

EGU21-14816

<https://doi.org/10.5194/egusphere-egu21-14816>

EGU General Assembly 2021

© Author(s) 2021. This work is distributed under the Creative Commons Attribution 4.0 License.



Faulting, doming and basin formation during orogenic arcuation – the case of the Shkoder-Peja Normal Fault System (northern Albania and Kosovo)

Marc U. Grund¹, Mark R. Handy¹, Jörg Giese², Jan Pleuger¹, Lorenzo Gemignani¹, and Kujtim Onuzi³

¹Freie Universität Berlin, Institut für Geologische Wissenschaften, Tektonik und Sedimentäre Systeme, Berlin, Germany (m.grund@fu-berlin.de)

²Geological Survey of Norway -NGU- Trondheim, Norway

³Polytechnic University of Tirana, Institute of Geosciences, Tiranë, Albania

The junction between the Dinarides and the Hellenides coincides with an orogenic bend characterized by a complex system of faults, domes and sedimentary basins. The major structure at this junction is the Shkoder-Peja Normal Fault (SPNF) system, which trends oblique to the orogen and is segmented along strike, with ductile-to-brittle branches in its southwestern and central parts that border two domes in its footwall: (1) the Cukali Dome (RSCM peak-T 190-280°C), a doubly-plunging upright antiform deforming Dinaric nappes, including the Krasta-Cukali nappe with its Middle Triassic to Early Eocene sediments; (2) the newly discovered Decani Dome (RSCM peak-T 320-460°C) delimited to the E by the ~1500 m wide Decani Shear Zone (DSZ) that exposes Paleozoic to Mesozoic strata of the East Bosnian Durmitor nappe (EBD). In the northeasternmost segment, the strike of the SPNF system changes from roughly orogen-perpendicular to orogen-parallel. There, the SPNF system has brittle branches- most notably the Dukagjini Fault (DF) that forms the northwestern limit of the Western Kosovo Basin (WKB).

The westernmost ductile-brittle SPNF segment strikes along the southern limb of the Cukali Dome with an increasing vertical offset from 0 m near Shkoder eastwards to >1000 m at the eastern extent of the dome (near Fierza) where normal faulting cuts the nappe contact between the High Karst and Krasta-Cukali unit. The central segment north of the Tropoja Basin, with several smaller branches changing in strike, has a vertical throw of at least 1500 meters based on topographic constraints. Even further to the northeast, the SPNF system includes the moderately E-dipping DSZ juxtaposing the EBD in its footwall against mélange of the West Vardar unit in its hanging wall, where offset is difficult to determine. 3 km eastwards, in the hanging wall to the DSZ, the brittle DF accommodates another 1000 m of vertical displacement as constrained by maximum depth of sediments of the WKB.

Ductile deformation along the Cukali and Decani Domes occurred sometime between the end of Dinaric thrusting and the formation of the WKB. Brittle faulting partly reactivates ductile segments, but also creates new branches (DF) within the hanging wall of the ductile DSZ. These were active during mid-Miocene to Pliocene times as constrained by syn-tectonic sediments in the WKB. We

interpret the SPNF system as a two-phase composite extensional structure with normal faulting that migrated from its older trace along the ductile DSZ to the brittle DF as indicated by cross-cutting relations. The Decani Dome, with higher metamorphic temperature conditions than the Cukali Dome, may reflect the south-westernmost extent of late Paleogene extension in the Dinarides. It may be related to other core complexes and possibly to limited subduction rollback beneath the Dinarides (Matenco and Radivojevi, 2012). Extension from mid-Miocene time onwards was probably related to Hellenic CW rotation during Neogene orogenic arcuation, possibly triggered by enhanced rollback beneath the Hellenides (Handy et al., 2019).

Handy, M.R., et al. 2019: *Tectonics*, v. 38, p. 2803–2828, doi:10.1029/2019TC005524.

Matenco, L., & Radivojevi, D. 2012: *Tectonics*, v. 31, p. 1–31, doi:10.1029/2012TC003206.