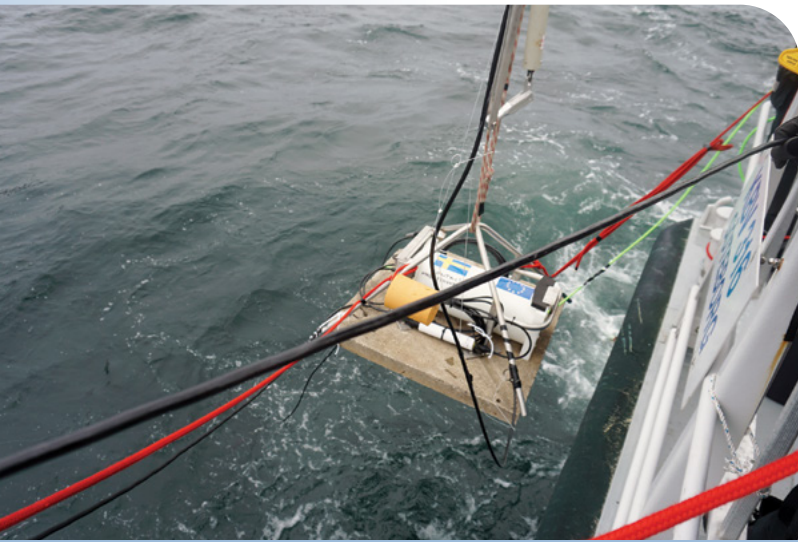
258 abstracts have been submitted for these and other sessions with the word “acoustic” in the abstracts.

NEWS FROM ENDORSED PROJECTS

- **ADEON** (<https://adeon.unh.edu/>)—ADEON completed its fourth cruise on 6 November 2019, on the R/V *Neil Armstrong*. The cruise was designed to recover, service, and re-deploy ADEON bottom landers at 7 locations on the continental shelf of the U.S. East Coast. In addition to the work with the landers, CTD profiles were taken at each station, as well as an active acoustic survey and trawl sampling in the station areas to correlate the active and passive acoustic observations with organisms in the lander areas. One more cruise is scheduled for ADEON, in November 2020.
- **JOMOPANS** (<https://northsearegion.eu/jomopans/>)—From Niels Kinnevig: “JOMOPANS implements a monitoring strategy for continuous sound in the North Sea. The products from the project will meet obligations under the European Marine Strategy Framework Directive (MSFD), but will also be available for the wider community of underwater sound specialists.”

On 8 October 2019, JOMOPANS held its mid-term event at the Royal Society in London. The intermediate results of the project were presented and a discussion was held on the needs for monitoring of ambient sound and on various aspects of continuous noise in the marine environment. The technical work of JOMOPANS has progressed steadily. All 14 measurement stations are operational and the first soundscape maps of 2019 have been produced. These results are now being analyzed and improvements in the process are being implemented. At the same time, JOMOPANS is working on an assessment framework for ambient noise. This framework follows the general approach proposed for the EU MSFD. The results are now being discussed in the relevant working groups of the EU and by the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR).

Peter Tyack, one of IQOE’s co-chairs, gave a keynote presentation at the mid-term meeting on the importance of sound for marine organisms and the threats from human-produced noise. Jakob Tougaard, another member of the IQOE Science Committee, presented on a Web-based tool that JOMOPANS is using to present maps and observations to policymakers. Christ de Jong, another IQOE Science Committee member, gave a presentation about IQOE at the meeting. The event also provided an opportunity for networking with other projects with similar focus, including JONAS and QUIETMED2 (see below). For more information, see <https://northsearegion.eu/jomopans/events-history/midterm-event/>.

