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Finite pattern of Barrovian metamorphic zones: Interplay between thermal reequilibration and post/peak deformation during continental collision

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The Barrovian inverted metamorphism of the Svratka dome developed within two nappes derived from the Brunia continent that was thrust beneath the Moldanubian orogenic root. The metamorphism increases from biotite-chlorite zone in the basement to very closely spaced staurolite, kyanite and sillimanite zones at the top of the nappe pile. The sequence of mineral growth, chemical zoning of garnet, and pseudosection modelling indicate prograde paths from 4.5 kbar/510 °C to 5.5 kbar/540 °C in the garnet zone, from 6 kbar/530 °C to 7 kbar/600 °C in the staurolite zone, and from 3.5 kbar/510 °C to 8.5 kbar/650 °C in the kyanite zone. The age of monazite inclusions in garnet and staurolite are interpreted to reflect prograde metamorphism at 338±7 Ma and 336±7 Ma, respectively. An older matrix monazite crystal is interpreted as dating prograde crystallization at 345±7 Ma, whereas a younger monazite group records recrystallization at/or down to 334±7 Ma. While these petrological and geochronological data are consistent with data from an inverted metamorphic sequence of the southern Thaya dome, the spacing and distribution of metamorphic zones, nappe thicknesses, and late structures are different in the two domes. An antiformal stack of imbricated basement sheets and the extreme attenuation of metamorphic isograds at the top of the nappe pile in the Svratka dome is explained by a relatively cold overthrusting Moldanubian domain, formed mainly of middle orogenic crust. The homogeneous thickening of the hinterland-dipping basement duplexes and the regular spacing of metamorphic isograds in the Thaya dome are explained by a hot overriding Moldanubian domain, which in this region has a high proportion of exhumed lower orogenic crust and formed a hot mid-crustal channel.

Mots-Clés : Bohemian Massif, Inverted Barrovian metamorphism, Monazite dating, Imbricated antiformal stack, pseudosection modelling, channel flow

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