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Tectonics of the Central Anatolia Plateau between the Black Sea and the East Mediterranean

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The Central Anatolia Plateau, focus point of the TopoEurope Vertical Anatolia Movement Project, is an elevated area (ca. 1.5km) with fairly smooth topography bounded to the N and to the S by mountain ranges (Pontides and Taurus) and flanked by marine domains (Black Sea and Cilicia Basin-Eastern Mediterranean). Towards the south the Cilicia Basin passes to the Island of Cyprus and eventually to the Cyprus subduction zone and African plate. To constrain the evolution of the CAP from its birth in the Miocene to present, we present the evolution of an upper crustal section stretching from the Black Sea to Cyprus with particular focus on a 350km long segment from the central part of the Plateau (Tüz Gölü) to the Cilicia Basin. This entire area occupies an upper plate position with respect to the Cyprus subduction zone.

Tectonics from Early to Late Miocene times were fairly simple and characterized by a gently southward dipping basement experiencing generalized subsidence. Depositional environments gradually changed from continental in the north to shallow marine in the south. The overall tectonic regime during this stage is poorly constrained. In the Late Miocene the entire area of the future CAP began moving upward. At the same time, subsidence continued in the Cilicia basin. Uplift above sea level in the south is nicely recorded by the termination of marine sedimentation and the onset of erosion. Dominant tectonic structures during this stage are associated with N-S shortening. The largest structures caused the formation of the large S-dipping monocline characteristics of S Turkey.

The coexistence of upward and downward movements (in the CAP and in the Cilicia basin respectively) as well as the dominant contractional regime suggest that the development of the CAP is related to dynamic changes in the Cyprus subduction zone. We validate this hypothesis with 2D thermo-mechanically coupled models. We demonstrate that the growth of the upper plate forearc basin system in relation to the Cyprus accretionary arc lead to thickening of the Anatolian overriding crust and forced the sedimentary overburden and blanketing effects inducing the thermally activated viscous deformation at the base of the crust and the surface uplift that created the Taurus.