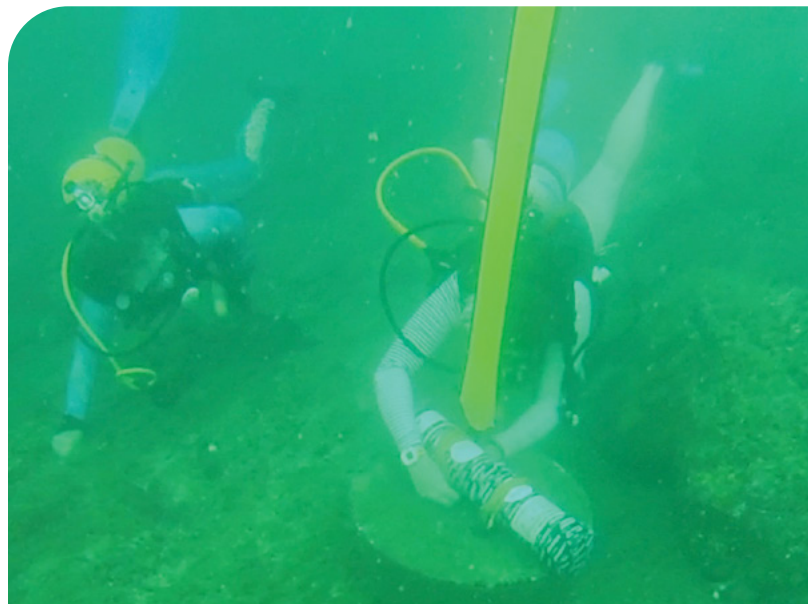


Launch of the Swedish Svenga station for Jomopans (Jomopans/FOI)

JOMOPANS presents its results regularly at international conferences, and will do so at the [2020 Ocean Science Meeting](#) in San Diego, California, USA.

- **JONAS** (<https://www.jonasproject.eu/>)—From Lucy Taylor: “The JONAS project aims to assist Atlantic area countries to standardise how they assess the risks from underwater noise to sensitive marine species and to enable decision makers to better mitigate these risks and to meet their reporting obligations under MSFD Descriptor 11 in a more consistent way. So far, we are working to gather all of the available data on underwater noise and species’ sensitivities and distributions, and use these for a risk mapping tool. The project network will also work to produce methods for threshold setting that are applicable to the European Atlantic region. Later in the project, all of these data will be fed into an online decision support platform and a series of mitigation case studies that will focus on the range of noise sources present in the northeast Atlantic. The JONAS project will be at the World Marine Mammal Conference in Barcelona in December (www.wmmconference.org) at booth 203, which is shared with the JOMOPANS project.” JONAS held its first Technical Meeting in Nantes, France on 25–26 September 2019, particularly to discuss data collection, processing, sharing, and visual display. A meeting will be held in early 2020 to discuss the visual display of information and the needs of end users. Anyone interested in attending this meeting should send an email to jonas@ucc.ie.
- **PHySIC**—From Kerri Seger: “PHySIC has completed another round of field work, resulting in a full hard drive of data from a vertical hydrophone array at Nuqui, Colombia. This year we targeted two different

months than observed last year, in order to explore the peak humpback season, instead of the end of it. Due to the highest tide in memorable history, the water was too turbid to recover our instrument at Morro Mico for an extra few weeks, but the instrument was eventually recovered by divers and will be sent to Bogota to determine if the instrument collected data. Students Maria Paula Rey and L. Valentina Huertas have analyzed about 1/4 of the data from 2018 to explore whether power spectral density (PSD) percentile levels align with tidal and lunar cycles and/or detections of biological sounds. Maria Paula presented the acoustic cycling results at XVII Seminario Nacional de Ciencias y Tecnologías del Mar in Medellín, Colombia in October 2019 with a student poster. She will continue to work on the remainder of the data analysis for her undergraduate thesis project, which will officially start in December. Valentina Huertas will work with Kerri Seger on modeling the propagation variability across the Gulf of Tribuga using acoustic features Valentina has measured from different sound sources. Exploring potential masking of these sounds through propagation modeling visualization will become her undergraduate thesis. Valentina will give her first ever talk (and in her second language) at the Acoustical Society of America conference in December 2019 about the acoustic cycles, PSD percentiles, and a preliminary propagation modeling image or two. A student from Los Andes



SCUBA deployment of an Ecological Acoustical Recorder (Oceanwide Science Institute) on July 28, 2019, by Dr. Kerri Seger of Applied Ocean Sciences, LLC, and Liliana Arango, owner of Kákiri Estación de Buceo in Guachalito, Colombia. A 33% duty cycle at 15.625 kHz will sample for 1.5 months at Morro Mico: a small island along the Pacific Coast of Colombia marking the southern border of Utria National Park protected waters.

