



A detailed three-dimensional P-wave velocity structure in Italy from local earthquake tomography

Raffaele Di Stefano, Barbara Castello, Claudio Chiarabba, and Maria Grazia Ciaccio
Istituto Nazionale di Geofisica e Vulcanologia (mariagrazia.ciaccio@ingv.it)

We here present an updated high resolution tomographic P-wave velocity model of the lithosphere in Italy, obtained by adding about 296,600 P-wave arrival observations from \sim 7,200 earthquakes, from the preliminary update of the CSI 2.0, recorded in the period 2003-2007, to the previously inverted dataset (165,000 P-wave arrivals). Additional events have been strictly selected for location quality (azimuthal gap $< 135^\circ$; horizontal error $\leq 2\text{km}$; vertical error $\leq 4\text{km}$; rms $< 1\text{s}$) and a number of P-wave observations ≥ 8 . Our results confirm the main structural features in the best resolved parts of the inverted volume and show a much better resolution in some of the previously less resolved areas, due to both the larger number of inverted phases and the more even distribution of seismic stations. Surface basins and relationships between the Adriatic, Tyrrhenian, and European plates are better imaged. The integrated analysis of 20 years of seismicity and the high resolution tomographic images obtained, allows us to add new constraints to the kinematics and the geodynamics of the lithosphere-asthenosphere system in this region. We also present preliminary results obtained by thickening the nodes spacing from 15km x 15km to 10km x 10km and we finally compare the complex velocity structures imaged by the inversion of the two different grid spacing.