between the two part of the Transdanubian Range North-Alpine and the South-Alpine origin ceased.

Late Cretaceous bimodal igneous association of the northern Kozara Mts. revisited: New geochemical data serving for refined geodynamic interpretations

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The recent interpretations suggest that the Sava-Vardar (SVZ) is a relic of the youngest Tethyan realm in the present-day Balkan area, which left behind after Upper Jurassic closure of the West and East Vardar domains. The SVZ supposedly represents the last suture between the Tisza/Dacia and Dinarides acting as upper and lower plate, respectively. One of the best exposed SVZ segments is found on the Kozara Mts. (northern Bosnia and Herzegovina). We here report and discuss new geochemical data on igneous rocks of the northern Kozara Mts. in order to further constrain their geotectonic setting and with special emphasis on the petrogenetical link between the basic and acid rock suite.

The northern Kozara Mts. bimodal igneous association is thrust onto the West Vardar ophiolites of the southern Kozara Mts. and is unconformably overlain by Late Cretaceous-Paleogene fluvial siliciclastic sediments. It consists of isotropic to layered gabbro, diabase dykes and basaltic pillow lavas and hyaloclastites, as well as of relicts of rhyodacite-rhyolite lava flows and extrusions and subordinate small-scale granitoid intrusions representing basic (BS) and acid suite (AS), respectively. We analyzed 13 samples of the BS and 11 samples of the AS on major and trace element concentrations (including rare earth elements – REE) in the ACME Laboratories Ltd. Vancouver (Canada). A vast majority of the studied rocks show silica contents <53 wt % or >64 wt % SiO_2. The BS and AS rocks show different trends on Harker's diagrams with SiO_2 as index of differentiation. Thus, Al_2O_3, P_2O_5 and TiO_2 contents in the BS rocks mostly increase with increasing silica concentrations, while in the AS rocks the opposite trend is observed. On the chondrite- and primitive mantle-normalized diagrams for REE and incompatible trace elements, respectively, the BS rocks show relatively flat to moderately light-REE enriched patterns with no or weak negative Eu-anomaly. The AS rocks exhibit steeper patterns and have distinctively more pronounced Eu- and Sr- negative anomalies. Compared to the known intra-ophiolitic granitoids from the Eastern Vardar Zone, the AS rocks show geochemical similarities to oceanic plagiogranites.

These new geochemical data confirm earlier opinions that the BS rocks of the northern Kozara Mts. neither derived from pure mid-ocean ridge basalts (MORB) nor from volcanic arc basaltic magmas. This conclusion appears to be robust even taking into consideration that most BS rocks crystallized from evolved magmas. Moreover, it is suggested that the BS primary magmas probably correspond more to enriched MORB (or to MORB+EMORB) than to typical ocean island basalts. On the other hand, geochemical characteristics of the AS rocks indicate that their primary magmas most probably originated via partial melting of the altered gabbros from the lower oceanic crust. Main geodynamic implications of our study are, first, that it confirms the oceanic nature of the northern Kozara Mts. rock assemblage, and second, that it could have formed within an anomalous ridge setting similar to present-day Iceland. We therefore challenge previous interpretations that the northern Kozara Mts. ophiolites are relicts of an oceanic plateaux from a wide oceanic area.

Acknowledgements: This study is supported by the Ministry of Science and Education of the Republic of Srpska.