during different episodes of the long lasting deformation history of the SFZ. At the time of their formation, their Ti uptake is in equilibrium with the fluid, reflecting the geochemical conditions of vein formation. Due to the inefficient resetting of the Ti concentrations under retrograde deformation conditions, the formation temperatures are largely preserved. In terms of the quartz microstructures, the timing and amount of overprinting of initial structures by subsequent deformation stages depends on the amount of strain accommodated in the gneissic matrix and its variation in space and time. In this sense, some of the early-formed quartz veins preserve an old stage of dynamic recrystallization, while others are completely overprinted by younger low temperature deformation (e.g. small grain sizes, bulging recrystallization). Whether the veins are old or young can be inferred from the Ti in quartz signature. It follows that even in the very high strain part of major shear zones, a careful combination of microstructural and geochemical analysis allows us to look far back into the temporal evolution of such a shear zone, with the potential to thereby obtain improved, high-resolution information on the spatial and temporal evolution of retrograde shear zones.

New geochemical data of Badenian volcanic rocks from south Pannonian Basin in Baranja, Eastern Croatia

Horvat, M.[1], Slovenec, Da.[1] & Lugović, B.[2] †

[1] Croatian Geological Survey, Sachsova 2., 10 000 Zagreb, Croatia
(mhorvat@hgi-cgs.hr; dslovenec@hgi-cgs.hr)
[2] Faculty of Mining, Geology, and Petroleum Engineering, University of Zagreb, Pierottijeva 6, HR-10 000 Zagreb, Croatia

Investigated area is situated in the south part of the Pannonian Basin in Baranja province (Eastern Croatia). This abstract presents new geochemical results of volcanic and pyroclastic rocks, collected during the investigations in Baranja through preparing of Basic geological map of Republic Croatia (scale 1:50 000).

Investigated volcanic rocks (lavas) and pyroclastic rocks that include tuffaceous breccias and crystallovitrophyric tuffs are collected from three localities: Popovac, Vračevo and abandoned Batina quarry. Field evidence suggest polyphase magmatism which is evidenced by Badenian sediments that overlie lavas and by dykes cutting Badenian limestones (Begovac quarry). In Batina quarry volcanic and tuffaceous breccia are overlain by sub-horizontal beds of Quaternary loess. K-Ar measurements on volcanic rocks gave 13.8 and 14.5 Ma.

Volcanic rocks and magmatic fragments of volcanic and tuffaceous breccias (Batina quarry) are composed of plagioclase, olivine and clinopyroxene phenocrysts set in the groundmass of glass, microlites of phenocrystic population and accessory apatite, ilmenite and magnetite. Clinopyroxene and olivine microlites may be pseudomorphosed by chlorite and serpentine, respectively. Amygdules are filled by calcite and chlorite.

Volcanic rocks have SiO_2 ranging from 52.58 wt.% to 57.64 wt.% and Na_2O+K_2O content of 4.97-5.83 wt.%. They are dominantly sodium rich (Na_2O/K_2O = 2.1-5.5). In the TAS diagram they show subalkalic affinity and plot in the field of basaltic andesites and andesites. In the diagram K_2O – SiO_2 they show calc-alkaline to high-K calc-alkaline affinity. The lavas are moderately fractioned in the term of Mg# and Cr content (50.1-61.3 and ~ 110 ppm, respectively) but are very depleted by Ni (< 20 ppm) suggesting olivine + spinel fractionation. Rounded fragments of basaltic andesites from the volcanic breccias are characterized by lower K_2O, HFSE and REE, and higher Cr and Ni contect with regard to the basaltic andesite and andesite lavas.

All lavas show moderate enrichment of LREE over HREE [(La/Lu)cn = 5.41-8.38] at ~ 86 times chondrite relative concentrations. Negative Eu anomaly (Eu/Eu* = 0.77–0.95) indicates early feldspar fractionation at low pressure. The spider diagram normalized to N-MORB values shows an inconsistent secondary LILE enrichment. Negative anomaly of Nb-Ta

relative to La is well pronounced [(Nb/La)n = 0.41-0.48] as well of other HFSE which is typical of subduction zone magmas.

However, although the chemistry of Badenian calc-alkaline basalt-andesite rocks in Baranja is similar to those of the recent orogenic and subduction related areas, the origin of their primary magma should be linked to post-orogenic geotectonic environment typical for continental margin (back-arc) rift-basin. Thus, the geotectonic setting of Baranja volcanic rocks harmoniously complements initial extension phase of Neogene geodynamic evolution of Pannonian Basin proposed by many authors. The Pannonian Basin is interpreted as post-colision continental back-arc basin which extended during the Miocene due to uplift the upper mantle diapirs that caused strong trancurent faulting. This allows the differentiation of the Basin in several small pull apart rhomboidal depression. Calc-alkaline basaltic to basaltic andesite magmas, which may fractionated to andesitic and/or dacite and rhyolite extrusives, erupted along weakened tectonic zones of the basinal depressions.

Middle and Upper Triassic slope and basin carbonates along the Neo-Tethyan (Meliata) margin (NE Hungary): facies and paleoenvironmental interpretation

Horváth, B.[1] & Hips, K.[2]

[1] Eötvös Loránd University, H-1117 Budapest, Pázmány Péter sétány 1/A Hungary (kyklad@gmail.com)
[2] Geological Geophysical and Space Science Research Group of The Hungarian Academy of Sciences, H-1117 Budapest, Pázmány Péter sétány 1/A Hungary (hips@caesar.elte.hu)

The studied area, the Aggtelek-Rudabánya Hills (NE Hungary) is part of the Silicic nappe system of the Inner Western Carpathians. In the Triassic pre-rift stage (from ?Middle–Late Permian to Middle Anisian) the evolution of the area was uniform, however, during the Neotethyan synrift stage in the Early-Middle Anisian the Steinalm carbonate ramp broke up, creating three different tectonostratigraphic units: the pelagic Bódva Unit, the Szőlősardó Unit representing slope sedimentation and the Aggtelek Unit where the carbonate platform building continued until the Late Norian. During the time period between the Middle Anisian and Rhaetian different types of carbonate rocks were deposited on the slopes and in the basins of these units: 1) greyish pink bedded limestone that suffered multiple phases of brecciation, 2) red, nodular, cherty limestone with purple-red shale intercalations, 3) grey to red bedded limestone with stromatactis structures, 4) the Massiger Hellkalk and Hangendrotkalk Members of the Hallstatt Formation and 5) grey, cherty beds of the Pötschen Formation.

Within the framework of the current study sedimentary and microfacies analyses were conducted regarding the Middle and Upper Triassic slope and basin carbonates of the three units, including resampling and revision of important drilling cores, detailed geological mapping of the surface outcrops and thin-section analysis. The next step in the near future will be the Conodont-biostratigraphical revision of important, yet not dated cores and profiles as well as stable isotope and other instrumental analyses.

The aim of the work is to create a modern and comprehensive facies model for the different rock types thus to gather additional data related to their paleoenvironment and paleogeographical position, clarify the similarities and differences between the different formations and try to correlate the Hungarian examples to the Austrian ones. A future goal is to use these newly acquired data and interpretations to help understand the otherwise very complex structural system and tectonic movements of the Aggtelek-Rudabánya Hills by determining the original relative position of the tectonostratigraphic units.