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# Continental crust subducted deeply into lithospheric mantle: the driving force of Early Carboniferous magmatism in the Variscan collisional orogen (Bohemian Massif)

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The vigorous Late Devonian–Early Carboniferous plutonic activity in the core of the Bohemian Massif was marked by a transition from normal-K calc-alkaline, arc-related (∼375–355 Ma), through high-K calc-alkaline (∼346 Ma) to (ultra-)potassic (343–335 Ma) suites, the latter associated with mainly felsic HP granulites enclosing Grt/Spl mantle peridotite bodies. The changing chemistry, especially an increase in $K_2O/Na_2O$ and $^{87}Sr/^{86}Sr_i$ with decrease in $^{143}Nd/^{144}Nd_i$ in the basic end-members, cannot be reconciled by contamination during ascent. Instead it has to reflect the character of the mantle sources, changing over time.

The tectonic model invokes an oceanic subduction passing to subduction of the attenuated Saxothuringian crust under the rifted Gondwana margin (Teplá–Barrandian and Moldanubian domains). The deep burial of this mostly refractory felsic metaigneous material is evidenced by the presence of coesite/diamond (Massonne 2001; Kotková et al. 2011) in the detached UHP slices exhumed through the subduction channel and thrusted over the Saxothuringian basement, and by the abundance of felsic HP granulites ($>$ 2.3 GPa), some bearing evidence for small-scale HP melt separation, in the orogen's core (Vrána et al. 2013). The subduction channel was most likely formed by 'dirty' serpentinites contaminated by the melts/fluids derived from the underlying continental-crust slab (Zheng 2012). Upon the passage through the orogenic mantle, the continental crust-slab derived material not only contaminated the adjacent mantle forming small bodies/veins of pyroxenites (Becker 1996), glimmerites (Becker et al. 1999) or even phlogopite- and apatite-bearing peridotites (Naemura et al. 2009) but the felsic HP–HT granulites also sampled the individual peridotite types at various levels.

Eventually the subducted felsic material would form an (U)HP continental wedge under the forearc/arc region, to be later redistributed under the Moldanubian crust by channel flow and crustal relamination mechanisms. The presence of refractory light material rich in radioactive elements under the denser upper plate would eventually result in gravity-driven overturns in the thickened crust. The contaminated lithospheric mantle domains yielded, soon thereafter, ultrapotassic magmas whose major- and compatible-trace element signatures point to equilibration with the mantle peridotite, while their LILE contents and radiogenic isotope signatures are reminiscent of the subducted continental crust.

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