3-D INTERPRETATION AND VISUALIZATION OF POTENTIAL FIELDS/CASESTUDY HOLLABRUNN

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In geophysics inversion techniques are applied to derive reasonable geological models from gravity and magnetic data.

Based on the direct expressions for potential fields of arbitrary polyhedral homogeneous bodies in three dimensions (HANSEN & WANG, 1988), a 3-D non-iterative inversion technique has been suggested (WANG & HANSEN, 1990). Using the spatial equivalent of frequency-domain auto-regression, series of coefficients have been calculated by solving an over-determined linear equation system. The numerical calculated solutions carry informations about depth and locations of polyhedral vertices. In the latter these so called "depth-points" can be volumized to a body which satisfies known geological conditions. However, the advantage of this non-iterative methods (no initial model and no density/susceptibility information are necessary) is balanced by both computational capacities and the problem to interprete clusters of depth-points in geological terms. Visualization packages applied during post processing enable us to attach geological informations to the more or less "abstract" results.

This sequence of techniques has been applied to a distinct group of anomalies located near the southeastern margin of the Bohemian Massif close to the Vienna Basin (Hollabrunn; SEIBERL, 1991). Comparing the magnetic signatures of the Moravian/Moldanubian realm with the anomaly group near Hollabrunn striking differences become obvious. Whereas the signature over the plutonic domains is characterized by a calm pattern disturbed just by distinct anomalies close to the peripheric parts of the granitic bodies and the pattern of the metamorphic domain is dominated by several superposed structures due to sources not very deep below surface or even exposed, the "Hollabrunn group" is isolated and has close similarities to the high gradient/high amplitude structures typical for the Central Alpine region.

Visualizing the anomaly pattern of the southeastern margin of the Bohemian Massif, these similarities or differences become striking. The depth points are clustered generally in depths of more than 4 kms below field continued elevation; the maxima of depth point distribution are shown in Fig. 1.

The cluster 1/3 and 2/4 have been volumized; the resulting source bodies are dike type slabs with the top in 2100 m below surface (N), 3600 m (S) and bottom in 5100 m below surface (N) and 6100 m (S) - generally minimum values. Additional data and results from investigations on remanences (PIOCK-ELLENA, 1993) support the interpretation that the anomaly group is not definitely belonging to source bodies of the Bohemian Massif.

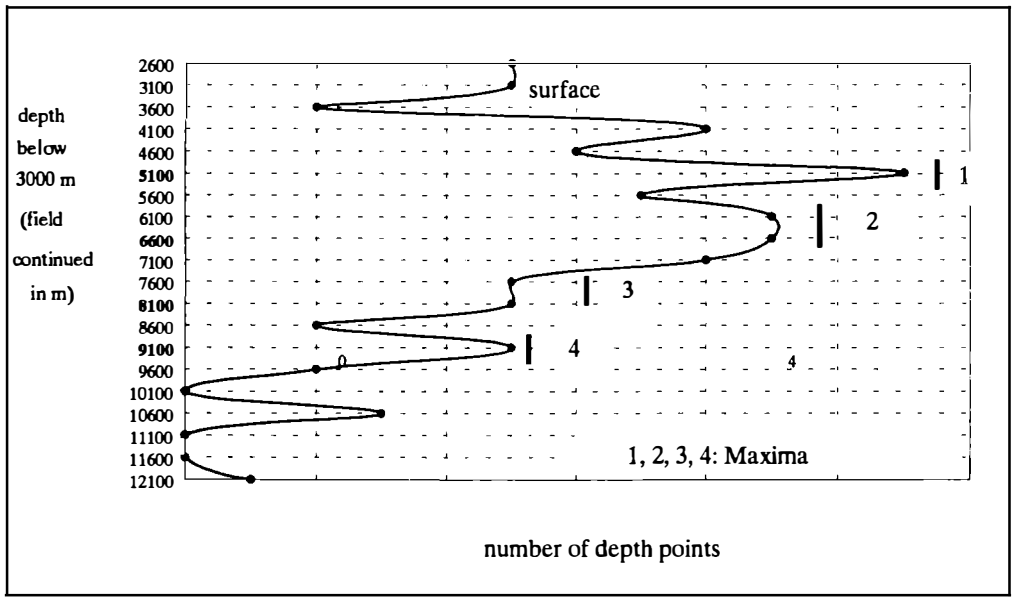

Fig. 1: Bi-modal magnetic anomaly near Hollabrunn. Distribution of depth points, showing 4 maxima. Data from ARNDT (1993) and inversion after WANG & HANSEN (1990).

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K/Ar DATING OF METAMORPHIC ROCKS FROM THE SOPRON MTS., LOWER AUSTRO-ALPINE UNIT (HUNGARY)

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Muscovite, biotite and feldspar were dated from leucophyllite and gneiss samples of the Sopron Gneiss Formation (Grobgneiss) and from the andalusite-sillimanite-biotite schist of the Obrennberg member of the Sopron Micaschist Formation.