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SILESIA BATHOLITH – AN IMPORTANT SUBSURFACE PHENOMENON IN THE EASTERN SILESICUM

Two large variscan granitic plutons crop out in the eastern Silesicum. They are the Žulova pluton on the North and the Šumperk Pluton in the South.

The major-element chemistry as well as mineralogy indicates that Žulová pluton could be classified as fractionated I-type granite. The less fractionated amphibole – biotite tonalites and granodiorites form enclaves with remarkable cumulate textures. They are enriched in HFSE and REE as a consequence of crystal accumulation of allanite, apatite, ilmenite and titanite, their feldspar shows a rather simple internal fabric in CL. The more fractionated biotite granites constitute substantial part of the batholith. The enrichment in LILE and depletion in HFSE and REE corresponds to higher content of K-feldspar and lower amount of accessory phases. Feldspars exhibit complex internal fabric in CL, indicating a major role for feldspar fractionation in the evolution of the batholith, as does the pronounced negative Eu anomaly and higher K/Ba ratio. The interpretation of gravity data indicates a fair homogeneity of the batholith.

The much smaller and poorly exposed Šumperk pluton could be petrological and geochemical well compared with the biotite granites from Žulova pluton. The major difference between both bodies is the degree of oxidation. The less oxidized Žulova pluton contains ilmenite, whereas the highly oxidized Šumperk contains magnetite and hematite. The presence of ilmenite in the Žulova pluton instead of magnetite, which is normally more common in I - type granites, could be explained by intrusion of the I-type magma in graphite bearing rocks (Branná or Velké Vrbno groups) serving as a reducing agent (Zachovalova et al. 2002).

Both bodies form local minima in a huge regional negative gravity anomaly. This regional anomaly firstly appears near the city Brzeg, on the Polish territory and continues in the NNE – SSW direction on a distance more then 130 km.

Preliminary estimate of the depth to the center of gravity of the Žulová pluton range from 3.3 to 5.0 km. Šumperk pluton seems to be much shallower. Its centre of gravity lies at the depth of 1.5 km only.

Geophysical, as well as petrological data indicate that the Žulova pluton together with Šumperk pluton are parts of much larger, but mostly unexposed granitic body. Rychtar et al. (1991) firstly term this hidden body as Silesian Pluton.

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Because of the granitic body seems to be quite large and composed of different lithologies eg. tonalites, granites, the more correct designation would be Silesian Batholith. The strong gravity gradient on the eastern edge of the gravity anomaly is a manifestation of the Červenohorske sedlo zone. This zone was probably responsible for the intrusion of the batholith. The area still exhibits certain tectonic activity, manifested by microearthquakes recorded recently south from Hanusovice. The focal depth of those tectonic events is approximately 20 km (Sýkorová et al. 2003).

REFERENCES

- RYCHTÁR, J., RYBÁK, V., MRLINA, J., 1991: Závěrečné zpracování podkladů detailního tíhového mapování v oblasti Hrubého Jeseníku a okolí. – MS Geofyzika, a.s., Brno.
- SÝKOROVÁ, Z., ŠPAČEK, P., ŠVANCARA, J., PAZDÍRKOVÁ, J., BOLELOUCKÝ, S., HUBATKA, F., 2003: Seismological Monitoring of the Dlouhé Stráně Hydro-Electric Power Plant. –MS IPE MU Brno.
- ZACHOVALOVÁ, K., LEICHMANN, J., ŠVANCARA, J., 2002: Žulová Batholith: a post-orogenic, fractionated ilmenite – allanite I-type granite. Jour. Czech.Geol. Soc.