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Tracing the closure of Neotethys from the Alps to Western Turkey I: The Sava-Izmir-Ankara suture zone

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The Sava Zone defined in the northern part of the Dinarides comprises a variety of rock associations (Ustaszewski et al 2009 & 2010): (1) Intra-oceanic magmatic associations covered by pelagic sediments providing testimony that parts of Neotethys oceanic lithosphere located between the Adriatic margin (Dinarides) and the Europe-derived Tisza Mega-Unit could not have been closed before latest Cretaceous times, (2) Maastrichtian-age siliciclastic sediments deposited along the Adria-Europe plate boundary and incorporated into the accretionary wedge that evolved during the initial stages of continent–continent collision and (3) Metasediments indicating temperatures of 350 to 630 °C and pressures up to 5–7 kbar reached at around 65 Ma, derived from deeper parts of the subducted accretionary wedge and exhumed as core complexes during a latest Oligocene to Miocene phase of extension located at the southern rim of the Pannonian basin. These rock associations define a suture zone (Sava suture) located between a non-metamorphic upper plate (Tisza Mega-Unit) and a lower plate that consists of a nappe stack derived from the Adriatic margin. These units are referred to as Dinarides, whereby internal ones are „composite“ in the sense that they include previously, i.e. during the latest Jurassic, obducted Neotethys ophiolites (Western Vardar Ophiolitic Unit; Schmid et al. 2008). The external Dinaridic nappe stack formed after collision, i.e. during Cenozoic times by foreland propagation towards the present-day Adriatic Sea (Schmid et al. 2011).

Near Zagreb the Sava suture swings into the Mid-Hungarian Fault Zone, known mainly from borehole data that provide evidence for a Late Cretaceous to Eocene flysch belt (Solnok flysch). This flysch separates Tisza in the SE from the northerly adjacent Bükk Mountains, a Dinaridic fragment displaced during Miocene lateral extrusion of Alps and Western Carpathians. This flysch belt can be traced into the strongly curved “Pienides” of Northern Romania and finally into the suture zone of the Alpine Tethys (Magura flysch). Note, however, that subduction polarity in the Alps is opposite to that of the Dinarides; hence the Mid-Hungarian Fault zone reactivated an older transform boundary linking subduction zones of opposed polarity.

The eastern continuation of the Sava Zone of Bosnia is exposed again in the Fruška Gora inselberg and the neighbouring Belgrade area and further to the SE in a narrow strip that extends all the way to southernmost Serbia. It marks the western limit of the Serbomacedonian Unit that carries previously obducted ophiolites (Eastern Vardar Ophiolitic Unit) and is considered as a part of the Europe-derived Dacia Mega-Unit (the earlier formed Carpatho-Balkan orogen). The Sava suture is marked here mainly by a Senonian flysch, locally containing ophiolitic detritus or olistoliths. The metamorphosed parts of the latest Cretaceous accretionary wedge sediments of the Sava suture and/or underlying metamorphosed sediments of the Dinaridic lower plate are seen in many isolated windows all along its trace due to later core complex formation, such as in the areas of Cer, Fruska Gora, Bukulja, Bukovac or Jastrebac mountains. The narrow strip of Senonian flysch, marking the Sava suture, can further be followed into Macedonia and Northern Greece where it forms the boundary between the nappes of the internal Hellenides (i.e. Pelagonian), including previously obducted Western Vardar Ophiolitic Units (e.g. Almopias or Vourinos ophiolites; Schmid et al 2011), from the western limit of the Circum-Rhodope belt that tectonically overlies the Serbomacedonian massif and hence also belongs to the Europe-derived Dacia Mega-Unit.

Across the Aegean Sea the Sava suture follows the southern rim of the Circum-Rhodope Belt, finally ending up in the Izmir–Ankara zone. This zone separates the Anatolides–Taurides as parts of the Adria microplate from the Pontides located north of the Neotethys suture. In western Turkey, the Izmir–Ankara suture zone is

made up of highly sheared flysch units of latest Cretaceous to earliest Paleogene age that contain large blocks of Mesozoic limestone derived from the Anatolide–Tauride platform, as well as basalt, serpentinite and radiolarian chert (Bornova flysch; Okay 2008).

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