University (Daniel Noreno) did field work this year to record dolphins, to make the first whistle catalogue of the Gulf of Tribuga for his undergrad thesis. Moving to professional members of the PHYCIC collaboration, Dr. Natalia Botero, who runs the field site, hosted scientists from the Southern Ocean Persistent Organic Pollutants Program (SOPOPP) lab at Griffith University (Australia) for a month of drone and biopsy work. Natalia is in the final phases of securing a Fulbright scholarship to work at the University of California at Santa Cruz to learn to process biopsies from whales for stress hormones.

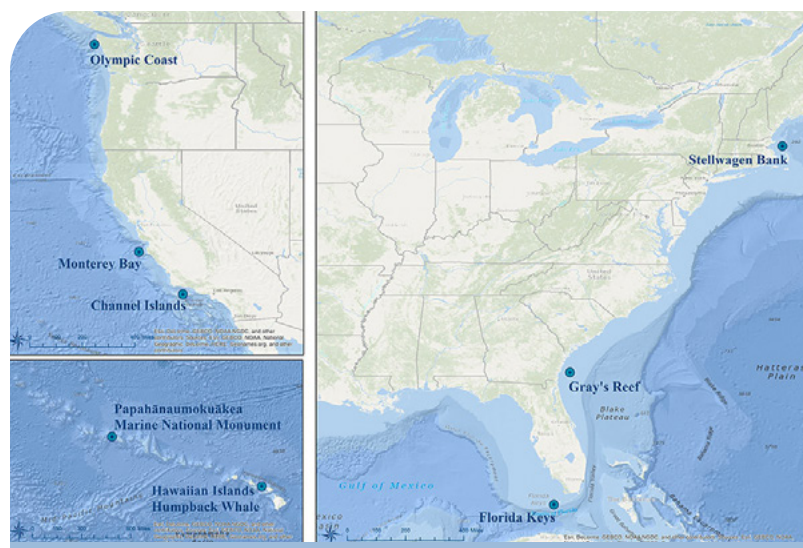
After triple and quadruple checking the PSD percentiles and calibrations of the hydrophones deployed on the Ecological Acoustic Recorders (EARs) from Morro Mico, it was concluded that the noise floor at this location is down around 52 dB, due to the protected location of the hydrophones, and the surrounding bathymetry and substrate type. Data from the Nuqui site (immediately outside the town where boat traffic is concentrated) remain to be processed to characterize the variability in sound levels in the Gulf of Tribuga.”

- **QUIETMED2** (<http://quietmed2.eu>)—From Marta Sanchez: “The first of two workshops planned with the Joint CMS/ACCOBAMS/ASCOBAMS Noise Working Group was convened on 25–26 June 2019 in Monaco with QUIETMED2 partners to discuss a proposal for an impulsive noise indicator for the Mediterranean Sea region. This indicator will provide quantitative metrics for the risk of impact from impulsive noise to assess the effect of the noise pressure. On the basis of the work developed at European Commission level by the Technical Group on Noise (TG Noise) and the OSPAR Convention, several sessions were devoted to define technical aspects such as the indicator metric, assessment approaches, baseline and reference levels, and assessment criteria. Furthermore, the applicability in the Mediterranean Sea Region and the difficulties and barriers at national and regional levels were tackled. After this first joint exercise to develop the indicator, a second workshop with the Joint CMS/ACCOBAMS/ASCOBAMS Noise Working Group will be held in January 2020, in the Marine Technology Centre (CTN), in Spain.

