

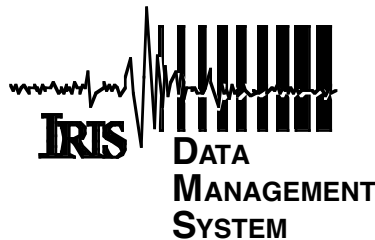
ALP 2002

Seismic Exploration of the Alpine Lithosphere

www.alp2002.info

G.R. Keller, E. Brueckl, W. Chwatal, Z. Hajnal, M. Grad,
A. Guterch, E. Hegedus, A. Gosar, J. Ylinieme, T. Tiira,
H. Thybo, P. Jorgensen, K. Miller, S. Harder

Assembled Data Set 04-017



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EVENTS

VIENNA 25-29 FEB 04

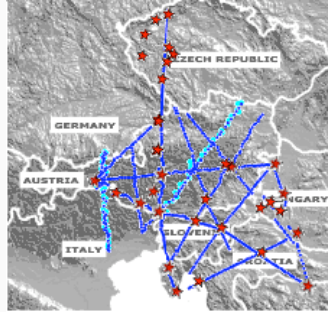
WARSAW 15-19 NOV 03

VIENNA 17-21 FEB 03

WARSAW 12-17 NOV 02

GREIFENSTEIN 7 JUL 02

ALP2002 is an ambitious, international seismic experiment whose scientific objective is to further scientific understanding of the structure and evolution of the lithosphere in the Eastern Alps and surrounding areas.



This effort included passive seismic monitoring during portions of June and July 2002 and an active source seismic refraction experiment conducted from 1-6 July 2002.

These data will be integrated with the goal of better understanding the geodynamic processes currently at work and the complex tectonic history of this region.

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ABSTRACT

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ABSTRACT

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.

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[SPONSORS](#)

[ORGANIZING TEAM](#)

[EXPERIMENT TEAM](#)

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OVERVIEW

ACTIVE EXPERIMENT

PASSIVE MONITORING

IMPRESSIONS

OVERVIEW about the FIELD EXPERIMENT



[»Start animation](#)

- 1 .. **07 June:** Start of passive monitoring
- 2 .. **01 July:** Deployment of 1100 seismic recorders
- 3 .. **02-03 July:** Shooting during first night
- 4 .. **03-04 July:** Shooting during second night
- 5 .. **04-05 July:** Shooting during third night
- 6 .. **07 July:** ALP 2002 - Experiment completed

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RESULTS

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RESULTS

Active Experiment

All raw data from the Texan-recordings are saved on several hard discs and tapes. The raw data of all shots and from 926 Texans were converted to SEG-Y, completed by geometry information and saved on CDROM. They are ready for downloading from a server to all members of the ALP2002 Working group.

[some examples](#)

Passive Monitoring

Data preparation of the passive experiments along ALP04 and ALP12 is in progress. The recordings of the shots will be added to the data set of the active experiment.

[some examples](#)

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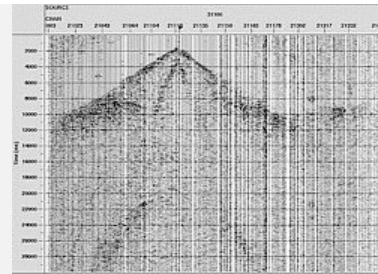
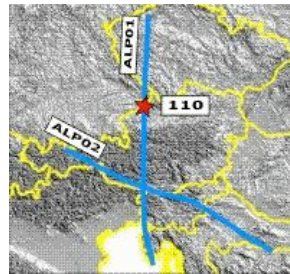
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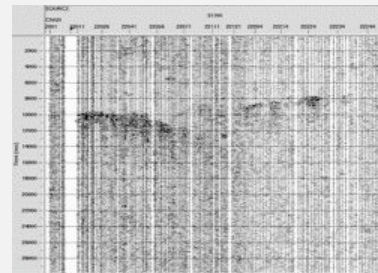
ACTIVE EXPERIMENT

PASSIVE MONITORING

SAMPLES of RECORD SECTIONS



Shot 110 on ALP01
(above)
Shot 110 on ALP02
(below)
traveltimes reduced by
offset/8000 m/s
bulk shift 1s



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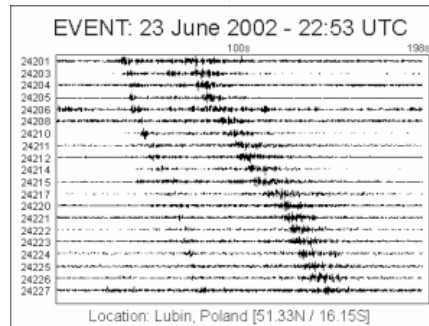
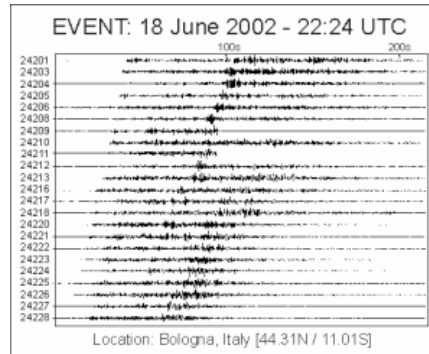
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