THE MOLDANUBIAN PLUTON STRUCTURE (THE LITSCHAU CZ/A FRONTIER PART) AS STUDIED BY THE GROUND MAGNETICS AND BY THE GAMMA-RAY SPECTROMETRY

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The gamma-ray spectrometry, the magnetic suspectibility survey and the ground magnetics were systematically applied in the Litschau frontier CZ/A part of the Moldanubian Pluton on 420 km^2 of the lower Austrian and on 170 km^2 of the south Bohemian territories. More than 5200 observation points were measure in this Plutonic area of the total extent of 590 km^2.

The in-situ magnetic susceptibility surfey proved very low (mostly .05 to .08x10^{-3} SI) and monotonous data in the W and NW part of the area studied which is built by the Eisgarn granite. The SE corner of the area, on the contrary, showed higher and more variegated susceptibility data ranging mostly from .1 to .25x10^{-3} SI. The rocks responsible for these susceptibility data are the Weinsberg and the Wolfsegg granites and small diorite to gabbro bodies.

The most significant object disclosed by the ground magnetics is the Reingers magnetic anomaly situated in the NE corner of the area under study. It arises from the minima of -30 nT in the S and W and from -60 nT in the N to the high of 170 nT in its positive top part. Its size is also remarquable reaching 15 km in diameter. The source body is interpreted as a vault dome structure pertaining to a light acid granite rock. The acid granite milieu is expected there because the detailed gravity map does not show any response of heavy (basic) rocks in the space of this magnetic anomaly. The top part of the source body is supposed to be in the depth of 300–500 m, the substantial part of the source rocks is expected in the depth interval from 500 to 2000 m. In accordance with studies by PISA et al. (1983) and by GÖD & KOLLER (1978) this object is evaluated as a promissing Mo- und W-bearing structure.

As for the other studied parts of the area, the NW Eisgarn granite realm is typical with the monotonous magnetic field while the SE corner built by the Wolfsegg and Weinsberg granites and small bodies of diorites and gabbros show more variegated magnetic field. Relatively high but short-wave anomalies pertain also to some remnants of gneiss-amphibolite paraseries.

The gamma-ray spectrometry was proved to be a very effective tool in geological studies of the Moldanubian Pluton. The Eisgarn granite, in general, was found to be the biggest carrier of the uranium in this part of the Pluton because all its subtypes are relatively rich in this element. The uranium concentrations frequently exceeding 7 ppm U pertain to the coarse-grained porphyric subtype called the Landstein granite in the

Czech site which is followed with medium concentrations of the thorium. The uranium concentrations about 5–6 ppm U accompanied with low concentrations of the thorium (6–10 ppm Th) are typical for the fine-grained subtype of the Eisgarn granite. The bodies of this subtype can be perfectly distinguished by the low Th/K values and by the increased U/Th values in the mentioned ratio maps.

The highest uranium concentrations from 10 to 20 ppm U accompanied with extremely low (< 2 ppm) concentrations of the thorium and with medium concentrations of the potassium (about 3 % K) were detected in the albite-muscovite granite of the Homolka Hill in the NW corner of the area. This relatively rare type of the prominently differentiated granite is also rich in phosphorus, alkali elements and rare metals (BREITER & GNOJEK, 1996). The granite of the analogous features was disclosed by the gamma-ray spectrometry also around the Hoher Berg Hill 5–6 km to the SW from the town of Litschau, the body of which continues to the W to the Czech Republic. Relatively increased thorium concentrations (25–40 ppm Th) belong to the Weinsberg granite but the biggest thorium concentrations from 40 to 75 ppm Th pertain to the Wolfsegg granite. The both mentioned granites appear in the SE part of the area. The boundary line separating the uranium rich part from the thorium rich one as well as the magneticaly monotonous part from the variegated on elies on the line connecting to towns of Gmünd (SW), of Heidenreichstein and of Kautzen (NE).

