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Shear wave velocity structure at Mt.Etna from the inversion of Rayleigh wave dispersion patterns (1 s< T < 20 s)

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In the present work we investigate the dispersion characteristics of medium-long period Rayleigh waves (1 s <T<20 s), by using both single-station (MFT and PMF) and multichannel techniques (p-w stack, semblance, cross-correlation, cross-spectrum), in order to determine the velocity structure at Mt. Etna volcano. We apply these techniques to a data set of teleseisms, regional and local earthquakes recorded by two broad-band seismic arrays installed at Mt. Etna in 2002 and 2005, during two seismic surveys organized by INGV-Osservatorio Vesuviano. The obtained dispersion curves show phase velocities ranging from 1.5 to 4 km/s in the frequency band 0.05-0.45 Hz. We inverted the average phase velocity dispersion curves by using a non-linear approach, obtaining an ensemble of shear-wave velocity models with a maximum resolution depth of 28 km. Moreover, in order to check the presence of lateral velocity contrasts, we used the method of triangles dividing the whole array into 7 triangular sub-arrays. The inversion of the dispersion curves relative to each triangle has provided the velocity profiles for each of the 7 different sub-areas.