Geochemical and isotopic characteristics of the Murán Gneiss Complex, Veporic Unit (Slovakia)

(2 figs)

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The Murán Gneiss Complex is one of the several lithostratigraphic complexes of the Veporic Unit in the Central Western Carpathians (e.g. Krist et al., 1992). It is exposed in the south-eastern part of this Unit and consists of several metamorphic rock types, which are of magmatic and sedimentary origin (Hovorka et al., 1987). Here we present new geochemical and isotopic data to constrain their age and origin.

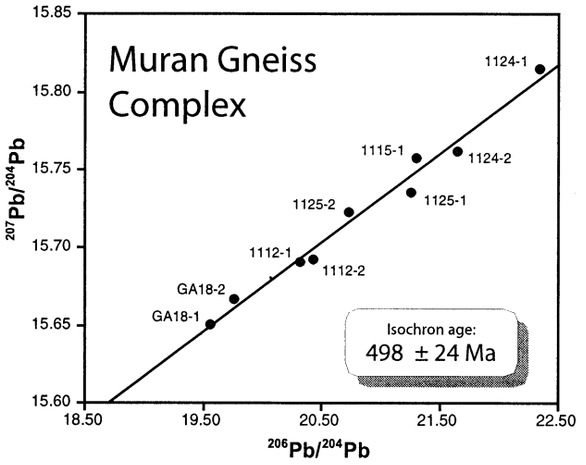

Fig. 1 Pb-Pb diagramm of the whole rock samples for the felsic unit of the Muran Gneiss Complex. Errors are given in 2 σ.

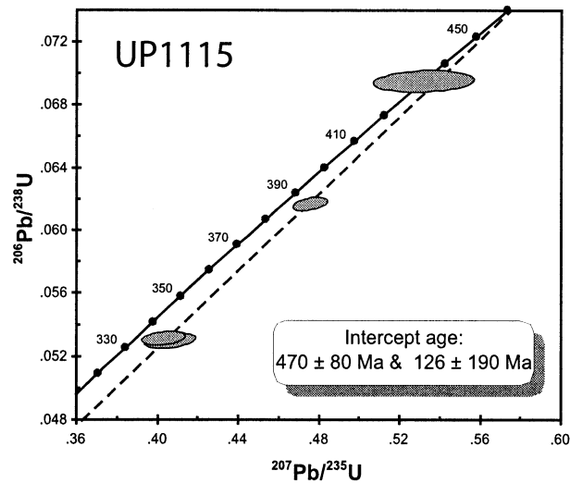

Fig. 2 U-Pb diagramm of the representative sample for the felsic unit of the Muran Gneiss Complex. Errors are given in 2 σ.

The lowermost and most abundant unit of this complex is formed by strongly deformed, partly mylonitic, felsic gneisses with K-feldspar, plagioclase, quartz, biotite, phengite and minor garnet. Intercalated within, there are fine-grained garnet- and epidote-bearing amphibolite lenses with a thickness of several 10 m. Overlying pelitic and semipelitic mica-schists contain garnet, staurolite, kyanite, phengite and biotite. Metamorphic P-T conditions in these mica-schists and the amphibolites reached ca 9–10 kbar and 620 °C, based on geothermobarometric calculations (Janák, 2001).

Pb-Pb isotope data of the mica-schists, the felsic gneisses and the amphibolitic rocks were analyzed on fresh whole-rock splits by means of the TIMS method. Major and trace elements of whole rock powders will be measured with XRF and ICP-MS. Sr and Nd isotopic compositions will be measured on whole-rock powder using TIMS. U-Pb dating of single zircons was performed using the single zircon vapor digestion method.

The Pb isotopic composition of the samples lies on the Upper Crustal evolution line (e.g. mica schists: 18.5–19.0 for 206/204 Pb and 15.6–15.7 for 207/204 Pb). The Pb-Pb-WR data for the felsic gneisses reveal an isochron at around 500 Ma (Fig. 1). This is in accordance with the upper intercept age of 470±80 Ma obtained by the single-zircon U-Pb dating (Fig. 2). Alpine metamorphic over-print is inferred from the Cretaceous age defined by the lower intercept of the discordia. This implies that magmatic crystallization of the felsic gneiss occurred in Cambro-Ordovician time, whereas metamorphic recrystallization was largely during the Alpine orogeny.

These results are in good correlation with previously published UV-laser Ar-Ar data on white mica from the mica-schists, which constrain the Cretaceous age of metamorphism and cooling between 77 and 72 Ma (Janák, 2001).

References

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