Editorial

# Foreword to the special issue 'Recent advances in unraveling Variscan orogeny in the Bohemian Massif'

Having fascinated (and puzzled) geologists for centuries, the Bohemian Massif became a 'classic' and nowadays one of the most studied examples of ancient orogens around the World. The huge body of new structural, petrologic, and geochronologic data that have accumulated over the past twenty years have revolutionized our previous knowledge and brought new, often conflicting interpretations. The Bohemian Massif has thus turned into a test piece of various models for collisional orogeny, with a wide appeal for the global geologic community.

This continuing scientific interest in the Bohemian Massif was also expressed in a special session devoted to the Variscan Orogeny, convened at the joint conference of the Czech and German geological societies in Pilsen in September 2013 ('GeoPilsen 2013'). Stemming from a large number of contributions and vigorous discussions during this meeting (see Žák et al. 2013 for the conference abstract volume), a truly varied collection of research papers was gathered to this special issue of *Journal of Geosciences*. To reflect the breadth of topics presented and debated at the GeoPilsen 2013 meeting, the special issue is thus not devoted only to the Variscan history of the Bohemian Massif, but also includes contributions dealing with its pre-Variscan evolution and with its correlatives in the Variscan belt.

The issue starts with a geochemical study of *Fiala et al.* who analyzed major and trace elements, as well as Sr and Nd isotopes in the Neoproterozoic metasedimentary rocks (mostly graywackes) of the western Teplá–Barrandian Unit, referred to as the Teplá Crystalline Complex. They revealed rather a uniform composition and interpreted these rocks as having been derived from a juvenile volcanic arc, well comparable to similar turbidites in modern settings. Some of the metagraywackes still preserve signatures of their source andesites. The authors conclude that, together with a comparison of metagraywackes with basaltic bodies, their geochemical data are compatible with a model of incorporation of these rocks into a Cadomian accretionary wedge, the relic of which now underlies much of the Teplá–Barrandian Unit.

The following paper by *Bialek et al.* presents new U–Pb SHRIMP zircon ages for the Zawidów granodiorite, northern Bohemian Massif. The new data suggest that granitic plutonism, related to the Cadomian Orogeny and the Cambro–Ordovician rifting, comprised a prolonged magmatic cycle of at least *c.* 30 My duration, or several pulses separated by shorter intervals of time.

After these two papers discussing pre-Variscan events, *Schulz* contributes with a study about the Variscan metamorphic evolution of the Upper Gneiss Unit in the Haut-Allier region, French Massif Central. Based mainly on microprobe data for garnet and monazite, a clockwise P–T–t path can be shown with a pressure maximum at 700 °C/13 kbar, a temperature maximum at ~800 °C/11 kbar and subsequent decompression from 10 to 5 kbar at 700–750 °C. This metamorphic evolution is then discussed in the context of an early Carboniferous collision event.

A multidisciplinary study of *Žák et al.* uses several analytical methods, including whole-rock and mineral geochemistry, U–Pb laser-ablation ICP-MS dating of zircon, and Re–Os geochronology, to examine the yet poorly known Padrť stock that intruded the southeastern margin of the supracrustal Teplá–Barrandian Unit. Based on the new dating, this pluton appears slightly younger than the correlative, much more voluminous

A snapshot from the "Variscan" special session at the GEOPilsen 2013 meeting. Photo: P. Hejtmánková

~346 Ma high-K calc-alkaline granitoids of the Central Bohemian Plutonic Complex. In addition, this study provides some new data on the age of ore mineralizations, important for better understanding the evolution of the whole Příbram ore district. As revealed by Re–Os geochronology, the related molybdenite and antimonite mineralization hosted in quartz veins postdated emplacement of the stock by several millions of years.

Focusing on the Variscan Internides, *Pertoldová et al.* present new U–Pb zircon ages obtained from skarns in the Kutná Hora and Svratka units. The ages show significant variations from Archean to Carboniferous reflecting different zircon clastic grain sources and different metamorphic histories. The Early Carboniferous ages are interpreted as a result of strong Variscan HT metamorphism and subsequent fluid circulation.

Two other papers then bring new data and interpretations from the eastern Bohemian Massif. *Schulmann et al.* define various tectonothermal processes in the Silesian orogenic wedge at the eastern Variscan front. Applying K–Ar dating on micas and electron-microprobe U–Th–Pb dating on monazite (CHIME), they argue for a Visean formation of the Silesian orogenic wedge. Two younger hydrothermal events can be demonstrated, which occurred in connection with the early Permian intrusion of the Žulová Pluton and later Permian faulting.

*Laurent et al.* investigate the petrogenesis of the Žulová Pluton at the north-eastern margin of the Bohemian Massif. By means of LA-ICP-MS U–Pb zircon dating they show that the pluton formed in early Permian times from coeval magma batches of biotite granite, granodiorite, and quartz monzodiorite. Based on a large set of geochemical and isotope data, the authors argue that the quartz monzodiorite stems from an enriched mantle source, whereas the biotite granite and the granodiorite may be derived from the melting of the local Devonian volcano-sedimentary crust.

Finally, the youngest Variscan brittle deformations and their relationship to granite emplacement are dealt with in a structural study of *Zachariáš and Trubač*. They propose that the Ševětín Pluton, composed of S-type granites comparable to those of the Moldanubian Batholith, intruded syntectonically during the waning stages of the Variscan Orogeny. Based on structural, anisotropy of magnetic susceptibility (AMS), and paleostress analyses, it is suggested that emplacement of the pluton was directly linked to the formation of the Blanice Graben, one of the most important late-Variscan tectonic elements in the Bohemian Massif. Furthermore, the authors' interpretations point to a prolonged late Carboniferous to early Permian history of the graben with several distinct episodes of shearing and extension, associated magma emplacement and hydrothermal fluid flow.

As apparent from the above, this special issue covers a broad range of topics related to the evolution of the Bohemian Massif. We may only hope that it will provide readers of the Journal interesting and thought-provoking reading and will stimulate further research and scientific discussions. Last but not least, we express our gratitude to all the contributing authors and we would like to acknowledge the reviewers, who volunteered their time and effort to improve the quality of the special issue.

## References

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