Ein undeformierter Metasomatit (Kalifeldspatgestein) aus dem Kontakt zwischen der Sulfidvererzung und dem metamorphen Nebengestein in der Sulfid-Lagerstätte Silberberg bei Bodenmais weist ein konkordantes mittleres Alter von 324 ± 5 Ma auf. Dieses Alter wird auch als Bildungsalter der Sulfidvererzung interpretiert.
Die hier untersuchten leukokraten Gesteine haben ähnliche Verteilungen der Kernalter: konkordante Kernalter liegen zwischen 380 und 660 Ma, diskordante Analysen weisen auf 1,8 and 2,5 Ga.

Der Eklogitamphibolit aus Hermannsried ist gekennzeichnet durch Zirkone mit oszillierender Zonierung und mit relativ einfachen Internstrukturen ohne ererbte, alte Komponenten. Mit dem konkordanten mittleren Alter von 481 ± 8 Ma wird die magmatische Bildung des basaltischen Ausgangsgesteins datiert.

Strength Reversal of Porphyroblasts. A Potential Tool for Estimating Strain Rate

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The Plattengneiss shear zone in the Eastern Alps contains two textural features that may be interpreted of its strain rate: 1.) The rock contains porphyroblasts of (a) K-feldspar, (b) plagioclase, (c) aggregates of plagioclase and quartz. 2.) The decompression reaction of muscovite to biotite is preferentially located in pressure shadows behind garnet. Here we explore the rheological implications of different porphyroblast phases in the rock. The fact that three different porphyroblasts occur in the gneiss implies that all three phases or aggregates are of similar rheology. We show that they only may be of similar rheology (i.e. near conditions of strength reversal) if they are strongly non-linear viscous and if the stress exponents of the three phases have considerably different values. Differences in activation energy and pre-exponent constant of the flow law play a subordinate role. We explore both the strain rates at which this may occur (using rheological constants from the literature) and the rheological constants that allow strength reversal (using assumed strain rates).

Shallow high-resolution seismics along the TRANSALP profile in southern Bavaria

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A high-resolution reflection seismic survey was carried out in the southern part of the Bavarian Molasse basin in 1998 and 1999. The survey aimed at investigating the near-surface structure of the complicated transition from the unfolded Foreland Molasse to the Folded Molasse, and the Folded Molasse to the internally complicated thrust systems of Helveticum, Ultrahelveticum and Rhenodanubian Flysch. The study is linked to the TRANSALP seismic project, and results contribute to fill the gap between surface and upper 300 to 500 ms two-way traveltime, typical of deep-reflection seismic experiments.

The contact zones are covered totally by Quaternary sediments. During the survey the acquisition parameters of geophone spread, spacing and frequency range were particularly adjusted to reflectors which are expected to dip steeply southwards. A high-frequency vibrator was used designed for shallow reflection surveys.

The common problem of the Quaternary cover with glacial deposits complicates the data processing to a large extent. To this the complicated geological/tectonical conditions and the unfortunate circumstances for energy distribution are added. The consequences are that in most cases evaluation of reflection hyperbolic functions is not possible in raw data. Only after a time-demanding pre-stack processing, reflections with travel-times up to 300 ms TWT can be interpreted in unstacked sections. This affords a sensitive combination of air blast attenuation, spectral balancing, bandpass filtering and amplitude scaling. This combination proved to work successfully when permanently adjusted to the quickly changing data quality along the profile. The muting zone has to be estimated for each vibration location separately, so that in addition, small spatial and near-surface velocity variations could be taken into account.

The main aspect of data processing can be seen in the determination of velocities. They play a distinctive role in computing static corrections, the NMO-correction for CMP-stacking and, finally, in migration.

The data of this project shall redress the lack of interpretation of deep and exploration seismics at the uppermost 300-500 ms TWT. To connect the overlapping interpretations it is necessary, however, to include larger travel times as good as possible, too. Combining refraction statics and residual static corrections has shown to be best suited. Thereby, the usable band-width of the signal as well as the stacking velocity was improved iteratively.

This project of high-resolution reflection seismics in complicated geological transition zones of the Bavarian Alp rim shows, that even in areas, which are strongly folded and faulted by imbricate thrusts, seismic information can be gained. Three high-resolution seismic profiles reveal a detailed image of the transition zones. Even the Quaternary cover in the vicinity of the Foreland Molasse and the Folded Molasse could not only be (seismically) observed, but also seismic information could be gained down to 1.3 s TWT in this area. The dipping events of the transition zone Folded Molasse/ Helveticum/Rhenodanubian Flysch are much lesser than expected.

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Deep reflection seismic evidence of the Upper Devonian extensional exhumation of HP-HT eclogite bearing metamorphic assemblage: the Kladská–Mariánské Lázně–Teplá Complex (west Bohemia, Czech Republic)

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The crustal seismic image of the western Bohemian Massif acquired during the explosion-source reflection profiling 9HR experiment provided evidence of whole-crustal megashear zone formed by the HP/HT eclogite bearing Kladska- Mariánské Lázně–Teplá complex. Four main extensional ductile faults dipping 30°-50° to the SE were recognized in the seismic time section. The uppermost part of the megashear zone is formed by the rocks of the Barrandean Proterozoic. The middle part consists of kyanite paragneisses, garnet amphibolites with eclogites retrogressed at pressures around 1.0 GPa and temperatures of 700°C. The lowermost portion of the megashear is represented by less metamorphosed rocks overthrust by eclogitic sequences. Exhumation took place subsequently along extensional faults during the entire Upper Devonian and was probably governed by an arc-parallel extension driven by oblique subduction. The eclogites were exhumed in two phases: to the Moho depth in the Upper Silurian immediately after their subduction; and in the Upper Devonian along the seismically defined megashear zone. Extensional exhumation of the forearc occurred in the eclogitic wedge and its buttress and brought to the surface the eclogites and contemporaneously the lower crust of a Cambrian magmatic arc (Ivrea-like) assemblage of magmatites (the Kdyne-Neunkirchen pluton). Other Upper Devonian HP remnants like the Muenchberg Massif could have been exhumed similarly.

Evolution of the Vienna Basin at the northeastern corner of the Eastern Alps

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The Vienna basin is regarded usually as classical example of a pull-apart basin (Royden, 1981) in many textbook of structural geology. Even though some authors see difficulties connected with this oversimplified evaluation), the overwhelming majority of recent interpretations repeats pull-apart story.

I present here the evidence based on deep (14 s) and shallow (5-6 s) seismic profiles and geologic studies from numerous boreholes and surface that there were, in fact, three distinct periods of the development of the Vienna basin during Neogene and only one might be regarded as the pull-apart one.

The first one occurred during late Eggenburgian, Ottnangian and Karpatian (20-16.5 Ma). Piggy-back basin transtensive fore-arc development on the moving accretionary wedge was present. Syn-subductional transtension led to unusually rapid subsidence and sedimentation during counterclockwise rotation of the Carpa-