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The Late Cretaceous supra-subduction magmatism of North Kozara (northern Bosnia and Herzegovina): implications for the Cretaceous to Paleogene collisional history between Tisza and the Dinarides

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The widespread occurrence of ophiolites is the most distinctive feature of the internal Dinarides of the Balkan Peninsula. Believed to have formed part of the Triassic to Jurassic Meliata/Vardar oceanic system (i.e. parts of Neotethys in the sense of Schmid et al. 2004), they were incorporated into Jurassic melange (Meliata) or obducted onto the passive margin of the Apulian plate during the Late Jurassic (Vardar). At present, these ophiolites and their Late Jurassic footwall occupy a structurally high position within the SW-verging nappe stack of the Dinarides, which formed in the Late Cretaceous to Paleogene in response to the closure of a remnant oceanic domain originally positioned between the internal Dinarides and Europe-derived units (including Tisza). While many authors infer that this closure started in the Late Cretaceous, hardly any evidence for intra-oceanic magmatism younger than the Jurassic existed until the findings of Karamata et al. (2000).

This study provides additional geochronological, biostratigraphic and geochemical evidence for Late Cretaceous igneous activity between the internal Dinarides and the Tisza unit. In the Kozara Mountains of northern Bosnia and Herzegovina, a mafic succession (comprising isotropic gabbros, doleritic dikes and basaltic pillow lavas) is thrusted onto the “classical” Dinaric ophiolite succession (obducted already in the Late

Jurassic). Pelagic limestones, intercalated with the pillow lavas, yielded a Campanian globotruncanid association. These results are in perfect agreement with U-Pb dating of zircons from differentiated dolerites, which gave a concordia age of 81.39 +/- 0.11 Ma. Rare earth element concentrations suggest an intra-oceanic island-arc (or supra-subduction) origin of these mafic rocks. The initial isotopic values for 80 Ma are 4.4 to 6.3 for eNd and 0.70346 to 0.70507 for 87Sr/86Sr, respectively. With respect to MORB these values indicate only a very low degree of crustal contamination, again suggesting an intra-oceanic origin.

The igneous succession is unconformably overlain by sandstones and conglomerates including abundant ophiolitic detritus and shallow-water benthic foraminifera of Maastrichtian age. Upsection, intercalations of bioclastic shallow-water material of Paleocene age occur within the mostly siliciclastic succession. Still higher up, a turbiditic sandstone succession, devoid of any ophiolitic detritus, covers both the Dinaric and the Late Cretaceous Kozara igneous succession unconformably. In combination, these observations suggest the closure of an oceanic domain between the Dinarides and the Tisza unit during the Maastrichtian to earliest Paleogene. This Late Cretaceous oceanic domain may either represent a remnant of Neotethys, or alternatively, of the Alpine Tethys; possibly both were connected in the working area.

References:

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