Geophysical Research Abstracts
Vol. 19, EGU2017-5583-3, 2017
EGU General Assembly 2017

Phase equilibria of HP mica schists from the Kamieniec Metamorphic Belt (Sudetes, NE Bohemian Massif)

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The Kamieniec Metamorphic Belt (KMB), situated in the north-eastern part of the Bohemian Massif, represents the easternmost part of the Variscan Belt of Europe and is interpreted as a fragment of Central Sudetic accretionary wedge containg vestiges of the Saxothuringian crust (Mazur et al., 2015). The KMB comprises a volcano-sedimentary succession dominated by mica schists with intercalations of quartzo-feldspatic schists and subordinate marbles, amphibolites and eclogites. These rocks bear an imprint of Variscan tectonometamorphic reworking. PT conditions of these events were previously estimated at ca. 550 – 590 oC and 7.5 up to 12 kbars (Nowak, 1998; Józefiak, 2000) for mica schists and at 15 kbar and 575 oC for eclogites (Achramowicz et al., 1997).

The metamorphic evolution of micaschists comprise the early HP/LT assemblage M1 with Cld+Phe and also earlier reported pseudomorphs after lawsonite (Nowak, 1998) followed by MP/MT mineral assemblage M2 comprising Grt+Pl+Bt+Ms+Qtz±St. Minerals of the M1 and M2 metamorphic events were overprinted by the LP/MT assemblage M3 containing Pl+Chl+Bt+Ms+Qtz±And. Thermodynamic modelling suggests that mineral assemblages record peak-pressure conditions of 20-25 kbar at 520 oC (M1) followed by nearly isothermal decompression to 6-7 kbar, and subsequent metamorphism with record of temperature progression from 500 to 600 oC at 10 kbar (M2) and final retrogression to 3 kbar and 550 oC (M3). The calculated PT conditions indicate a surprisingly low geothermal gradient during the M1 event of 5.5-7.1 oC/km. However, similar eclogitic mica schists with recognised geothermal gradient of ca. 8 oC/km were documented elsewhere from the Saxothuringian domain (Konopásek, 2001). Presented data provides the first report on mica schists from the KMB metamorphosed under eclogite-facies conditions at such low geothermal gradient.

Acknowledgements: The study was supported from NCN research grant UMO-2015/17/B/ST10/02212.

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