near the village of Kazak. These ^{40}Ar/^{39}Ar ages are broadly in agreement with the geochronology that has been done on the Greek side of the Rhodopean Massif. However, given the much older U-Pb ages of related rocks, we interpret the ^{40}Ar/^{39}Ar ages to represent cooling following the overprinting metamorphism.

The ages obtained for the Sredna Gora zone do not show an overprint by Alpine metamorphism. Biotite ages from mica-rich gneisses yielded ages of 113.4 ± 1.0 Ma, 112.3 ± 1.5 Ma, and 110.7 ± 1.7 Ma. Muscovite ages from the same gneisses yielded ages of 110.8 ± 1.0 Ma, 101.3 ± 0.6 Ma, and 106.2 ± 1.0 Ma, respectively. Also, a hornblende-rich gneiss yielded a biotite age of 95.6 ± 1.0 Ma and a hornblende age of 247.3 ± 1.8 Ma. (This significantly older hornblende age may reflect incomplete re-equilibration of this mineral). Since the metamorphic basement rocks of the Sredna Gora must be older than numerous unmetamorphosed Variscan (~300 Ma) intrusive rocks, these cooling ages indicate either prolonged residence at a temperature between the closure temperatures for the micas and hornblende, or a minor reheating event in the Cretaceous. These data verify the suspicion that the Rhodope and Sredna Gora terranes have undergone very different metamorphic histories.

Quartz and feldspar fabrics in igneous rocks of the Eastern Erzgebirge Pluton (Germany, Czech Republic): evidence of multiple magma mixing

A. MÜLLER[1] – R. SELTMANN[1] – K. BREITER[2]

[1] Natural History Museum London, A.Mueller@nhm.ac.uk
[2] Natural History Museum London, R.Seltmann@nhm.ac.uk
[3] Czech Geological Survey, breiter@cgu.cz

The Eastern Erzgebirge Pluton (EEP) is situated in the eastern most part of the Fichtelgebirge-Erzgebirge anticline where late- to post-orogenic Variscan uplift and exhumation processes were accompanied by intense felsic (rhyolitic and granitic) magmatism controlled by brittle fracture tectonics. During orogenic collapse a volcanotectonic depression – the Altenberg-Teplice caldera (ATC) – developed in the central part of the EEP. The study includes (1) the Older Intrusive Complex granites, particularly the Niederbobritzsch granites, (2) the Schönfeld rhyodacites, (3) the Teplice rhyolites, (4) the rapakivi-textured microgranite of Altenberg-Frauenstein (caldera ring dyke filling), and (5) the Younger Intrusive Complex granites, particularly the Schellerhau granite complex.

The study is focused on the characterisation of quartz and feldspar phenocrysts from different magmatic stages by cathodoluminescence (CL) and by trace element profiling. We evaluate the extent to which variations in mineral chemistry reflect either magma mixing or other processes caused by magma dynamics during the magma evolution of the EEP.

We present a model of the temporal, spatial and chemical evolution of the EEP mainly based on textural and chemical observations of quartz and feldspar phenocrysts and whole rock chemistry. The results verify the suitability of quartz and feldspar phenocrysts as a record of differentiation trends, magma mixing and recharge events, and suggest that much heterogeneity in plutonic systems may be overlooked on a whole rock scale. Multiple resorption surfaces and zones and element concentration steps in zoned quartz and feldspar phenocrysts indicate mixing of the silicic magma with a more mafic, mantle-derived (?) magma.

Based on the presence and absence of quartz phenocryst populations confirmed by the whole rock chemistry and previous melt inclusion studies, three levels of magma reservoirs are supposed: (1) at the root zone of the Variscan orogen at 60 km depth, (2) between 21–27 km, and (3) between 21 and 3 km. At least three sub-reservoirs exist in the third level till the collapse of the ATC.

Several intrusion stages of the EEP display textural and chemical evidence for multiple interaction of mafic and silicic magmas during their genesis, particularly, the Niederbobritzsch granites, the Schönfeld rhyodacites, the Teplice rhyolites (phase TR3c), and the microgranite of Altenberg-Frauenstein. The heterogeneous nature of mixing is indicated by the varying distribution of textures between and indeed within lithologies. Currently, a number of studies indicate that such textures, especially rapakivi textures, are present on a regional scale within the granite belts of the Variscan orogen. This regional distribution of mixing-compatible textures suggests that magma mingling and mixing were major processes during evolution of late-Variscan magmatism.

The ATC represents an unique example of the long supposed association between late-Variscan plutonism and volcanism which has been proven chemically and texturally as well. It is the only known example from the inner part of the Variscan orogen, where late-Variscan plutonism and related volcanism can be studied in such detail.