Explanations to the interpretation scheme enclosed:

The Reingers magnetic anomaly:

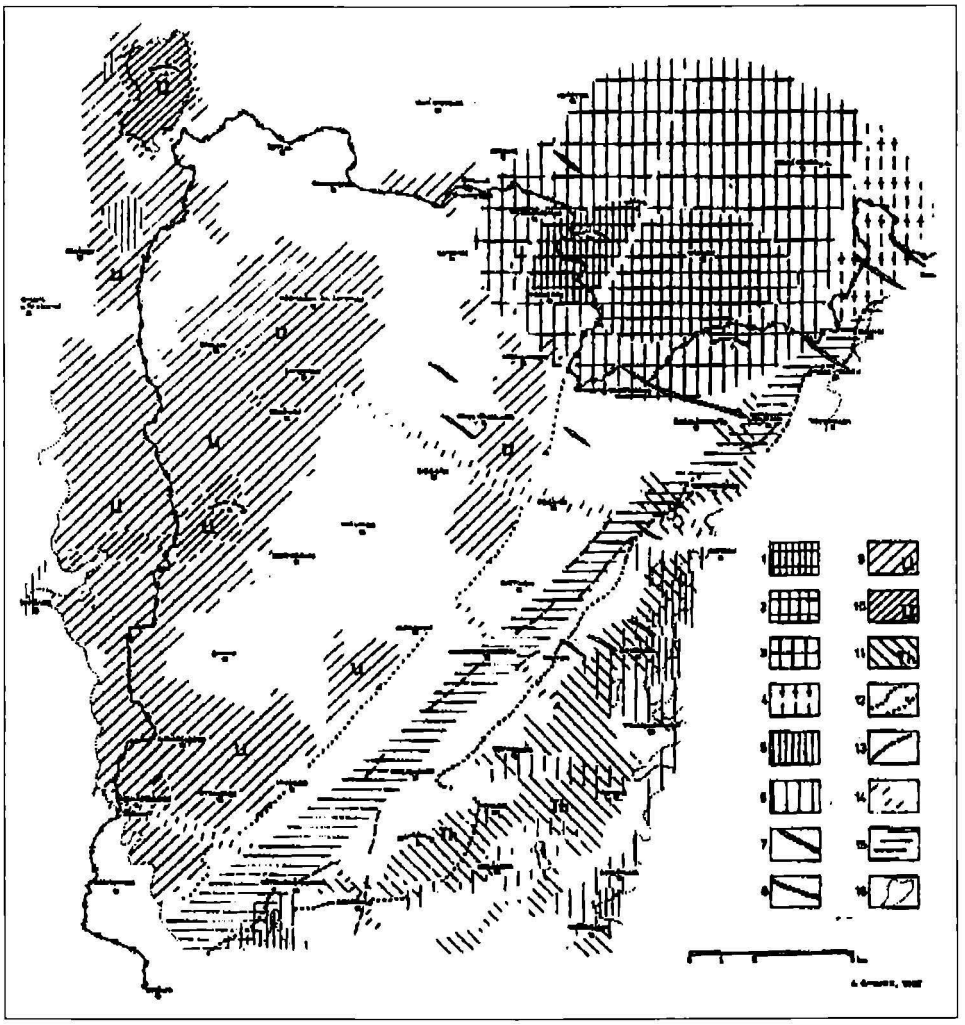
1 the upper.ost part of the source with outcropping altered rocks and very high magnetic susceptibilities
2 the rest top part of the magnetic body in the depth about 500 m
3 the remaining part of the magnetic body mostly in the depth of 1-2 km
4 the marginal part of the magnetic body exertec by tectonic influences
5 mostly outcropping or near-surface non-granite source rocks
6 presumed deeper-seated magnetic rocks
7 outcropping dyke-rocks identified by high susceptibility values
8 presumed hidden dyke-rocks or altered rocks

The radiogeochemical features

9 areas with the U/Th ratio-values from .5 to 1.9 (predominance of the uranium)
10 areas with the U/Th ratio-values higher than 2 (expressive predominance of uranium), the Homolka stock and the vicinity of the Hoher Berg SW of Litschau
11 areas with the U/Th ratio-values lower than .2 (predominance of thorium)

The boundary lines

12 the main magnetic susceptibility boundary lines a) the weaker one
13 axis of the SW – NE elongated magnetic field minima
14 magnetic field NW – SE discontinuities, acis of the magnetic field minima
15 the main boundary line separating the rocks of different magnetic and radiogeochemical properties: NW of it, there are the very low magnetic and the uranium rich granite rocks, SE of it, there are the slightly magnetic and uranium pour (thorium rich) granite rocks. A tectonic significance of this boundary is not excluded
16 some important geological boundaries.



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