

ALP 2002 Seismic Exploration of the Alpine Lithosphere

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ABSTRACT

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The Alps are one of the most famous and interesting mountain belts in the world and have intrigued geoscientists for centuries. They can be thought of as the southern boundary of the relatively stable lithosphere of western and central Europe. The western Alps have been the target of many lithospheric scale geophysical experiments, but such data are very sparse in the eastern Alps.

The **CELEBRATION 2000** seismic experiment was a massive effort and included some observations in the northeastern Alps. However, the focus of this effort was further north. Thus, the ALP 2002 project was organized to build on the CELEBRATION 2000 effort and provide comprehensive seismic coverage in the eastern Alps. <http://www.nsf.gov/sbe/nuggets/037/nugget.htm>

The **ALP 2002** project was organized to build on the CELEBRATION 2000 effort and to provide comprehensive seismic coverage in the eastern Alps. In a technical sense, the two experiments are tied together, and thus, a joint interpretation of the data from them will produce a 3-D model of the crust and mantle lithosphere that will resolve the major plate tectonic features. Furthermore, it will support the planning and interpretation of future deep seismic reflection lines in this area and will aid in our understanding of earthquake activity.

During ALP 2002, over 1000 portable seismograph recorders were deployed to record earthquakes and 26 specially designed explosions. We employed the same methodology of deploying instruments along a series of interlocking profiles as was used during CELEBRATION 2000.

Including the data from the first large experiment conducted by our group (**POLONAISE 97**), a broad network of seismic refraction information now extends along the Trans-European Suture Zone region from the Baltic Sea, through the Carpathians and Alps to the Adriatic Sea and the Dinarides. We are using these data to construct 2-D and 3-D models of the lithosphere containing structural and compositional information derived from P- and S-wave travel times and amplitudes. ALP 2002 includes the collection of more data in the complex Bohemian massif, which is one of the primary structural blocks in Western Europe that lies primarily in the Czech Republic. In the Alps and adjacent areas to the east and south (Carpathians, Pannonian basin, Dinarides), we are dealing with a plate tectonic regime that is very active and complex.

In the western Alps (**TRANSALP**), we have a collisional regime whereas the Pannonian basin represents an unconstrained plate margin that is extending. Although there is much debate about the details of the processes at work, the lithosphere east of the Alps was extruded laterally eastward in the Miocene and Oligocene as indicated by many types of data including present day seismicity.

<http://www.alp2002.info>