Integration of Underwater Noise Measurements into EMODnet Physics

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Introduction

Underwater noise has been significantly raising in the past decades due to an increment of human-related activities in the oceans such as shipping, industrial activities, seismic explorations, etc. These activities may have adverse effects on fish and mammals, such as communications masking and modifying predator–prey interactions.

In order to assess and limit the impact of these, the European Commission approved the Marine Strategy Framework Directive (MSFD) which aims to achieve a good environmental status in European waters. Within this directive different environmental challenges are addressed, including the long-term monitoring of underwater noise throughout European waters.

EMODnet Physics

EMODnet Physics is one of the European Marine Observation and Data network thematic portals, which is is currently providing easy access to a wide variety of data products.

It is continuously increasing the number and type of platforms in the system by unlocking and providing high quality data from a growing network. It has recently started working on underwater noise with the aim of making available more operational data, offer a single European entry point to impulsive noise registries (MSFD I.11.1) and work on (regional) sound maps.

OBSEA Underwater Observatory

OBSEA is a cabled shallow water underwater obsevatory located at Vilanova i la Geltrú, (Barcelona, Spain), 4 km offshore and 20 m depth. It contains several sensors acquiring CTD, ADCP, pH, wind and seismic measurements. Data gathered at OBSEA is being published to EMODnet Physics since 2014.

Moreover, the OBSEA observatory also includes an hydrophone streaming data in real-time. This acoustic data has been published in the LIDO (Listen to the Deep Ocean Environment) since 2010.
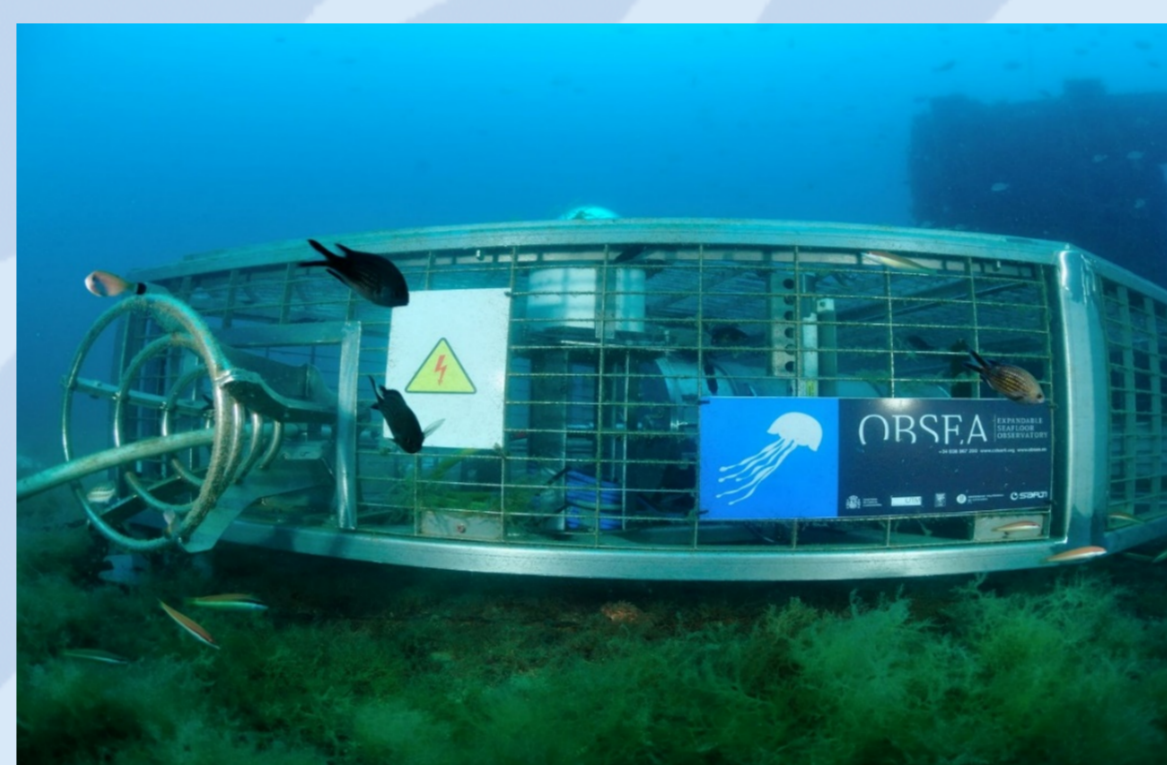
Naxys Hydrophone

Sensitivity	-192 dB re 1µPa
Bandwidth	5 Hz – 300 kHz
Precision	16 bits
Sampling Rate	96 kHz
Manufacturer	Naxys - Bjørge

Data Delivery

Instead of streaming the raw acoustic data, Sound Pressure Level (SPL) is calculated in real-time. According to the MSFD Directive, SPL levels 63 Hz and 125 Hz third-octave bands. Additionally SPL at full bandwidth is also calculated.

In order to use a standard data delivery system the use of Sensor Web Enablement Standards has been adopted. The hydrophone metadata is stored within a SensorML file.

After the SPL levels are calculated the SWE Bridge software combines the SPL result with the metadata encoded within the SensorML file and generates SOS-complicant output files.

The SOS (Sensor Observation Service) is used to store the processed data. EMODnet data portal gathers directly the data using the standard SOS interface. Furthermore, other processes can also connect the the SOS standard to access the data and metadata.

SensorML

Naxys Hydrophone   **OBSEA Underwater Observatory**   **SOS Server**   **Data visualization Client**