

OBSEA: AN ACOUSTIC-ENABLED OBSERVATORY FOR UNDERWATER NOISE MONITORING, SOUND SOURCE LOCALIZATION AND TRACKING

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OBSEA is an underwater cabled observatory located 4 km off the coast of Vilanova i la Geltru, Barcelona, Spain at 20m depth. It has been continuously operating since 2009 providing multi-parametric data from a wide range of sensors. Its location close to the coast, easily accessible with boats and operated by scuba divers make it valuable not only as a coastal observatory, but also as a test site. It is equipped with a variety of acoustic systems, allowing activities such as long-term passive acoustic monitoring, sound source localization and target tracking.

The observatory is equipped with a Naxys-Bjørge Ethernet Hydrophone, providing real-time acoustic data. Since 2017 the observatory is providing real-time Sound Pressure Level (SPL) measurements, computed in 1/3 octave bands to comply with the Marine Strategy Framework Directive, specifically the long-term underwater noise measurements indicators. Real-time SPLs values are propagated to EMODnet physics data portal, where they are available to the community. Additionally, the OBSEA also has a Sensor Observation Service (SOS) entry point, fully compatible with the Sensor Web Enablement standards.

A NeXOS A2 hydrophone array is also available at OBSEA. This sensor system is composed of four hydrophones synchronized with a master unit which processes the Time Difference Of Arrival (TDOA), estimating the localization of the sound source. It can be used to track a specific device (i.e. an acoustic tag) or to estimate the location of an anthropogenic sound source (e.g. ship, pile-driving, etc.).

Complementing the passive acoustic monitoring features, the observatory also has the capability to use active tracking techniques based on a set of Vemco tags and receivers (e.g. behavioural study of shrimps using tags). Although the default Vemco receivers only detect the presence of a tag within its range, it is possible to enhance the results with an USBL from EvoLogics to precisely trace the trajectory over time, significantly improving the behavioural data obtained.

To enhance the tracking capabilities beyond the site itself, the Guanay II AUV can be used. This vehicle uses an EvoLogics S2C-18/34 modem to track moving objects using single-beacon range-only techniques.

All these capabilities make the OBSEA observatory a valuable asset to the ocean observing community providing long-term underwater noise data and the ideal framework for behavioural studies based on acoustic tracking. Moreover, thanks to its role as test site, it is possible to validate and refine existing sensor systems, algorithms and monitoring techniques.