sediments of the Proč, and/or Proč-Jarmuta layers, we consider them olistoliths. Macroscopically they are homogenous very fine-grained rocks with visible phenocrysts of olivine, clinopyroxene and rarely amphibole. The matrix is made from devitrified glass, tiny albites, clinopyroxene and amphibole microliths and zeolites. Olivine is wholly altered and superimposed by a mixture of chlorite and serpentinite minerals. The basalts from Velikij Kamenec have similar mineral and chemical composition. The mineral composition (Cpx – high contents of Ti, Na, K; amphibole – kaersutite etc.) points to alkaline character of the rocks, which is also evidenced by the presence of partly resorbed leucite/analcime.

The chemical composition of volcanics is rather specific. Generally, these rocks are characterized by low SiO_2 contents (ca 41.0 weight %), enhanced contents of TiO_2 and P_2O_5 (3.3, and/or 1,5 weight %) and elevated contents of incompatible elements such as Ba (1300 ppm), Sr (1100 ppm) and LREE, as well as those of Nb (217 ppm), V (161 ppm) and Zr (1050 ppm). For various discrimination diagrams these volcanics correspond to OIA (oceanic island alkali basalts) or WPA (within-plate alkali basalts) fields. Similarly, the course of the normalized REE curve is clearly declined in the direction of low HREE contents without a considerable Eu-anomaly. Such a course of normalized curve is typical for ocean island (OIB), Cretaceous basalt from the Jarmuta Formation or continental alkaline volcanic suites of central and Western Europe, as well as for Mesozoic alkaline rocks from various parts of Europe.

Reconstruction of the geodynamic setting of the Cretaceous mafic alkaline volcanism in the Alpine-Carpathian-Pannonian realm infers the general extensional/rifting tectonic regime that ultimately led to the opening of Penninic oceanic rift arms. However, this rifting started as basically passive and non-volcanic. Only during the later, post-breakup extension phases the slow-spreading oceanic ridges developed, which are characterized by the MORB-type basaltic volcanism. Alkaline volcanic provinces have linear character and appear to follow passive continental margins of Penninic oceanic arms opened during the Jurassic and Early Cretaceous. We infer that alkaline volcanism resulted from heating and partial melting of the subcontinental mantle lithosphere on peripheries of asthenospheric upwellings confined to slow-spreading ridges of the Alpine Tethys. Consequently, regarding the debate about the plume vs. non-plume origin of the Cretaceous alkaline volcanism, the geological data from this area rather support the latter opportunity.

Could geophysical modeling solve some of the Transylvanian Basin (Romania) structural problems?

