CHARACTERISTICS OF BROADBAND SEISMIC EVENTS AT STROMBOLI VOLCANO

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We present some results obtained analysing seismic events at Stromboli. We used data recorded in 1997 by a network of 21 three-component Guralp CMMG-40T broadband seismometers deployed on the flanks of the volcano. Data analysis has been performed by linear decomposition method (i.e. FFT), Maximum Entropy Method (MEM) and Independent Component Analysis (ICA).

We considered signals containing explosion quakes superposed to tremor and also very long tremor sequences with no explosion. Polarisation analysis of tremor, even in the case of low frequency band (i.e. characteristic periods of 10 s), shows strong analogies with the explosions, i.e. the wavefield origins from crater area and there is linear and radial polarisation. ICA analysis, applied on explosion quakes, points out separated spectral peaks in the bands 1-5 Hz and 0.1 Hz, related to the source and to the geometry of the conduits, in perfect agreement with previous results. A detailed study of very long tremor records, at low frequency band (0.02-0.5 Hz), exhibits a new result evidencing the presence of a 0.03 Hz component. The existence of components with periods larger than 10 s is quite common for transient signals related to explosion phenomena or formation of calderas, while the presence of such a low frequency tremor has been observed only at Aso Volcano in Japan. The detailed analysis in the time and frequency domain does not seem to be related to meteorological causes, as is the case of the Kilauea volcano. We suppose, instead, that the source can be ascribed to the magmatic transport and to the presence of slow waves in a biphase system. The results confirm the necessity to use high sensitivity and broad-band instruments to monitor and model eruptive phenomena.