



# **1 Investigating the Tisza-Dinarides boundary: Structural and petrological features of the north-Bosnian inselbergs of Kozara, Prosara and Motajica.**

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The area investigated by this study is located at the south-western margin of the Pannonian Basin, which marginally transgresses the northernmost parts of the Dinarides. There, in northernmost Bosnia, pre-Neogene rocks crop out only in the isolated hills of Kozara, Prosara and Motajica. The hills of Prosara and Motajica, as well as parts of the Kozara mountains, are reported to be part of the so-called “Sava Zone” (Pamic et al., 2000). This Sava-Zone is characterized, amongst other features, by the presence of Upper Cretaceous to Early Palaeogene Flysch units, intruded by Palaeogene granites, which build up the mountains of Prosara and Motajica. These areas locally exhibit Tertiary-age regional and contact metamorphism and hence they may define a kind of “suture” between the internal Dinarides and the Tisza block. The evidence given by Lanphere & Pamic, (1992) and Pamic et al. (2002) regarding metamorphism of the Flysch series, grading from epizonal to greenschist facies conditions with increasing proximity to the granitic intrusions, is confirmed by our study. Early Tertiary (55-35 Ma according to Lanphere & Pamic, 1992) plutonism and metamorphism were found to be concomitant with intense dynamic recrystallisation of the para-series. This is evidenced in sheared pegmatitic dikes that intruded the sedimentary series, as well as from the formation of a foliation in the topmost parts of the granitic bodies. However,

it is not clear yet as to how much of this metamorphism is regional and how much is due to the local intrusive bodies. Transport directions measured in the western part of Prosara Mountain indicate top-to-the-S shear. This is probably linked to overthrusting of the Tisza block onto the innermost Dinarides. In the eastern parts of Prosara Mountain and all over Motajica Mountain, however, stretching lineations rather trend E-W and along strike, perhaps indicating strike slip movement. This discrepancy could also be related to doming around the intrusions, or to a subsequent tectonic phase.

It appears that within this “Sava Zone” (sensu Pamić) two ophiolitic belts, so far treated as separate by most workers, are juxtaposed. However, the mutual relations of these ophiolite belts, tectonically overlain, or alternatively, stratigraphically overstepped by the Paleogene Flysch deposits are still unclear. A southwestern ophiolite belt, the “Dinaridic ophiolitic zone” (DOZ) is directly juxtaposed against a more internal ophiolite zone that may or may not correspond to the “western Vardar zone” (WVZ) in the sense of Karamata (1996). In Serbia, this more internal ophiolitic belt is separated from the Dinaridic ophiolite zone by the Drina-Ivanjica terrane (Karamata et al. 2003). In view of the uncertainties regarding a correlation into N Bosnia we refer to this more internal ophiolite zone as the “N-Kozara ophiolites”. These ophiolites consist of gabbros of unknown age, pre-Campanian pillow basalts overstepped by red Scaglia sediments (Karamata et al. 2000), and of Late Cretaceous to Palaeogene volcanics, as well as of a largely tectonised ophiolitic mélange that includes Late Cretaceous to Palaeogene olistoliths (Pamić 2000). We propose the hypothesis that the N-Kozara ophiolites represent a remnant of the Vardar ocean that stayed open until the Early Paleogene. In this case the N-Kozara ophiolites should not be parallelized with the western Vardar zone (WVZ) zone of Serbia, since the latter is commonly regarded as a part of the Vardar zone which was already obducted in Late Jurassic times.

The aim of this combined structural, petrological, geochemical and geochronological work is to constrain the consolidation of this particular part of Europe before the onset of rifting in the Pannonian basin from the middle Miocene onwards. Age determinations and geochemical investigations of the gabbros and dolerites of the two ophiolitic belts of Kozara, as well as a more detailed study of the transport directions and the relations between the granitic intrusions and the emplaced rocks of Prosara and Kozara, will help to unravel the contact zone between Tisza block and internal Dinarides..

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