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# Core-complex in the wrong tectonic position? Towards solving the puzzle of Altan Tepe unit of Eastern Europe

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European extensional core-complexes associated with the Hercynian orogeny are lower crustal domes characterized by high temperatures, local melting, migmatisation and emplacement of juvenile fluids. Interesting examples are found in the North Dobrogea of Eastern Europe, where one clear such extensional dome occurs in the orogen itself (the Megina dome of Marza-Ene et al., 2026). One other extensional dome (Altân Tepe) is apparently located in the neighbouring Central Dobrogea part of the tectonically stable Moesian Platform, which is a wrong location for an orogenic core-complex. Because this latter Altân Tepe has no previous structural quantification, we first use field and microstructural kinematic observations to demonstrate that this dome is indeed a typical core-complex. The results indicate a similar evolution when compared with Megina, initial Hercynian top-NE nappe stacking, and burial metamorphism, followed by Triassic extensional exhumation, retrograde metamorphism and top-SE ductile shearing that formed an orogen-parallel extensional dome. Electron microprobe analyses on thin sections and geochemistry from both core-complexes estimate prograde metamorphic conditions of 550±30°C and ~6 kbar with a common subduction setting of the original protolith. The Altân Tepe metamorphics were originally part of a sedimentary sequence with basal basaltic lava flows, which is geochemically characteristic for an island-arc, whereas the geochemistry of metamorphics of the Măcin unit indicates an ophiolite complex containing deep water sediments. Both were subsequently subducted and metamorphosed during the Hercynian collision. These results demonstrate that the Altân Tepe unit is part of the North Dobrogea orogen and the contact with the Moesian platform formed subsequently by the activity of a large offset strike-slip fault. In conclusion, our research in North Dobrogea demonstrates subduction of an island-arc during the Paleotethys' closure, burial and metamorphism, which formed a typical Hercynian orogen containing Middle Triassic high-temperature core complexes, subsequently affected by Late Jurassic - Early Cretaceous Cimmerian oblique thrusting associated with large offset strike-slip in the orogenic core.

Marza-Ene, A., et al. (2026). Small-scale high-temperature metamorphic core-complexes: From nappe stacking to orogen parallel extension and subsequent thrusting in the Megina dome of North Dobrogea orogen. *Global and Planetary Change*, *258*, 105276.