

## **Crustal structure and gravity in the Eastern Alps**

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and ALP 2002 Working Groups<sup>^</sup>**

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<sup>^</sup>[http://paces.geo.utep.edu/celebration\\_web/celebration.shtml](http://paces.geo.utep.edu/celebration_web/celebration.shtml); <http://www.alp2002.info/>

### **Abstract**

This study concentrates on the Eastern Alps and their transition into the surrounding Bohemian Massif, the Pannonian basin, the Carpathians and the Dinarides. The geodynamic situation is characterized by the ~N-S directed head-on collision between the European and Apulian plates in the central part of the Eastern Alps, leading to the E-directed lateral extrusion of the Eastern Alps into the Pannonian domain, and the transition of the Eastern Alps to the Dinarides. New seismic data through the lithosphere in this area has been derived from the wide-angle reflection and refraction experiments CELEBRATION 2000 and ALP 2002. A 3D model of the P-wave crustal velocity has been generated by tomographic methods. Further, a map of the Moho discontinuity has been constructed. Both travel time inversion and stacking techniques to improve signal to noise ratio have been applied. Interactive modeling by 2D ray tracing along selected lines has been used to supplement the 3D evaluation. The tomographic model of the crust supplies continuous information about the P-wave velocity only in the uppermost 10 km of the crust. Bouguer gravity data has been implemented to better constrain the velocity of the lower crust by the use of a velocity-density relation. For the uppermost 10 km, the density has been derived from the seismic model. For the lower crust, linear velocity-depth functions have been deduced removing the gravity effect of the Moho topography from the Bouguer gravity. The residual gravity shows a significant regional pattern and interpretation of it is in progress. Altogether, the seismic and gravimetric results give data about the crustal structure, the collision style, the direction of subduction and lateral extrusion tectonics. From this, the existence of a Pannonian micro-plate has been postulated.

**Keywords:** Eastern Alps, crust, Moho, mantle, lithosphere, wide-angle reflection and refraction seismology, gravity, collision, extrusion