In addition, one of the main objectives of the project is to liaise with National Authorities to support them in the implementation of the Marine Strategy Framework Directive. With this aim, the QUIETMED2 project has organized the workshop “Training Session to Better Manage Underwater Noise Pollution in the Mediterranean Region” during the World Marine Mammal Conference on 7 December 2019 in Barcelona, Spain. The aim of this training workshop is to support the assessment of Good Environmental Status (GES)

with regard to underwater noise pollution (Descriptor 11 of the EU Marine Strategy Framework Directive) in the Mediterranean Region. The main activities during this workshop will be to provide training on the ACCOBAMS International Impulsive Noise Register for the Mediterranean Sea Region and review the GES assessment and presentation of existing approaches and solutions for the management of underwater noise pollution impacting marine biodiversity. This training session is intended not only for European competent authorities, but also for non-European authorities to boost cooperation at Mediterranean level.”

- **SanctSound** (<https://sanctuaries.noaa.gov/science/monitoring/sound/>)—From Leila Hatch: “SanctSound is a multi-year effort, co-managed by the U.S. National Oceanic and Atmospheric Administration (NOAA) and the U.S. Navy, to monitor underwater sound within the U.S. National Marine Sanctuary System. In late 2018 to early 2019, recorders were placed at 28 of the project’s 30 monitoring locations within seven national marine sanctuaries and one marine national monument. Twenty-six of these locations are serviced about 3 times/year, while 4 locations in the Papahānaumokuākea Marine National Monument are serviced annually. Additional data collection efforts are underway/planned for fall-winter 2019, including listening glider surveys in Gray’s Reef and Stellwagen Bank National Marine Sanctuaries off the U.S. east coast, and in Papahānaumokuākea Marine National Monument in the Pacific Ocean. Several sites are integrating recording efforts with telemetry infrastructure, and supplementary tagging of soniferous species as well as receiver maintenance was underway in summer-fall 2019. The first six months of



Locations of SanctSound observations
(from <https://sanctuaries.noaa.gov/science/monitoring/sound/>)

raw data from the project were sent to NOAA's National Centers for Environmental Information (NCEI) for archiving. Data from the first year of the project will be publically available in 2020. Pilot standardized analysis products were also sent to NCEI to begin development of a Web-accessible database and portal for the project. The project held its annual progress meeting in April 2019 in Monterey, California. Project leads are providing overview posters at international conferences, such as "Effects of Noise on Aquatic Life" in July 2019, Ocean Obs'19 in September 2019, and the World Marine Mammal Science Conference in December 2020. Initial analytical presentations will be presented at the Ocean Sciences conference in San Diego, California, USA in February 2020."

- **TANGO**—The project has monitoring stations in place and will service them in early December 2019. The project will report to the Nordic Council of Ministers in mid-2020. It is seeking additional funding.

Get Your Product 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—

The working group has been focusing its efforts on completing a review paper on the use of acoustic diversity as a measure of biodiversity.

Arctic Acoustic Environment—As mentioned earlier, the group presented a poster at the OceanObs'19 conference. The co-chairs of the working group recently met with the IQOE Project Director to update action items from its meeting earlier in 2019 and to plan additional steps for implementing the actions. The WG will cooperate with the European INTAROS project to disseminate a questionnaire regarding Arctic acoustic observations. The group continues to work on documenting both observing systems and available passive acoustic data in the Arctic Ocean. The working group chairs submitted a short statement on behalf of the working group for the Arctic Observing Summit ([see https://arcticobservingsummit.org/](https://arcticobservingsummit.org/)) in Iceland on 31 March–2 April 2020.

Data Management and Access—This group has not been active lately, awaiting progress by the Standardization WG and establishment of the IQOE data activity at AWI.

Marine Bioacoustical Standardization—With the Standardization WG, this working group drafted letters to the chairs of the ISO Technical Committee 43 – Acoustics and Technical Committee 12 – Quantities and Units supporting the second Final Draft International Standard (FDIS) of ISO 80000-8:2019, which corrects several major errors in the 2007 standard and recognizes the reference sound pressure of 1 μPa for use in underwater acoustics, alongside the value of 20 μPa traditionally used in air acoustics. This is of particular importance to IQOE because ocean acousticians do not use 20 μPa , making the 2007 standard inadequate for underwater acoustics purposes. The letters were sent to the chairs of IOC TC 12 and 43 from Peter Tyack (IQOE Co-chair) and Ed Urban (IQOE Project Manager). The balloting of national committees related to these proposed changes has recently started. We encourage members of the IQOE community to contact their national ISO representatives to give your support to these proposed changes.

