



Neogene Exhumation of the Kazdag Massif (NW Anatolia) within the Framework of Aegean Extensional Tectonism

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Apatite fission-track analyses indicate that exhumation of the basement rocks of the Kazdag massif –an amphibolite facies metamorphic core complex in NW Anatolia– covers a relatively long time span between 22 and 11 Ma (i.e. early-middle Miocene), with a cluster of model ages at 17-14 Ma. Structural analysis of remnants of low-angle shear zones, high-angle normal faults and strike-slip faults, as well as stratigraphic analysis of upper-plate sedimentary successions, point to a two-stage structural evolution of the massif. The first stage comprises a continuum of chronologically overlapping mechanisms, from late Oligocene-early Miocene low-angle detachment faulting to early Miocene development of small supradetachment grabens filled with a mixture of epiclastic, volcanoclastic and volcanic rocks (Kucukkuyu Fm.). This phase encompasses much of the rapid thermal evolution of the massif, including the emplacement of a suite of granitoid stocks with cooling ages around 21 Ma. The second stage (Plio-Quaternary) is dominated by strike-slip faulting related to the westward propagation of the North Anatolian fault system and seemingly reactivated Miocene normal faults. Much of the spread in the fission-track model ages –as well as the existence of significant age differences between nearby samples– can be attributed to components of vertical (normal) movement along ENE-WSW-trending strike-slip faults now belonging to the North Anatolian fault system. Along the southern flank of the Kazdag massif such vertical component is responsible for the development of the Edremit Gulf, with extensional structural offset in the order of 4,000+ meters. Thermochronological data such as those presented here indicate that the crystalline terranes presently exposed in the metamorphic core complexes of western Anatolia have undergone significant dif-

ferential vertical movements, both by detachment faults and steeply dipping normal faults.