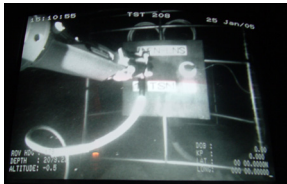
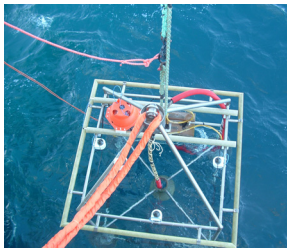
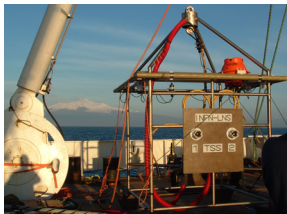
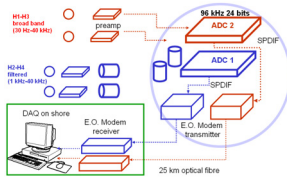
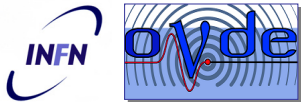


Noise spectra and biological sounds from the NEMO-Test Site

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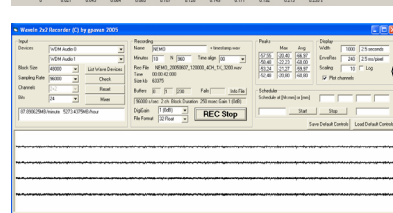
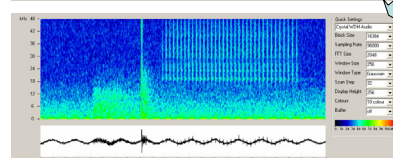
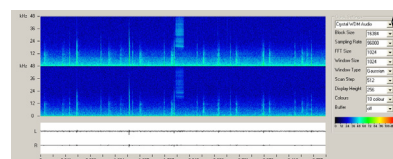
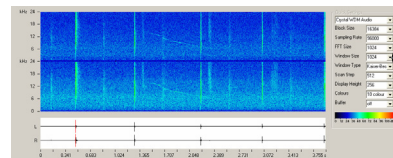
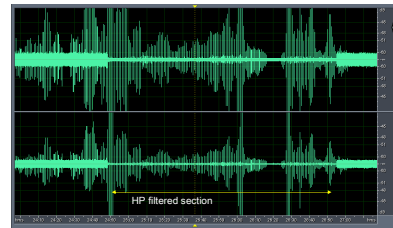


Once deployed on the sea bottom the frame has been connected to the optical cable by a ROV (Remotely Operated Vehicle)

Within the large NEMO (Neutrino Mediterranean Observatory) Project that addresses the underwater detection of high energy neutrino, an experimental deep station, named ONDE (Ocean Noise Detection Experiment), has been developed for measuring the underwater acoustic noise. It has been deployed on the sea bottom 21 km offshore Catania (Sicily, Italy) at 2000 m depth. It is connected to the shore labs through electro-optical cables to provide real-time monitoring and it is operating since the end of January 2005.

The main experiment hosted by the station concerns the study of the underwater acoustic environment to develop the strategies required for the detection of acoustic pulses generated by high energy neutrino interacting with water. The experiment is highly interdisciplinary and other than providing long term data on the underwater noise, it also provides an unique opportunity to study the acoustic emissions of marine mammals living in the area or passing through it during their seasonal movements within the Mediterranean basin. Four calibrated broad-band hydrophones, sampled at 96 kHz, send digital data to the shore lab 24/24h; as the continuous recording is not possible due to storage space constraints (uncompressed recording would require 124GB/day), recordings are made at intervals (5 or 10 minutes every hour). Nonetheless the amount of data acquired is huge and provides important new information.

Dolphins living in the area have been recorded almost every day, while sperm whales and fin whales have been recorded with less regularity. New analysis algorithms and recording strategies are being developed to maximize the recording capabilities and to track the movements of impulsive acoustic sources to reveal the movement of sperm whales whilst in the detection range.



Digital data arrives with 24 bits resolution and can be saved either in integer (16 or 32 bits/sample) or float format (32 bits/sample); float format is useful for importing data in Matlab for noise analysis. SeaPro, the sound analysis program developed at CIBRA has been improved to read 32 bits formats (integer and float) and to read 4 channels wav files.

Example of noise levels (PSD) measured till now (measures taken at 4:00 AM)

