



The new INGV broadband OBS/H: test results on submarine volcano Marsili and future developments.

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In July 2006, INGV (Istituto Nazionale di Geofisica e Vulcanologia) successfully deployed on the flat top of the submarine Marsili volcano, the first Italian OBS/H (Ocean Bottom Seismometer with Hydrophone), entirely developed at the Gibilmanna Geophysical Observatory within a project funded by an agreement between Italian National Civil Protection Department (DPC) and INGV. In this short deployment the OBS/H was equipped with a Nanometrics Trillium 40s seismometer and an OAS E-2PD Hydrophone. A 21 bits four channel digitizer (SEND MLS) recorded data at 200 sps to exploit, as well as possible, the wide flat response of the hydrophone (0-5 KHz). For long-term deployments, the instrument will be provided with Cox-Webb 500s-2 Hz differential pressure gauge and Nanometrics Trillium 120s or Guralp CMG40T-OBS and will record data at 50 sps, for as long as one or two years respectively, depending on the seismic sensor. Most of the recorded events (about 800) seem to be associated with the active nearby Marsili volcano. The instrument, during the 9 days of the test at a depth of 790 m, recorded 835 volcano-tectonic events, classifiable in 6 different categories: 1 teleseismic event (Java 2006/07/17, Mw=7.2), 8 located regional tectonic events, 9 not located local tectonic events, 705 low frequency volcanic events, 84 high frequency volcanic events, 26 "Tornillo" and 2 probable rockfall events. Spectral analysis shows, in the first 7 days of the deployment, an evident sequence of low energy events superimposed on the continuous background volcanic tremor, with dominant frequencies between 2 and 6 Hz, known in literature as VT-B (Volcanic-Tectonic event, type B) and related to shallow hypocenters (above 1-2 km). In the last two days of operation, the hydrophone recorded high frequency events, with dominant frequencies between 40 and 90 Hz; this kind of event could be associated with hydrothermal activity. In March 2007, three INGV OBS/H will be deployed in the southern Ionian sea, at different distances from the Malta escarpment, within

the European project NERIES (Network of Research Information Infrastructures for European Seismology). At present, we are planning a further improvement of the instrument, equipping it with a 24 bits digitizer and a communication system based on an acoustic modem and a low power consumption PC with ARM processor. In this way, it would be possible to pick up events traces from the OBS on the sea bottom, without recovering it. Furthermore, the acoustic link with a buoy, in its turn satellite linked with an on shore control centre, in association with triggering algorithms, could be employed to insert the INGV OBS/H in a tsunami warning system.