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**SHRIMP U-Pb ZIRCON GEOCHRONOLOGY
OF THE LATE-VARISCAN ŹELEŹNIAK RHYOLITE INTRUSION,
POLISH SUDETES – PRELIMINARY RESULTS**

The Źeleźniak intrusion (ZI) is located in the southern Kaczawa Mts in the West Sudetes, c. 15 km ENE of Jelenia Góra. This is one of the largest subvolcanic bodies (Majerowicz and Skurzewski 1987) intruding into the epimetamorphic (blueschist- to greenschist facies) Kaczawa Complex, interpreted to contain fragments of a Variscan accretionary prism (Baranowski et al. 1990). The age of this evidently post-tectonic intrusion is important not only for timing of regional metamorphism and intense deformation in the Kaczawa Complex, but also for the correlation with other Variscan igneous rocks in neighbouring units (e.g. Karkonosze Pluton) and, consequently, for deciphering of the Sudetic mosaic.

OUTLINE PETROLOGY

The ZI has a fairly irregular star-like shape composed of its core, c. 3 km² large, and a number roughly radially arranged dykes, several to hundreds of metres thick and up to 7 km long. The igneous rocks of the intrusion can be subdivided into two groups (Majerowicz and Skurzewski 1987, Machowiak 2002):

- Group 1 = fine-grained subvolcanic facies,
- Group 2 = medium-grained hypabyssal facies.

Group 1 comprises felsic rocks of various textures, including aphyric to porphyritic varieties, and of variable mineral compositions corresponding to rhyolites, rhyodacites, and minor dacites and trachyandesites. Group 2 is represented by relatively coarser-grained rocks, also of common porphyritic texture (microgranitoids), and moderately variable mineral composition, plotting within the fields of monzogranites, adamellites and granodiorites.

The mostly peraluminous rocks of both groups correspond to the calc-alkaline series (Muszyński and Machowiak 2000, Machowiak 2002). Their fairly similar REE patterns display rather low contents (7-10 * chondrite) and flat distribution of

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HREE, and remarkably fractionated LREE concentrations. Particular samples of Group 2 display significantly different LREE/HREE enrichment. The observed high $^{87}\text{Sr}/^{86}\text{Sr}$ initial ratios and their variation, from 0.708563 ± 13 to 0.728809 ± 14 (Machowiak 2002) indicate inhomogeneous crustal sources of the magmas.

RESULTS

Two samples representing both the facies varieties were selected for SHRIMP zircon dating:

- sample 26: rhyodacite of porphyritic texture, composed of microcrystalline matrix embedding phenocrysts of quartz, and of idiomorphic, weakly sericitized plagioclase, and fine-grained biotite;
- sample 14: monzogranite of fine- to medium-grained, slightly porphyritic texture, composed of quartz, oligoclase, K-feldspar, biotite, and zircon and apatite.

The SHRIMP data for one of the analyzed samples (microgranite, sample 14) are shown in Fig. 1. The ages of both the fine-grained rhyolite and medium-grained microgranite are very similar and indicate that the main magmatic episode in the ZI took place around 315 Ma (late Namurian). A few analyses of zircon cores show the presence of inherited grains up to c. 2598 Ma.

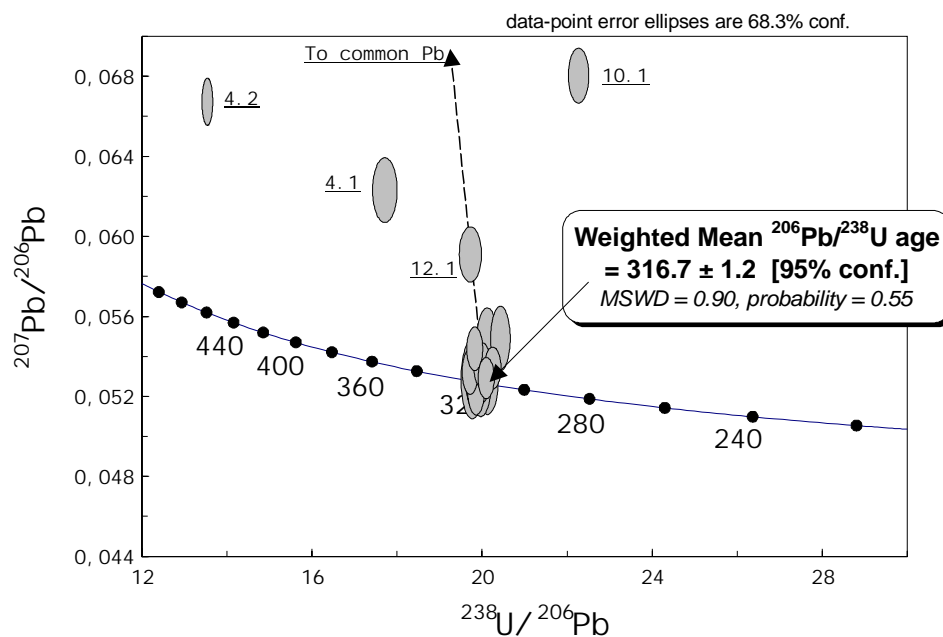


Fig. 1. Concordia plot of SHRIMP analyses of zircons from the Želežniak microgranite (sample 14).

CONCLUSION

Several authors (Majerowicz and Skurzewski 1987, and refs. therein) suggested possible genetic links of the ZI with the Karkonosze Pluton to the SW. Although the distance is not large (c. 10 km), the two areas are separated by the Main Intra-Sudetic Fault which evidently cuts the thermal aureole of the pluton (Kryza and Mazur 1998) indicating significant tectonic displacements along the fault. A comparison of geochemical features of the Karkonosze granites and the Źeleźniak intrusives (Machowiak 2002) points to important differences between the two intrusions. Our new age results of c. 315 Ma for the ZI neither fit the ages of the two main granite types of the Karkonosze Pluton (c. 328 Ma and c. 310 Ma; Duthou et al. 1991).

Finally, the obtained age of c. 315 Ma, which post-dates the regional metamorphism and main deformation events seems to be the upper age limit for deeper-level tectonic and metamorphic (blueschist and subsequent greenschist facies) processes in the Kaczawa Complex. This age may also correspond to the final stages of exhumation of the blueschist facies rocks within that part of the Variscan accretionary prism.

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