

Exploring the variability and sources of the Variscan pre-collisional magmatism: the Peri-Moldanubian Arc (Bohemian Massif)

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In the Bohemian Massif, Tournaisian–Viséan (354–341 Ma) normal-/high-K calc-alkaline (NKCA/HKCA) magmatic complexes delineate the Moldanubian orogenic root against the adjacent lower-grade, mostly metasedimentary units. The Amp-bearing gabbros to tonalites–granodiorites are traced by a chain of strong positive magnetic anomalies and feature LILE/HFSE enrichments characteristic of magmatic arcs. U–Pb geochronology, elemental and isotopic analyses (Sr–Nd, zircon Hf) of this *Peri-Moldanubian Arc* document its short lifespan and variable magma sources.

In the Central Bohemian Plutonic Complex, the ~354–350 Ma NKCA suite originated by hybridization of CHUR-like mantle-derived magmas and melts of juvenile metabasic crust. In the younger (350–344 Ma) HKCA suite, (Amp–)Bt granodiorites, generated from Neoproterozoic–Ordovician greywackes, prevail over enriched-mantle-derived ($\epsilon^{346}_{\text{Nd}} \sim -3$) monzonitic rocks [1].

The ~347–341 Ma NKCA gabbros–tonalites and HKCA granodiorites of the Nasavrky Complex contain rare Cambro–Ordovician inheritance. Field, petrological and geochemical evidence underlines vigorous interaction between depleted-mantle- ($\epsilon^{345}_{\text{Nd}} \leq +6.8$) and crustally-derived ($\epsilon^{345}_{\text{Nd}} \geq -4.5$) magmas. Further east, the ~353 Ma Miřetín and ~350–349 Ma Budislav HKCA granodiorites are inheritance-rich; Cambrian–Cryogenian zircons prevail over Silurian–Ordovician and Mesozoic Palaeoproterozoic ones (~1.2, ~1.5–1.6, ~2.0 Ga). Inheritance in the contemporaneous (~353 Ma) Zábřeh Pluton is analogous, but lacking Mesoproterozoic peaks. All three plutons share the same $\epsilon^{350}_{\text{Nd}}$ (–3 to –4).

Along-arc in the Sudetes are syn-tectonic, ~344–341 Ma Staré Město Amp–Bt tonalites [2]. Rare dismembered quartz dioritic–tonalitic arc fragments occur within the Moldanubian domain – the ~352 Ma Kotlasy intrusion ($\epsilon^{350}_{\text{Nd}} = +0.3$) and ~360 Ma Lišov low-P granulites ($\epsilon^{360}_{\text{Nd}} = +0.5$ to –5.1) [3].

In summary, for the Variscan Belt uniquely well-preserved relics of the Tournaisian–Viséan continental arc occur in the Bohemian Massif. The subduction-modified mantle wedge had CHUR-like isotopic composition, except for the strongly-depleted Nasavrky segment. Crustal sources are represented mainly by metagreywackes, dominated by Cadomian continental arc detritus, but that partly recycled older (up to Palaeoproterozoic) crustal components.

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[1] Janoušek *et al.* (2022) *IJES* 111, 1491-1518.

[2] Jastrzębski *et al.* (2018) *Lithos* 316-317, 385-405.