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# Crustal Structure and Tectonic Processes in the Eastern Alps Revealed by Controlled Source Seismic Investigations

**E. Brückl** (1), M. Behm (1), K. Decker (2), M. Grad (3)

(1) Institute of Geodesy and Geophysics, Vienna University of Technology (ebrueckl@mail.tuwien.ac.at), (2) Department of Geodynamics and Sedimentology, University of Vienna, (3) Institute of Geophysics, University of Warsaw

Mapping of Moho structure by 3-D interpretations of recent wide-angle data (CELEBRATION 2000, ALP 2002) by the application of stacking techniques and tomographic methods indicates a fragmentation of the Alpine crust into three major tectonic units. Data image pieces of crust belonging to the Europan plate, the Adriatic micro-plate and a newly inferred crustal unit referred to as the Pannonian fragment. 2-D modelling using interactive ray-tracing techniques along main profiles of the ALP 2002 experiment, steep angle reflection profiles (TRANSALP, Northwest-Styria), and the ALP75 refraction and wide angle reflection profile support these findings. First tectonic interpretations of these crustal-scale structures were given within the context of collision of the Adriatic micro-plate with Europe, the exhumation of the Tauern Window, and escape of crustal fragments to the Pannonian basin.

In this study we exploit the 3-D data volume of stacked PmP and Pn waveforms by the use of high level interpretation systems. We further apply 3-D modelling using ray tracing techniques to seismic data supporting the observed Moho topography, crustal fragmentation and other interpreted structures. The reaction of the crust to convergence between Europe and Adria varies significantly in the investigation area. We find zones of crust, which are characterized by thinning prior to collision, elastic bending, thickening due to fold-thrusting and post-collisional crustal thinning by gravitationally induced extension and isostatic Moho uplift. Additional constraints from kinematic

data and exhumation / erosion rates are considered in our tectonic model, which explains the generation of the Pannonian fragment as a consequence of lateral extrusion and continuing convergence in the Eastern Alps.