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Polarization and high resolution parametric spectral analysis applied to the seismic signals recorded on the Marsili submarine volcano

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The Ocean Bottom Seismometer with Hydrophone deployed by the Gibilmanna OBS Lab (CNT-INGV) from the 12^{th} to the 21^{st} July 2006 on the flat top of the Marsili submarine volcano (790m of depth) recorded more than 1000 seismic events. By comparing them with the ones recorded in other volcanic areas and described in literature (Wassermann, 2002; McNutt, 2002; Díaz et al., 2007), we grouped these events in three categories: 817 VTB (Volcanic-Tectonic type B) events, 159 HF (High Frequency) events and 53 SDE's (Short Duration Event). Small-magnitude VTB swarms, with frequency band between 2 and 6 Hz and mean time length of about 30 seconds, were almost all recorded in the first 7 days, while in the last 2 days, OBS recorded HF events with frequency band over 40 Hz and few minutes of length. Signals with similar frequency and time domain features are associated, to hydrothermal activity (Ohminato, 2006). The SDE waveform, characterized by a monochromatic signal with a slowly decaying envelope, is generated by oscillations of a resonant body excited by magmatic or hydrothermal activity (Chouet, 1996). We applied, to all the signals dataset, polarization and high resolution parametric spectral analysis. This kind of study allowed to mark the VTB events as multi P-phase events with shallow sources placed in a narrow azimuthal window as regards the OBS/H position. The seismogenetic volume is probably located in the North-East sector of the Marsili building. The high resolution parametric spectral analysis of the SDE signals allowed to find with high accuracy their dominant complex frequencies (ω=f+ig). Plotting them in the complex frequencies plane we identified two distinct clusters with middle complex frequencies f=7.8s^{-1}, g=-0.35s^{-1} and f=7.5s^{-1}, g=-0.47s^{-1} respectively. These two

clusters are probably linked two different seismogenetic volumes.