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The Transylvanian Basin is composed of crystalline basement assigned either to the Internal Dacides/Median Dacides or to the Tisia/Dacia terrain, of Mesozoic deposits (belonging to the Vardar Ocean ?), sporadically of Paleogene deposits, of Upper Miocene deposits (7000-9000 m) formed in a fast subsidence regime and structurally of two pre-Miocene depressions (Puini Basin at west and Tarnave Basin at east) separated by a crystalline basement crest (Pogaceaua) with a maximum apex at 3500m. The Miocene subsidence depocenter with major development in the two basins preserving Jurassic (locally), Cretaceous and Paleogene deposits coincides with the presence of a supposed ophiolitic layer in the basement (seismic data), although the drillings revealed island-arc volcanics exclusively, similar to those outcropping in the Apuseni Mts. The thermal flux data (partially registered on the geothermal map of the Geological Institute of Romania, 1986) suggest a negative regime on areas with maximum Miocene subsidence. Maximum magnetic anomalies of (+250nT) and minimum gravimetric anomalies of (-64mgal) overlap the areas with increased subsidence. The interpretative variants which explain the starting of the Miocene subsidence summarize the generation of a back-arc basin (similar to the Tisian Basin of Pannonia) as a consequence of the Peninic slab subduction, as back-arc extension associated with an upwelling asthenospheric mantle. The major contradictory element of this hypothesis remains the deciphering of the Badenian-Pannonian continuous convergence which invalidates the back-arc extension hypothesis. Another element of the structural analyses on the Transylvanian Basin outlines the Moho and Conrad surfaces, both exhibiting important concave shape, overlapping the maximal subsidence zones (convex shape) of Puini and Tarnave depressions. The seismic and drilling investigation supplied the detailed geometry of the Mesozoic, Paleogene and Miocene sedimentary deposits, of the island-arc and presumed ophiolitic volcanics and of the contact surfaces with the crystalline basement respectively. A geophysical data modeling based on the tridimensional geometry of all stratigraphic compounds of the Transylvanian Basin, on the registered magnetic and gravimetric data and on the statistically processed petro-physical data, was also performed. The starting point concerns two types of structures, corresponding to two possible hypothetical models on the basement: 1. the development of a complex continental crust known as Tisia/Dacia with convex configuration at the Moho and Conrad surfaces level, beneath a concave basin filling (less explained); 2. the development of two trapped fragments of oceanic crust (Puini Basin and Tarnavelor Basin) designed after the collision of the Apuseni Mts. and the East Carpathians continental crusts, under which the mantle lies, rapidly cooled at their contact. The cooling mantle triggered the subsidence during Badenian. The modeling demonstrates that the second variant is the unique solution for the presence of several oceanic crust fragments trapped between collision continental crusts, rapidly cooled during post collision – a process that allowed the mantle compression and the basin subsidence.

Metamorphic sole in the northernmost part of the Vardar Zone Western Branch (Village Tejići, Mt. Povlen, Western Serbia)

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The geodynamic evolution of the Mesozoic ophiolites within Dinarides and Vardar zone is of special scientific interest. According to the available data these two ophiolites show both similarities and differences especially in their age, mineralogy and composition, including weakly- or well-developed metamorphic sole at their base. Ophiolites in the Tejići village consist a minor part of the Tethyan (Mediterranean) ophiolites situated in the northernmost part of the Vardar Zone Western Branch - a relic of the marginal basin but since Middle Jurassic a large oceanic realm which existed from the Upper Triassic to the Upper Cretaceous (Maastrichtian), i.e. the most important oceanic area of the Alpine-Mediterranean region after the closing of the main Vardar Ocean. It comprises ultramafic rocks (harzburgites and subordinated lherzolites) with typical tectonite fabric, gabbros, diabases, pillow lavas together with volcanic breccias and subordinated tuffaceous sediments that were tectonically emplaced to their present position during the late Upper Jurassic. The ophiolites itself are tectonically overlain by the Upper Cretaceous limestones. High-grade metamorphic rocks (amphibolite ± garnet and epidote-bearing amphibolite) occur at the base of the ophiolite sequence and are followed by medium- to low-grade metamorphic rocks represented either with blocks of augen gneisses or outcrops of garnet micaschist, chlorite micaschists and biotite (±chlorite)-epidote (±calcite) schists and subordinate calcshists and phyllites. Average P–T conditions of 630-680 °C and ca. 6±1.5 kbar were obtained for amphibolites and about 435-550 °C and 4.5 ±0.5 kbar for micaschist. In general, these rocks are characterized by greenschist to amphibolite facies mineral assemblages. Their protolith are basic igneous rocks, their volcanoclastic and rarely sedimentary (clastic) rocks. All mafic metamorphic rocks display moderate enrichment in light REE that could be ascribed to pre-metamorphic basalt-seawater interaction. The presence of metaclastic rocks probably indicates the site of emplacement close to a major landmass, which is in agreement with amygdales in pillow basalts and the absence of deep water sediments. Bulk-rock chemistry of the amphibolites and other primary basic rocks show two different geochemical affinities: tholeiitic (Nb/Y=0.07–0.18), and alkaline (Nb/Y=1.77–3.48). REE patterns and trace element discrimination