magmas underwent only minor olivine±clinopyroxene±spinel fractionation and apparently approach a primary melt composition.

The silica saturation index (vary from -59 to +2) and trace element ratios (La_N/Yb_N=11-31) generally suggest that these lavas have experienced different degrees of partial melting. The hy-normative basalts of Oberpullendorf have the highest degree of melting while Stradnerkogel nephelinites have the lowest. Those rocks that formed via a low degree of melting possess high Zr/Hf ratios (60-66), and negative K and Ti anomalies similar to those of carbonatites. All studied rock varieties have high Nb/La ratios (>1) suggesting OIB-like asthenospheric mantle source. The absence of LILE enrichments (K, Rb and Ba) indicating no interaction with fluids possibly derived from subducted slab. The steep REE patterns and the high Dy_N/Yb_N ratio (average 1.8) strongly suggest that garnet was a residual phase during the partial melting in the source region.

The $^{87}Sr/^{86}Sr$ isotopic compositions of the studied lavas are low (0.703505-0.704279), and the $^{143}Nd/^{144}Nd$ ratios are high (0.512736-0.512858). Thus, they are isotopic depleted relative to the bulk Earth and similar to HIMU-OIB. Moreover, they are similar to those of Romanian basalts and Neogene alkali basalts throughout Europe.

Petrographic characteristics of some Middle Triassic volcanic and volcaniclastic rocks in the External Dinarides (Croatia and Bosnia and Herzegovina)

Aljinović D. [1], Kolar-Jurkovšek T. [2], Jurkovšek B.[2] and Hrvatović H.[3]

[1]*University of Zagreb, Faculty of Mining, Geology and Petroleum Engineering, Pierottijeva 6, 10 000 Zagreb, Croatia, dunja.aljinovic@rgn.hr*

[2]*Zavod Slovenije, Dimičeva 14, 1 000 Ljubljana, Slovenia, tea.kolar@geo-zs.si, bogdan.jurkovsek@geo.zs.si.*

[3]*Federalni zavod za geologiju, Ilidža, Ustanička 11, 71 210 Sarajevo, Bosnia and Herzegovina zgeolbih@bih.net.ba*

In the geotectonic unit of the External Dinarides, several volcaniclastic-sedimentary successions of Middle Triassic age have been investigated from outcrops in Croatia (in the vicinity of Sinj and Knin) and in Bosnia and Herzegovina (in the vicinity of Bosansko Grahovo). The appearance of volcanic and volcaniclastic rocks in the External Dinarides have usually been interpreted as the Middle Triassic syn-rift phase in which graben-like depressions had been formed along deep structural fractures. The Middle Triassic rift phase in the External Dinarides is marked by volcanic activity that had been defined as basaltic extrusions at the beginning and more acidic explosive activity that characterised deposition of thick pyroclastic and volcanoclastic successions in the later phases. Volcanic and volcaniclastic successions near Sinj have been described mineralogically and petrographycally by the same authors and interpreted as vitric to crystal tuffs and ignimbrites deposited as pyroclastic flows in intrashelf environment, not far from a subaerially located caldera.

In our investigation we examined several lithotypes of volcanic and volcaniclastic rocks not previously described. Near Bosansko Grahovo there are occurrences of blocky pepperites. In the angular pepperite type jigsaw-fit texture can be observed suggesting quenching of Mg-depleted basaltic lava on the contacts with unconsolidated pelagic limestones. The Ladinian age of the succession was determined on the basis of conodonts found in limestones intercalations.

Near Sinj a thick volcaniclastic beds (called “pietra verde”) are interbeded with marine bioclastic, well bedded limestones, cherts and dolomites. Bioclastic limestone and dolomites are characterised by an abundance of calcareous algae, foraminifers, gastropods, bivalves, brachiopods, crinoids, serpulids as well as radiolarians, ammonoids and conodonts, the latter suggesting open marine (pelagic) associations. Limestone beds are strongly silicified and recrystalised. Dolomites exhibit macrocrystaline anhedral texture suggesting a secondary dolomitisation. Lower Ladinian age was inferred on the basis of conodonts and amonoids.

Volcaniclastic beds (tuffs) near Sinj are massive or evenly laminated. Cross lamination occurs at the top of some beds. Several volcaniclastic lithotypes (tuffs) do not significantly differ in composition. They contain predominant former glassy fragments which are cuspate,

platy, or udeformed bubble-wall shards. Pumice wisps occur in some lithotypes showing random orientation and relict tube vesicle texture. Other components are sparse feldspar and quartz crystal fragments. The formerly glassy shards are recrystalised to a fine quartz-rich mosaic. Shards are occasionally well preserved due to carbonate microcrystaline calcite that outlines them.

The dominance of juvenile pyroclasts, particularly the abundance of various shard types and quartz crystal fragments suggest that they were sourced from explosive, acidic eruptions. The interlayering with carbonates containing pelagic (open marine) fossil assemblages suggests that they have been deposited farther offshore. In this circumstances are these subaqueous deposits not likely to by strictly primary pyroclastic in origin. Bedforms indicate rapid, possibly mass-flow, deposition in offshore environment. Nevertheless the abundance of texturally poorly or unmodified pyroclasts suggests that pyroclastic material was delivered more of less directly to sedimentary transport and deposition systems. Although it has been suggested that the origin had been primary pyroclastic surge deposits from subaerial depositional settings, we thought that pyroclastic material generated from explosive eruptions at marine submerged vents. The dominance of juvenile pyroclasts suggests that fragmentation occurred when lavas emplaced into marine unlithified sediments allow explosive vaporisation of pore fluids or when superheated water flashed to steam that rapidly expands. Thus we interpret deposits near Sinj as pyroclast rich offshore mass-flow deposits.

Buzau Land Geopark. Steps in building a new Geopark in Romania

Andrasanu A.

Department of Geology and Palaeontology, Faculty of Geology and Geophysics, University of Bucharest, 1 Nicolae Balcescu Bd., sect.1, Bucharest, Romania, mesajalex@yahoo.com

Rapid development of geopark concept and positive results of existing geoparks have generated in Romania both the official recognition of geopark as distinctive protected area and the increase of interests of new territories to develop geoparks. Based on a local initiative and a grass root effort a new geopark project has been launched in Romania: The Buzău Land Geopark. Located in the south-eastern part of Romania, the territory covers about 1100 sq kilometers, comprises 18 mayoralties and a population of 45000 inhabitants. Unique geological sites like mud volcanoes, amber deposits, salt caves, and oil springs are present. Sedimentary rocks folded and overthrusted outline a geological history covering more than 70 million years. The paper presents the main steps taken so far in building the new geopark. The approach is based on our previews experience in Hateg Geopark and in other geoparks members of the European Geoparks Network. The process comprises: interdisciplinary research studies, stakeholders identification, local heritage evaluation, and sustainable development strategy design, establishing the basic requirements for a brand development, correlation with local projects and initiatives and design of training courses for the geopark team. This approach allowed us to identify the optimal territory for the geopark, to create a framework for partnership, local needs identification and to set-up clear objectives for sustainable use of local resources. The commitment of local communities has generated national projects dealing with public awareness, cultural events, promotion, and informal education. All these are valuable elements to prove the rightness of the geopark concept and its capacity to join around groups and stakeholders from different areas of interest.