



Site effects in Colfiorito basin (central Italy) observed from joint accurate time frequency and high resolution array analysis

S. Bonnefoy-Claudet (1), M. Kristeková (2), J. Kristek (1,2), P. Moczo (1,2), G. Di Giulio (3), A. Rovelli (3)

(1) Department of Astronomy, Physics of the Earth, and Meteorology, Comenius University, Bratislava, Slovak Republic, (2) Geophysical Institute, Slovak Academy of Sciences, Bratislava, Slovak Republic, (3) Istituto Nazionale di Geofisica e Vulcanologia, Roma, Italy

The goal of this study is to explain the peculiarities of earthquakes motion in Colfiorito basin, central Italy, during the Umbria-Marche seismic sequence. We mainly focus on the 2 min long duration of the horizontal coda wave observed in aftershocks. To estimate the wave propagation properties (apparent velocity and back azimuth) of the motion, we first determine the spectral structure using accurate time-frequency analysis, and then we apply high resolution array analysis to the most energetic parts of the motion. Within the frequency range 0.5 to 3 Hz, we point out that the first part of motion is mainly due to the body waves resonance (both P and S wave). We show that at later times the main energy of persistent horizontal coda wave motion is concentrated around 1 Hz, and array analysis exhibits surface waves apparent velocities. Array analysis also indicates that back azimuths of surface waves propagating within the basin are systematically different from those of epicenters. The long duration of the horizontal ground motion in Colfiorito basin is mainly due to diffracted surface waves along the entire border of the basin, and not only due to single reflector.