



Tectono-stratigraphic evolution of the continental Miocene basins in southern Anatolia

Ayten Koç (1), Nuretdin Kaymakci (2), Douwe J.J. van Hinsbergen (3), Klaudia F. Kuiper (4), and Reinoud L.M. Vissers (3)

(1) Department of Geological Engineering, Yüzüncü Yıl University, Van, Turkey (kayten@metu.edu.tr), (2) Department of Geological Engineering, Middle East Technical University, Ankara, Turkey, (3) Department of Earth Sciences, Utrecht University, Utrecht, The Netherlands, (4) Department of Earth Faculty of Earth and Life Sciences, Vrije University of Amsterdam, Amsterdam, The Netherlands

The exposed portion of the Tauride fold-thrust belt in southern Turkey is flanked and overlain by Neogene sedimentary basins. To the south and on top of the high ranges, these basins are mainly marine, whereas previously poorly studied intra-montane basins dominated by continental deposits are exposed to the north. We have studied the stratigraphy and structure of these continental basins – the Altınapa, Yalvaç and Ilgın Basins. Their stratigraphy displays overall fining upward sequences of fluvio-lacustrine sediments, deposition of which interrupted by basin-wide unconformities; similar hiatuses seems to exist in each basin. The most prominent unconformity surface occurred during the Middle Miocene and corresponds to the timing of volcanic activity in the region. $^{40}\text{Ar}/^{39}\text{Ar}$ dating of the volcanoclastic samples from the Altınapa and Ilgın basins yielded 11.8–11.6 Ma ages. The main basin forming regional deformation phase was extensional and occurred during the Middle Miocene. The extension directions obtained from paleostress inversion techniques indicate multidirectional extension under vertical uniaxial stress which are compatible with the recent seismic activity and available focal mechanism solutions. The main basin-bounding faults, however, are constrained mainly N-S to NW-SE implying that they are reactivated structures. The Middle Miocene and onwards extensional history of these basins occurs behind and atop a thrust front along the Cyprus arc, extending towards the Antalya nappes and Aksu thrust in the heart of the Isparta angle. The synchronous, curved pairs of thrust fronts associated with subduction and overriding plate extension suggests that the Cyprus subduction zone has been retreating relative to central Anatolia since, at least, the Middle Miocene time. In addition to extensional history of the region, these continental basins contain evidence for the post-Late Miocene differential uplift of the Taurides in southern Anatolia. All of these continental basins were above sea level during the Middle and Late Miocene and are now found at an elevation of 1 km. On the other hand, the upper Miocene marine deposits just south of the study area currently are at an elevation of ~ 2 km, and have therefore been uplifted at least 1 km more than the continental basins to the north. We conclude that the current high elevation of the Taurides is synchronous with, and at least in part related to late Neogene extension and vertical differential uplift, likely related to the dynamics of the Cyprian subduction zone.