Einschlüsse vom Typ 1 und 2 sind nach den vorliegenden Ergebnissen während oder kurz nach dem Höhepunkt der variszischen Metamorphose gleichzeitig mit dem Granatwachstum in den Apliten entstanden. Einschlüsse vom Typ 3 dagegen gehören wahrscheinlich späteren Stadien der Abkühlung oder dem alpidischen Metamorphoseereignis an.

Diese Arbeit wurde mit finanzieller Unterstützung durch das FWF-Projekt S 4705 durchgeführt. Univ.-Doz. Dr. P. Knoll, Mag. M. Mayer und M. Pressl vom Institut für Experimentalphysik, Universität Graz wird herzlich für die Messung der Ramanspektren gedankt.

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CRUSTAL REWORKING, MAGMA GENERATION, AND INTRUSION HISTORY OF VARISCAN GRANITOIDS OF THE SOUTH BOHEMIAN PLUTON (BOHEMIAN MASSIF, AUSTRIA): A ZIRCON Pb-Pb AND U-Pb STUDY

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The existence of metamorphic and plutonics rocks of Cadomian (pan-African) age either consolidated with or reworked into the European basement during the Variscan orogeny is well documented for the middle and eastern part of the Bohemian Massif (i.e. "Moldanubikum" of Bohemia, "Bruno-Vistulikum"). For the composite South Bohemian Pluton in Austria and the Czech Republic such evidence has been lacking.

From petrographical studies, an intrusion sequence for the South Bohemian intrusive rocks has been established, but due to limited age data and discrepancies between U-Pb and Rb-Sr geochronology, a definitive age sequence is still in dispute.
The aim of the study was thus to geochronologically characterize the old basement below the South Bohemian pluton and to establish an age sequence for the different intrusive bodies.

A combined Pb-Pb evaporation and conventional U-Pb study of zircons from Weinsberg type granite and the Rastenberg type granodiorite gives the following age results:

- Quartz monzonitic enclaves in Weinsberg type granite (Sarleinsbach): 355 ± 8 Ma (rim or long prism.) and 529 ± 22 Ma (core or short prism.);
- Normal Weinsberg type granite: 357 ± 9 Ma (cores), and 348 ± 10 Ma to 321 ± 12 Ma (various);
- Rastenberg type granodiorite: 338 ± 2 Ma (rim, short prism. or tabular habit), 353 ± 9 Ma (core or long prism.), 623 ± 22 Ma (core or long prism.).

Upper intercept ages for the batholiths are in the range of 2000 - 2540 Ma.

The Cambrian and pre-Cambrian ages demonstrate the presence of inherited zircons from protoliths of Cadomian age in the investigated granitoids. As up to 50 % of the investigated zircons show Cadomian ages, it is postulated that the amount of reworked Cadomian basement is quite substantial. The limited scatter in age distribution suggest that the reworked Cadomian protoliths were either intrusive rocks or orthogenic metamorphic rocks. The upper intercept ages up the 2540 Ma further reflect the composite nature of the crust reworked into the Variscan granitoids.

The Carboniferous ages around 355 Ma found in major lithologies of the South Bohemian pluton are interpreted as the time of a first magma generation throughout the lower crust of the southern part of the Moldanubian basement. Additionally, an U-Pb upper intercept age of 353 Ma from the Weinsberg granite, which also fits well into this age pattern, has recently been given by F. Finger (pers. comm.).

The ages around 340 Ma in the eastern part of the South Bohemian pluton are interpreted to represent the time of intrusion of the Variscan granitoids into the middle crust. An U-Pb age of 342 Ma was reported for the Trebic massiv in the Czech Republic (pers. comm. K. Schulmann; Krems, 1994) which is interpreted as the time of intrusion. The geochemical similarity between Rastenberg granodiorite and the durbachites of the Trebic massiv may also indicate, that both intrusive bodies belong to the same intrusion cycle.

No definitive intrusion age can be given for the composite pluton of the Weinsberg granite. The spread in ages between 348 Ma and 321 Ma reflects the complex intrusion history of the pluton and the possible thermal disturbance during this process leading to lead loss in the zircons. Small, clear zircons may have crystallized as late as 321 ± 12 Ma.

Thus the zircon investigations in the South Bohemian Pluton clearly demonstrate the presence of reworked Cadomian basement within or at least below the present Moldanubian upper crustal rocks. 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.

A widespread magmatic event in the lower Carboniferous has led to a marked magma generation within the whole lower crust below the present South Bohemian pluton. The nature of the mechanism leading to this thermal event is not yet clear.

Subsequent to the first magma generation, the granitoid melts intruded the middle crust during a time period of 20 - 30 Ma, thus forming the present South Bohemian pluton. In the western part of the South Bohemian pluton (Sarleinsbach region), a relative deep part of the Moldanubian basement sequence is exposed today where in situ melting prevails and no individual intrusions can be indentified. This is in good agreement with the absence of zircon ages younger than 350 Ma and with other petrological data. On the other side, the eastern part (Rastenberg and Trebic region) is characterized by shallower granitoid intrusions into the gneisses of the Moldanubian basement accompanied by the observed younger zircon ages in the plutonic rocks.

PRÄ-VARISZISCHE KRUSTENRESTE IM WEINSBERGER GRANIT UND RASTENBERGER GRANODIORIT

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Der Südböhmische Pluton ist ein komplex aufgebauter Batholith. Er gehört zu den granitischen Intrusivkomplexen des variszischen Orogens und erstreckt sich über 160 km von Jihlava (Tschechische Republik) im Norden bis an die Donau im Süden. Mit rund 6000 km^2 ist er der größte Granitkomplex in der Böhmische Masse und intrudiert in die hochmetamorphen Paragneise der Monotonen Serie (Ostrong Einheit nach FUCHS & MATURA, 1976). Er ist aus wenigen, gering mächtigen basischen Intrusivkomplexen (Gabbros und Diorite) sowie aus vier Gruppen granitoider Intrusionen aufgebaut (KOLLER, 1990, 1994).

Zur ältersten Gruppe gehören die weitverbreiteten, grob- bis riesenkörnigen Weinsberger Granitvarietäten, wobei der östlich vorgelagerte Rastenberger Granodiorit vermutlich ebenfalls dieser Gruppe zu zuzählen ist. Die zweite Gruppe besteht aus texturell ähnlichen, feinkörnigen Biotitgraniten mit unterschiedlichen Lokalnamen (Mauthausener Granit, Freistädter Granodoirit, Schremser Granit, etc.). Diese Gruppe ist vermutlich sowohl hinsichtlich ihrer Zusammensetzung als auch bezüglich ihres Alters heterogen, wie KOLLER et al. (1993) für den Schremser Granit belegen konnten. Die dritte Gruppe entspricht den Eisgarner Varietäten, die eindeutige S-Type Granitoide darstellen. Die letzte und jüngste Gruppe besteht aus lokalen, kleinen Intrusionen von hochfraktionierten Leukograniten, die üblicherweise mineralisiert sind (KOLLER et al, 1994; BREITER et al., 1994).

In speziellen Varietäten des Weinsberger Granites (KOLLER & HÖCK, 1993a, b; KOLLER et al., 1993, 1994) und weit verbreitet im Rastenberger Granodiorit