

Devonian/Missisipian I-type granite magmatism in the Western Carpathian

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Single zircon U/Pb data obtained at NordSIM facility (Stockholm) from I-type tonalites from Variscan basement of the Western Carpathians indicate a Devonian/Missisipian magmatic event which is almost coincident with the data obtained from St Petersburg laboratory (Kohút et al. 2009 and references therein).

However, four samples from the Tribeč Mts. show older ages in the range of 368-358 Ma. A sample taken from a cliff containing microgranular mafic enclaves yielded the age of 365 ± 3.9 Ma, whereas a magmatic differentiate, leucogranite dike, 368 ± 2.5 Ma, both ages belonging to earliest among granitoids. Two other samples from the Tribeč Massif gave somewhat younger ages. The samples from the southern part of the massif yielded ages of 360 ± 2.5 Ma and 358 ± 2.9 Ma. Samples from the Nízke Tatry Mts. granite (biotite tonalite of Ďumbier type) show 356 ± 1.9 Ma and biotite granodiorite of Prašivá type 353 ± 3 Ma. The Sihla and the Čierna Hora biotite tonalite yielded ages similar to the younger cluster from the Tribeč Massif: 357 ± 2.5 Ma for the Sihla and 357 ± 2.9 Ma for the Čierna Hora, respectively.

In general, two age groups may be recognised from our results: the older biotite

tonalite with differentiates from the Tribeč Mts. (ca. 363 Ma) and all other biotite tonalites from Tribeč, Nízke Tatry and the Veporic Unit (ca. 356 Ma). Few inherited cores in zircons were found in samples. The datings indicate that the S-type granites in the Western Carpathians were formed shortly after the first group of I-type granitoids with enclaves but the granitoids in general can be considered as contemporaneous in origin.

The ion probe single zircon dating of I-type granitoids from the Western Carpathians demonstrates that the basement was intruded by granitic magmas in a very early stage of the Variscan collision. The formation of granite melt is inferred to be on the upper mantle-lower crust level where detached subducted oceanic crust enabled penetration of large amounts of active fluids and basaltic magmas to the upper parts of the lithosphere. The Western Carpathian basement resulted from collision of Laurussia and a fragment of Gondwana as a part of the Hunic superterrains in the sense of Stampfli and Borel (2002). Lateral N-E escape of the Western Carpathian basement during Late Alpine extrusion of Carpathians is suggested as a possible mechanism responsible for displacement of the terrain from Variscan to the present Alpine position.