



Upper mantle reflections from the Alpine-Carpathian-Pannonian transition zone

T. Oeberseder and M. Behm

Vienna University of Technology, Institute of Geodesy and Geophysics, Vienna, Austria (mbehm@mail.tuwien.ac.at, ++43 158801 12892)

From 1997 to 2003, Central Europe was covered by several extensive 3D wide angle reflection/refraction experiments. The survey design focussed on the crustal structure and in particular the Moho discontinuity. Additionally, in areas with high S/N ratio reflections from below the Moho are sometimes well recorded.

We investigate uppermost mantle reflections from the Alpine-Carpathian-Pannonian transition zone. These reflections occur at recording offsets between 200 and 500 km, and they are in particular strong on cross line recordings. The broad offset range with an apparent gap in reflectivity between smaller and greater distances allows for two interpretations: (1) Two distinct reflectors at different depths, or (2) one reflector where the reflectivity gap is caused by the varying incidence angle. Both possibilities are analysed.

A set of travel times is derived from the data and a tomographic inversion approach for the depth and shape of the reflecting interface is performed. The inversion makes use of an existing 3D crustal model which also includes the Moho topography. Prior to the inversion, 3D ray tracing for several presumed models is applied in order to support travel time picking. It turns out that the velocity distribution in the uppermost mantle has a significant effect on the estimation of the depth of the reflector. Since this velocity is generally poorly constrained in the crustal models, its choice is an important issue for our study.

The first results from the tomographic inversion indicate a reflector in the upper mantle with an average depth of 60 km, which would be 30 km below the Moho in this region. Previous studies in the Western Carpathians show a similar feature.