FROM THE ALPINE REGION TO THE CENTRAL APENNINES (ITALY): 3D UPPER LITHOSPHERIC P-VELOCITY MODEL WITH CONTROLLED SOURCE SEISMOLOGY DATA

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The complex lithosphere structure of the Italian region leads to difficulties in uniquely interpreting the results obtained with geophysical investigation methods. Relating to P waves velocity models, the geometry of the moho is the main first order structure influencing the interpretation of controlled source seismology (CSS) profile data and results from local earthquake tomography (LET). Moreover, the crustal structures complexities, though poorly resolved by teleseismic tomography, strongly distort teleseismic wave fronts and thus influence teleseismic traveltimes.

In 1996 a method was developed by F. Waldhauser to determine the 3D topography and lateral continuity of seismic interfaces using 2D-derived controlled-source seismic reflector data. This method has been successfully applied to retrieve the moho geometry in the complex Alpine region with the aim to obtain the simplest possible 3D structure consistent with all reflector data and error estimates.

For the Alpine region a 3D crustal P-wave velocity model has been thus developed from comparative use of published information from active and passive sources surveys. Here we present the extension of this map to the Italian peninsula to include Northern and Central Apennines. Information from the CROP project and from other CSS experiments performed in the past 40 years, both on land and offshore, has been included to cover the whole area. The first order features of Adriatic and Tyrrhenian moho have been recovered and a Vp crustal velocity model has been produced.
For the Northern Apennines we compare the newly derived crustal model with the 3D structure of the crust obtained by the inversion of P-wave first arrivals picked on the CSS data, and of gravity data collected on land and off-shore (see Tondi et al., session SM3).