MONAZITE AGES IN HIGH-GRADE METAPELITES FROM THE AUSTRIAN PART OF THE BOHEMIAN MASSIF: INSIGHT INTO A COMPLEX POLYPHASE METAMORPHIC EVOLUTION

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Polyphase garnet growth, remnant mineral inclusions and textural relations indicate that most high-grade metamorphic rocks in the Austrian part of the Bohemian Massif are poly-metamorphic. The method of in-situ EPMA Th-U-total Pb monazite dating provides an effective tool to constrain the age of different metamorphic events.

Monazite in migmatitic paragneiss from the Bavarian Unit in Upper Austria has mostly ages close to 320 Ma. These ~320 Ma old monazite grains formed in connection with late Variscan low pressure, high temperature metamorphism. However, monazite inclusions in zoned garnet porphyroblasts occasionally give older ages of ~ 340 Ma and document a preceding medium- to high-pressure Variscan regional metamorphism in the Bavarian Unit (SORGER et al., 2018).

In the central and eastern Bohemian Massif monazite ages of 335-340 Ma are most common. There is no evidence for an Upper Carboniferous regional metamorphic overprint in these areas (FINGER et al., 2007). However, the Variscan metamorphic evolution was complicated though. A polymetamorphic evolution can be documented for a granulite facies paragneiss from the Drosendorf Unit in Lower Austria (Loya quarry). The rock contains two garnet generations. Monazite inclusions in the older garnet (grt1) give an age of ~ 370 Ma and indicate an Early-Variscan (late Devonian) metamorphic stage. Matrix monazite formed along with the second younger garnet generation (grt2) at 340 Ma. Rare monazite relics of Cadomian age (~ 620 Ma) are preserved in the rock as well.

A polymetamorphic evolution with events at ~ 370 Ma and 340 Ma could also be shown for Moldanubian paragneisses from the Raabs Unit, using monazite in different textural positions. Thus, evidence is mounting that the Variscan evolution of the eastern Bohemian Massif involved two different orogenic events at 340 and ~ 370 Ma. Due to the strong Carboniferous metamorphism, the Devonian event has remained widely unrecognized so far. It may reflect the incipient collision of Armorica and Avalonia.

SORGER, D., HAUZENBERGER, C. A., LINNER, M., IGLSEDER, C., FINGER, F. (2018): Journal of Petrology, 59, 1359–1382

FINGER, F., GERDES, A., JANOUŠEK, V., RENÉ, M., RIEGLER, G. (2007): J. of GEOsciences, 52, 9–28