Editorial

Foreword to the special volume on 'Field, analytical and experimental approaches to silicic magmatism in collisional orogens'

Despite more than two hundred years of vigorous scientific interest, granite plutons are still in fashion and their origin continues to be hotly debated. This special issue of the *Journal of Geosciences* is intended to be a modest contribution to the recent granite debate by collecting process-oriented research papers on a wide range of related topics. These include the significance of granitoid intrusions for reconstructing plate tectonics, pluton emplacement, and interpretation of magma sources and granite petrogenesis. Despite the fact that the papers published in this special issue mostly focus on Variscan plutons in Europe (Spain, France, Slovakia, Czech Republic) and also from other areas (Mongolia), they may hopefully provide case examples with a broad outreach.

The issue is introduced by *Bonin* who reviews the state of the art of A-type silicic magmatism in the Variscan and Alpine Europe. This paper defines varieties of A-type granites, their plutonic and volcanic associations as well as their salient petrographic, geochemical and isotopic features. Two major problems of current research on A-type igneous suites are discussed in detail: 1) uranium-thorium mobility, phase transformations of zircon and its utility for geochronological studies, and 2) preservation of A-type chemical signature during regional metamorphism. An exhaustive review of European occurrences provides background for temporal cyclicity of the A-type events. One group marks post-orogenic settings whereas the other is associated with continental break-up, rifting and formation of new oceanic basins. The European occurrences cluster at Cambrian–Ordovician and Carboniferous–Triassic boundaries, each of the events spanning approx. 60 Ma and both separated by a gap reflecting existence of the Paleotethys Ocean.

The paper by *Dietl and Koyi* addresses the formation of tabular plutons using analogue modelling. These authors set up a stratified model consisting of multiple plasticine layers and demonstrate how buoyant material develops into tabular sills, the space for which is made by floor downdrop. As the most important outcome of this study, the authors demostrate that during growth of tabular plutons, the feeder channels may become blocked as a result of subsidence of the pluton floors.

The geochemical study by *Villaseca and co-authors* is devoted to peraluminous granites of the Montes de Toledo Batholith of the Central Iberian belt. This batholith comprises a sequence of chemically distinct intrusive units, which differ in degree of peraluminosity, and calcium and phosphorus abundances. A detailed survey of neodymium and lead isotope systematics has revealed a mixed source with distinct proportions of two end-members: Neoproterozoic metasediments and lower crustal, metaigneous precursors. As an additional peculiarity, these granites contain a variety of magmatic aluminosilicate phases including coexisting andalusite and sillimanite. This mineral couple, rarely recorded elsewhere, provides independent constraints on the emplacement conditions and crystallization history of this batholith.

Leichmann and Höck provide a detailed petrographic and geochemical review of the Brno Batholith, which is a composite body located in the Brunovistulian Unit at the eastern margin of the Variscan orogenic belt. The batholith consists of two granitic complexes, which are separated by an ophiolite unit. The Eastern Granitic Complex represents an exposed, primitive magmatic arc related to the Cadomian (Pan-African) convergence. In contrast, the Western Granitic Complex is an assembly of three suites, with S-, I- and A-type affinities, which were produced by melting of lower-crustal metasedimentary lithologies underplated by mafic magmas. The geological and geochronological data point to similarities between the Brunovistulian magmatic activity and that in the Egyptian Eastern Desert and demonstrate their affiliation with the Gondwanan margin in Neoproterozoic.

The Variscan silicic activity exposed in the present-day Carpathians was investigated by *Kohút and Nabelek* using a combination of radiogenic and stable isotope methods. The Western Carpathians offer outcrops of unparalleled geochemical varieties of granitic rocks, which include potassic-magnesian, potassic-ferroan, calc-alkaline, peraluminous, subalkaline as well as alkaline-anorogenic types. Both the strontium and neodymium isotopes rule out a single-source, mantle or crustal model for their origin but require an involvement of several sources, which may have been provided by melting of a vertically zoned crustal sequence. The oxygen isotope data span a broad array as well, and this reflects significant and variable proportions of mafic to silicic igneous precursors.

Chudík and co-authors present a detailed mineralogical study of extremely evolved, highly peraluminous pegmatitic system from Považský Inovec in the Western Slovakia. The unusually high budget of high-field strength elements is stored in abundant accessory phases – columbite–tantalite, tapiolite and zircon, which are associated with garnet-sillimanite-bearing assemblage. The first two accessories do not show significant variations of divalent cations (Mn,

Fe) with distinct compatibility but oscillatory zoning in Ta and Nb, which partly overlaps with the tantalite–tapiolite miscibility gap defined by previous investigations. This pegmatitic system provides another example of Zr/Hf and Nb/Ta decoupling in magmatic reservoirs, being probably related to local extreme fractionation.

The paper by *Economos and others* combines field observations, structural data, and geochemistry from the Chandman Granite Massif, Mongolia, to resolve its geologic history and to outline implications for tectonic evolution in the nearby metamorphic terranes. The authors show that this intrusion cannot be related to Caledonian events as thought previously, but instead may reflect a subduction-related volcanic-arc magmatism of Early Carboniferous age, first reported in the western Gobi-Altay Terrane.

This issue shall provide a cross-section through various magmatic products of Variscan orogeny in time and space. We hope that the breadth and multitude of approaches presented in the following papers will stimulate new studies and applications of state-of-the-art analytical techniques to enhance our understanding of geodynamics in continental collisional zones.

We express our gratitude to all the authors who have contributed such a variety of thought-provoking articles to this Special Issue. Last but not least, we would like to acknowledge the reviewers of the above papers who volunteered their time and effort to improve the quality of this special issue.

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