The crustal structure of South Eastern Europe in the new European Plate reference model

Irene Molinari (1), Andrea Morelli (1), Victor Raileanu (2), Dragoș Tataru (2)

(1) Istituto nazionale di Geofisica e Vulcanologia, sezione di Bologna - molinari@bo.ingv.it; morelli@bo.ingv.it ;
(2) National Institute for Earth Physics, București-Magurele, Romania - raivic@inf.pnf.ro

INTRODUCTION

The new European Plate crustal model (EPcrust) represents a continental-scale, a priori, compiled version of current knowledge on the crustal structure of the upper layers of the earth, designed as a large-scale reference dataset for European crustal structure and seismicity. Here we specifically review some of the contributions used, and test and compare the model in detail for the South Eastern Alps region.

EUROPEAN PLATE REFERENCE MODEL (Molinari & Morelli, 2009)

New a priori model of the European plate, EPcrust, is based on a new, comprehensive compilation of currently available information from diverse sources, ranging from seismic prospectors to receiver functions studies. Most original (aerial component) information refers to P-wave speed, from which we derive S-wave speed and density from scaling relations.

The model covers the whole European plate from North Pole to North Pole (20°N-70°N) and from the Mid-Atlantic ridge to the Urals (20°W-70°E). The parameterization represents the crust in three layers (sediments, upper crust and lower crust), and describes the geometry and seismically relevant parameters with a resolution of 0.1° x 0.1° on a progressively increasing latitude-longitude grid (target resolution is 1 km). For each grid point and layer a single set of parameters (seismic velocities Vp, Vs and density) and relative error bars, are specified.

We include in EPcrust a new contribution from some selected seismic profiles in the Eastern Alps region.

SEISMIC PROFILES

We collected informations about the crustal structure from local compilations and individual studies mostly deriving from analysis of active source experiments, passive seismic reflection data and published papers. For each seismic line some 10 models were tested either on location of shotpoints or at distances spaced between 50-100 km along the line. In those points we delineated the three major layers: sediments, upper and lower crust by interfaces from the top of upper and lower crust and Moho. A mean Vp for each major layer was computed as a weighted mean of velocities of the secondary layers. These 10 models are reported as a column on the displayed cross-sections.

CONCLUSIONS

EPcrust, by being the result of integration of different data and pre-existing models, cannot honor precisely the seismic profiles taken from literature. Nonetheless, it is able to fit them well.