



P-wave tomography of the Calabrian Arc region (South Italy) using a new “a priori” three-dimensional velocity model

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A recently published tomographic investigation of the Calabrian Arc, South Italy (Neri et al., SRL, 2009) has shown that the Ionian subducting slab appears in-depth continuous only beneath the central part of the Arc (southern Calabria), while it has already undergone detachment at the edges of the arcuate structure (northern Calabria and northeastern Sicily). Starting from this result we tried to better define the features of the slab by performing a new tomographic inversion of crust and upper lithosphere in the Calabrian Arc region. The starting velocity model was derived from the integration of a new crustal velocity model obtained applying the method proposed by Waldhauser et al. (GJI, 1998 and 2002) and a deep model used by Neri et al. (SRL, 2009). We merged these two models into an averaged regional one, ranging between the surface and 300km depth. Then we used it to perform a new P-wave tomographic inversion of shallow and deep earthquakes occurred between 1981 and 2008 in Southern Italy. We selected all the events with a minimum of 12P+S and 8 P+S readings for shallow and deep earthquakes respectively. The quality of the readings was, in the majority of cases, checked directly on the recordings. The final inversion dataset consists of 75141 P and 40118 S arrival times relative to 7050 earthquakes recorded at a total of 591 stations. All the data available from the national and local networks, including the CAT-SCAN and UniCal network, have been used for inversion. This new model reduced significantly the RMS parameter and allowed us to enlarge the inversion zone. The investigation, together with a detailed analysis of seismicity, allows us to propose an improved and more complete view of the subduction system with respect to the previous works, including Neri et al. (SRL, 2009).