

having the same declinations but with negative inclinations ( $D = 201^\circ$ ,  $I = -21^\circ$ ,  $k = 88$ ,  $N = 18$ ; VGP  $48^\circ\text{N}$ ,  $162^\circ\text{E}$ ).

The main carrier mineral of the A1-directions has been found to be magnetite (with unblocking temperatures in the range of  $550 - 580^\circ\text{C}$ ) while the A-directions are due to a low temperature mineral, interpreted as either pyrrhotite or titanomagnetite, with unblocking temperatures in the range of  $300 - 400^\circ\text{C}$ .

Both magnetizations (A1, A) are considered as magnetic overprints due to distinct recrystallization processes that occurred under different hydrothermal and tectonic conditions. Briefly speaking, the GRANITOIDS investigated were emplaced in Early to Middle/Late Carboniferous whereas the period of acquisition of characteristic remanent magnetizations lasted from Late Carboniferous to Late Permian. This yields as an important result of this study that the magmatic and PALEOMAGNETIC history of a crystalline basement maybe slightly but significantly different, possibly with a rather short overlapping period.

### **3-D FORWARD MODELING OF THE BERCHTESGADEN MAGNETIC ANOMALY**

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According to modern trends in seismics, 3-D algorithms gain more and more significance in interpreting magnetic and gravity data. Based on BARNETT (1976) a more simple expression for potential fields of arbitrary polyhedral bodies in three dimensions has been introduced by PEDERSEN (1978) showing that required calculations are simpler in frequency domain and therefore correspondingly faster. All these algorithms have requirements for special coordinate systems or coordinate transformations, which, under practical circumstances, need more calculations as well as additional computer capacity. HANSEN & WANG (1988) generalized the expression for the spectra of the potential field of homogeneous three-dimensional polyhedra.

This method has been applied for the computation of direct models of a low frequency magnetic anomaly ("Berchtesgaden structure", see Fig. 1) observed in the Alpine margin in central Austria, SEIBERL (1991). Geological models are presented. Delimitations of these models are:

- the depth of the Curie isograde which is usually about  $25 - 27$  kms below surface (normal geothermal gradients provided) - bottom of the body.
- the surficial geological information, comprising the thickness of the overlying sequences (Northern Calcareous Alps, Rhenodanubian Flysch, Helvetic Nappes at least) - top of the body.

- indirect geological evidences (e.g. heavy mineral spectra in sediments influenced by erosion of the body which has been exposed at times of sedimentation) - petrophysical properties of the body.
- geotectonic evidences - extension of the body.
- geodynamic background - is it a part of the Bohemian Massif or an Alpine element?

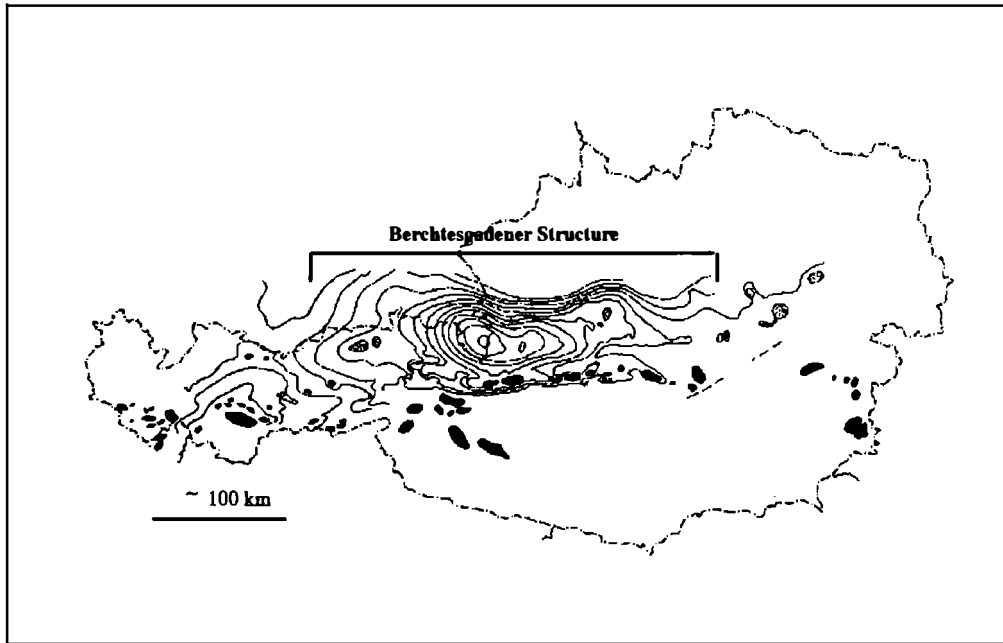


Fig. 1: Magnetic pattern of central Austria. Black: limited structures. Dotted: superposed anomalies. Berchtesgaden structure indicated by isolines (equidistance: 10 nT, center of anomaly: +160nT, reference field: 47141 nT/Epoch: 1977.7), after SEIBERL (1991).

One possibility of interpreting the results would be the assumption of a large scale ultramafic body within the consolidated (Hercynian) southern margin of stable Europe. However, as we have to assume that the Hercynian basement in this area consists mainly of Granites without magnetic signatures of importance, it is very probable that the source body is due to Alpine elements. The original magnetic signature of the basement could be represented by the superposed anomalies (dotted in Fig. 1).

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- SEIBERL, W. (1991): Aeromagnetische Karte der Republik Österreich, 1:1 000 000. - Geologische Bundesanstalt, Wien

## **THE MECHANISM OF EMPLACEMENT OF TREBIC DURBACHITE MASSIF BASED ON PETROFABRIC STUDY**

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The Trebic durbachite massif is a triangular shaped pluton intruding high grade rocks of Moldanubicum at the eastern margin of the Bohemian Massif. This plutonic body occurs at the boundary between two important intra-Moldanubian units: migmatites of Gföhl unit at the east and monotonous greywackes of Drosendorf unit at the west.

The rocks have a fairly homogeneous composition throughout the whole body ranging from dark magnesium rich type at the margins to clearly high potassium varieties prevailing at the core. The associated dyke swarm is mostly aplitic in composition. The internal fabric of durbachitic body is very strong and was studied in great detail both mesoscopically in the field and also using optical goniometry in the laboratory. This tedious work was done in samples in which both magmatic foliation and lineation were hardly distinguishable. In order to study the fabric elements of prophyric rocks a special apparatus was designed allowing measurements of orientations of feldspar clasts by optical means. The orientation of magmatic fabric elements was further calculated using standard eigenvalue method allowing precise determination of directions of principal axes of fabric ellipsoid elements. Another apparatus was devised to determine the sense of magmatic flow using asymmetry in preferred orientation of phenocrysts of different axial ratio.

A numerical computer model based on simulation of movement of rigid triaxial particles in slowly moving viscous Newtonian fluid was established to model the behavior of rigid feldspar phenocrysts in durbachitic magma. It was found that an asymmetric fabric develops, but only if the flow is not strictly non-coaxial and if a small amount of contemporaneous shortening occurs. This condition plays a decisive role for estimation of kinematics in flowing viscous Newtonian magma.

The internal structural pattern of the magmatic body exhibits geometrical coherency with the surrounding metamorphic sequences. The southern part of the intrusion is marked by steep east-dipping flow planes and almost a subhorizontal flow direction with consistent sinistral kinematics. There is a clear transition from postsolidus magmatic fabric prevailing at the core to subsolidus SC fabrics dominating at the