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ZIRCON Pb-Pb AND U-Pb GEOCHRONOLOGY OF THE RASTENBERG GRANODIORITE (LOWER AUSTRIA): EVIDENCE FOR THE INCORPORATION OF CADOMIAN AND POSSIBLY ARCHEAN CRUST INTO VARISCAN GRANITOIDS OF THE SOUTH BOHEMIAN PLUTON

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Introduction: The existence of metamorphic and plutonic rocks of Cadomian (pan-African) age either consolidated with or reworked into the European basement during the Variscan orogeny is well documented for the central and eastern part of the Bohemian Massif (i.e. "Moldanubicum" of Bohemia, "Bruno-Vistulicum"; ZOUBEK, 1988; ZWART, 1986). For the South Bohemian Pluton in Austria and the Czech Republic such evidence was lacking until now. A combined zircon Pb-Pb evaporation and conventional U-Pb study from the Rastenberg type granodiorite demonstrates for the first time the existence in the South Bohemian Pluton of inherited zircons derived from pre-Variscan basement.

The Rastenberg type granodiorite forms a separate intrusion of ~ 170 km^2 east of the large composite South Bohemian Pluton in Austria (EXNER, 1968; KLÖTZLI, 1993). It crosscuts the Monotonous Series and the Dobra gneiss of the Variscan

nappe sequence. It shows no post-intrusive tectonic or metamorphic overprinting. Two distinct zircon populations can be identified throughout the pluton (KLÖTZLI, 1993):
Population 1: ∅ S24 subtype of Pupin, colorless to slightly pink, clear to turbid, often with cores, few to abundant inclusions, long prismatic (∅ 3:1);
Population 2: ∅ S4 subtype of Pupin, colorless to reddish or slightly pink, clear to slightly turbid, no visible cores, abundant inclusions, tabular habitus, short prismatic (< 2:1). All the zircons investigated show true magmatic morphologies.

Results:

$^{207}Pb/^{206}Pb$ Evaporation	Conventional U-Pb analyses
338 ± 1.4 Ma (rims from population 1 and total crystals from population 2; 9 zircons)	**338 ± 2 Ma** (upper intercept of discordia with 2 fractions of population 2, regression through origin)
353 ± 9 Ma (total crystals from population 1 and 2; 3 zircons)	**352 ± 2 Ma** and **2005 ± 12 Ma** (discordia with 3 fractions of population 1).
623 ± 22 Ma (cores from population 1; 5 zircons)	
1206 Ma - 2540 Ma (cores from population 1, not well defined; 6 zircons)	

Interpretation: The Carboniferous ages of 338 ± 2 Ma are interpreted as the time of intrusion of the Rastenberg type granodiorite. The not very well defined ages of 353 ± 9 and 352 ± 2 Ma resp. are interpreted as the time of a first zircon formation during a first magmatic event which eventually led to the intrusion of the granodioritic magma close to 338 ± 2 Ma. These older ages are restricted to the eastern part of the pluton.

The pre-Cambrian ages of 623 ± 23 Ma are interpreted as minimum ages of an earlier magmatic or possibly metamorphic event. They clearly demonstrate in the investigated granodiorite the presence of inherited zircons from protoliths of Cadomian age. When recognizable the zircon cores investigated show magmatic morphologies (i.e. domination of {100} prisms in the population 1 zircon cores). This and the limited scatter in the age distribution suggests that the reworked Cadomian protoliths were magmatic rocks in origin, possibly metamorphosed during the Cadomian or an earlier event. Also because of the limited scatter in the age distribution the ages are not interpreted as resulting solely from lead loss of > 1206 Ma old rocks. As up to 50 % of the zircons in the investigated samples exhibit the same morphology and habitus as the dated zircons with Cadomian ages,

it is postulated that the amount of reworked Cadomian basement is quite substantial.

The ages >1206 Ma are interpreted as minimum ages for magmatic or metamorphic zircon growth during the Proterozoic and Archean. It cannot be decided whether these old zircons belong to the Cadomian or to the Moldanubian (basement-) sequences.

Conclusion: The zircon investigations in the Rastenberg granodiorite clearly demonstrate the presence of reworked Cadomian and older, possibly Archean basement within or at least below the present Moldanubian crustal rock sequences. It is not yet clear whether the Cadomian rocks belong to the overridden basement complex of the "Bruno-Vistulikum" microplate or whether they belong to the Moldanubian microplate probably having been incorporated there during earlier stages of the Variscan orogeny. Geochemistry and relatively low Sr isotope systematics favor the latter model (LIEW et al., 1989; KLÖTZLI, 1993).

The study demonstrates the complex age distribution of zircons found within one single small plutonic body due to both zircon inheritance from rock sequences with varying ages and new zircon growth during magma generation. Only precise investigation of zircon typology and single zircon dating can unravel these complex age patterns. The study also clearly demonstrates the usefulness of zircon evaporation analysis when combined with conventional U-Pb analysis.

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THE EFFECT OF THE METAMORPHIC GRADE ON DEFORMATIONAL MECHANISMS WITHIN THE VYSOKA HOLE BASEMENT THRUST SHEET (JESENIKY MTS.)

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The Vysoká hole basement thrust sheet presents the stack of rocks transported to the NE during Variscan deformation. The base of the unit is formed by Cadomian