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Bioacoustic results in NEMO-SN1 ONDE and way ahead with EMSO, the European Multidisciplinary Submarine Research Infrastructure

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INFN and INGV develop and run deep sea infrastructures and instruments for a wide range of scientific research developed by a network of institutional partners.
The marine bioacoustic research began in 2004 with the NEMO-OnDE platform deployed at 2000m depth 25 km off Catania (Sicily) and connected to the INFN-LNS laboratory of Catania by fiber optic cables. Wideband acoustic data have been collected during 2 years of operations (2005-2006) and revealed an unexpected presence of sperm whales in the Ionian Sea.
This pilot project led to the construction and installation in 2012 of the new SN1-OnDE observatory, funded under the LIDO Demonstration Mission of ESONeT (FP6) in collaboration between INFN, INGV and other national and international institutions. SN1-OnDE is a multidisciplinary seafloor observatory designed to perform seismic monitoring and oceanographic studies (SN1), and wideband acoustic measures (OnDE). The SN1-OnDE observatory is a cabled node to the EMSO ESFRI insfrastructure now operational offshore Catania. This new station is able to provide wide band acquisition for sperm whales and other odontocetes as well as for low frequency fin whales'calls. The goal of the research is to confirm the sperm whales'presence and seasonality, and, with a new low frequency dedicated sensor, to map the presence of fin whales and to measure the low frequency background noise. By using AIS data it will be possible to link measured noise levels to the ship traffic in the area and to identify the most noisy ships.
Another deep sea acoustic observatory has been deployed in 2013 at 3500 m depth offshore Capo Passero (Sicily). The acoustic data management of these observatories is carried out within the Submarine Multidisciplinary Observatory (SMO) program, a FIRB project granted by the Italian Ministry of the University and Research, hosted by INFN-LNS (http://web.infn.it/smo).
This type of seafloor installations open new research and monitoring perspectives, however new challenges emerge, mostly related to the processing and storage of huge data streams.

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