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Reference seismic velocity Earth model for Italy from local source tomography and 30 years of controlled source seismology data

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We present here a new high resolution regional P-wave velocity model for the lithosphere beneath the Italian region obtained by including information on the Moho topography, and integrating results from local earthquake tomography with 30 years of CSS data, applying the method of Waldhauser (1996). For the 3D moho map, we extended the crustal model, already available for the Alps by Lippitsch et al., 2003, to the Italian peninsula, Corsica, Sardinia, and Sicily. The tomographic model is obtained by inverting 166,000 Pg and Pn arrival times large part of which have been automatically picked and consistently weighted with an advanced automatic picking system (Aldersons, 2004). The resolution of the obtained velocity model is consistently higher and the grid spacing consistently smaller than in previous tomographic works targeting the same region. We are able to image the complex geometry of this part of the subduction-collision system between the Eurasian and African plates adding important details to the overview derived by the teleseismic tomography. Our results clearly show the plate boundary at Moho level from the Alps to the Southern Apennines and the Calabrian Arc in a volume unresolved in previous studies. The use of global 1D velocity models based on the flat Earth assumption is a pre-requisite to refine and interpret images and seismic responses of the earth obtained with geophysical studies (P and S tomography, surface wave tomography etc). Our model is suitable as a good starting point for a 3D velocity reference model of the crust and upper mantle beneath the Mediterranean area to be extended to the Adriatic Sea and to the Ionian Sea, with benefit for earthquakes location, teleseismic tomography, focal mechanisms and CMT

determination, local best 1D model calculation.