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First-order similarities and differences between Alps, Dinarides, Hellenides and Anatolides-Taurides

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We correlated tectonic units across several circum-Mediterranean orogen strands between the Alps, Carpathians, the Balkan Peninsula, the Aegean and Western Turkey. Our compilation allows discussing fundamental along-strike similarities and differences. One first-order difference is that Dinarides-Hellenides, Anatolides and Taurides represent orogens of opposite subduction polarity and age with respect to the Alps and Carpathians. The internal Dinarides are linked to the Alps and Western Carpathians along the Mid-Hungarian fault zone, a suspected former trench-trench transform fault; its lithospheric root was obliterated during Neogene back-arc extension that formed the Pannonian Basin. Dinarides and Hellenides alike consist of far-travelled nappes detached from the Adriatic continental margin along décollement horizons in Paleozoic or younger stratigraphic levels during Cretaceous and Cenozoic orogeny. The more internal nappes (i.e. Jadar-Kopaonik, Drina-Ivanjica, East Bosnian-Durmitor and their Pelagonian and Almopias equivalents in the Hellenides) are composite nappes whereby the allochthonous Adriatic margin sequences passively carry ophiolites (Western Vardar Ophiolitic Unit) obducted during the latest Jurassic–earliest Cretaceous. These obducted ophiolitic units, as well as ophiolites obducted onto Europe-derived units presently found in the East Carpathians (Eastern Vardar Ophiolitic Unit obducted onto the Dacia continental block), root in one single Neotethys ocean that started closing with the initiation of obduction in the latest Jurassic; final suturing occurred during Cretaceous times, terminating with the formation of the Sava-Izmir-Ankara suture in the latest Cretaceous. Ophiolitic "massifs" found outside the Sava-Izmir-Ankara suture zone do not mark oceanic sutures, nor do the Drina-Ivanjica and Pelagonian "massifs" represent independent continental fragments (terranes). The same logic applies to Western Turkey with the difference that the ophiolites were obducted in Late Cretaceous rather than Late Jurassic times. Also, the Sakarya zone and Cretaceous ophiolites of Turkey cannot be traced far into the Aegean region. The widespread existence of obducted ophiolites in the East Carpathians, Dinarides-Hellenides and Western Turkey thus represents a first-order difference to the Alps and Western Carpathians, where oceanic units derived from the Alpine Tethys occur invariably within accretionary prisms.
Important lateral changes are also observed when comparing the present-day lithospheric configuration of the Dinarides with that of the Hellenides. In the Dinarides the Adriatic lithospheric slab can only be traced down to a depth of c. 200 km. In the Hellenides an over 2100 km long slab is still preserved below the Aegean part of the Hellenides, indicating long-lasting subduction of a coherent lithospheric slab that initiated during the onset of closure of Neotethys in Late Jurassic times. Some 1500 km of this total slab length became subducted after the closure of Neotethys and formation of the Sava-Izmir-Ankara suture zone. Out of this total some 800 km result from plate convergence while some 700 km are a consequence of massive back-arc extension and rollback.