Standardization—The working group recently released the [report](#) from its July meeting with the Data Management and Access Working Group in The Hague. This report includes recommendations directed to ocean sound research programs, sponsoring international organizations, and their science advisory groups to support the development and implementation of ocean sound processing and reporting guidelines needed to make meaningful soundscape comparisons across time, space, and monitoring programs.

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.

CANADA

[Marine Environmental Research Infrastructure for Data Integration and Application Network](#) (MERIDIAN)—

MERIDIAN continues to develop activities and products focused on Canadian resources, but which should be of interest to the IQOE community:

- [Detection and classification of marine animal sounds using deep learning](#)—MERIDIAN is promoting progress in this area through several different projects, including fish detection (starting with Arctic cod and sablefish), whale detection and classification (e.g., North Atlantic right whale), an interactive training app and training

datasets, and an open-source software library. The first outcomes of these projects will be released in the coming months. FriendlyFish is one tool that is being developed. Two workshops have been held this year to advance this area of MERIDIAN's work.

- [Ocean Soundscape Atlas](#)—“MERIDIAN and collaborators are developing a Web-based, interactive Ocean Soundscape Atlas that will enable users to visualize and explore modeled noise levels in a multitude of dimensions including latitude, longitude, depth, time, frequency, and source type, and obtain impact risk estimates in areas of interest.” A software library for modelling soundscapes written in Python will be made openly available.
- [Data Discovery Portal for Underwater Acoustic Data](#)—MERIDIAN is developing and testing a portal for submission and discovery of underwater acoustic data from Canadian scientists.
- [Directional Acoustic Data Visualization](#)—this tool will help users triangulate the position of sound sources.
- [Passive Acoustic Monitoring](#)—MERIDIAN-funded scientists are creating sound libraries of known species.
- [Crowd-sourcing platform for underwater acoustic data](#)—MERIDIAN is in the beginning stages of developing a crowd-sourcing platform for classifying biological signals in underwater sound recordings.
- [Modeling and predicting the efficiency of acoustic detection arrays](#)—MERIDIAN is working with the Ocean Tracking Network (OTN) to apply machine-learning techniques to historical tracking data from OTN to study the efficiency of acoustic detection arrays.
- [Acoustic monitoring of boating activity](#)—MERIDIAN is developing software to classify underwater sounds produced by boats.

As software becomes available from MERIDIAN, they will be posted on the MERIDIAN Website. So far software is available for [acoustic detection and classification with deep neural networks](#).

USA

The University of New Hampshire opened its Center for Acoustics Research and Education (CARE) in June 2019 (see <https://eos.unh.edu/center-acoustics-research-education>), led by Dr. Jennifer Miksis-Olds. Miksis-Olds recently received a grant from the Lounsbury Foundation to implement recommendations from the IQOE Standardization

WG meeting held last July at The Hague, as well as two previous standardization workshops held over the past few years. The project will create a software package to produce standardized outputs from passive acoustic data. The grantees will create the Making Ambient Noise Trends Accessible (MANTA) software in 2020 in line with workshop recommendations.

Jesse Ausubel and Jennifer Miksis-Olds participated in a White House Summit on Ocean Science and Technology in November 2019 to promote the expansion of passive acoustic technology in U.S. waters, as well as the coupling of acoustic and eDNA approaches.

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 the email page.

Upcoming Meetings

New meetings have been added to the [calendar of IQOE-relevant events](#).

Endorsed projects (7): ADEON, JOMOPANS, JONAS, PHYSIC, QUIETMED2, SanctSound, TANGO

Publications in Aquatic Acoustic Archive: 6,498

IQOE Email List: 225