



Near-Real-Time Sismo-acoustic Submarine Station for offshore monitoring

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From the early 1980's, Italian seismicity is monitored by the National Seismic Network (NSN). The network has been considerably enhanced by INGV since 2005 by 24-bit digital stations equipped with broad-band sensors. The NSN is nowadays constituted by about 300 on-land seismic station able to detect and locate also small magnitude earthquake in the whole Italian peninsula. However, the lack of offshore seismic stations does not allow the accurate estimation of hypocentral and focal parameters of small magnitude earthquakes occurring in offshore areas. As in the Mediterranean area there is an intense offshore seismic activity, an extension of the seismic monitoring to the sea would be beneficial. There are two types of stations that could be used to extend the network towards the sea: the first type is connected to the coast through a cable, the second type is isolated (or stand alone) and works autonomously. Both solutions have serious limitations: the first one, for several technical and economic problems, linked to the indispensable transmission/alimentation cable, cannot be installed far from the coast; the second one, allows access to the recorded data, only after they are recovered from the seabed.

It is clear that these technical solutions are not suitable for the real time monitoring of the offshore seismicity or for the realization of a tsunami warning system. For this reason, in early 2010, the OBSLab of Gibilmanna begins the design of a submarine station able to overcome the limitations of the two systems above. The station is built under the project EMSO-MedIT. The two stations built have already been tested in dock and ready for installation. One of this station will be installed, in few time, in the southern Tyrrhenian Sea, near the epicentre of the Palermo 2002 main shock. The sea bottom station will be equipped with 2 very broadband 3C seismometers, a broad band hydrophone, a differential and an absolute pressure gauge. The station includes a submarine module, which houses the sensors. The submarine module is connected via an electromechanical cable to a stopper buoy, which acts as tensioning device, and a "tethered" cable, to a surface buoy, which supply power to the underwater part. The surface buoy handles the communication with the submarine module and the transmission of real-time/near-real-time data to the monitoring centre to the ground.