



Differences and similarities in the Late Miocene geohistory of the Mut and Adana basins (southern Turkey): a record of surface uplift of the southeast margin of the Central Anatolian plateau

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Neogene sedimentary basins in southern Turkey record the main geodynamic events that affected the area, including the Tauride orogeny, the Arabia-Eurasia collision and the uplift of the Anatolian Plateau. The Mut Basin is located in the uplifted area of the southern Central Anatolian Plateau (CAP). The northwest margin of the Adana Basin borders the southeastern margin of the CAP, while most of the basin is external to the plateau in a more subsiding sector. New stratigraphic data from these two basins better constrain the major stratigraphical changes that occurred in those sedimentary basins starting from their onset. This allows us to connect them chronostratigraphically and to reconstruct a more detailed geohistory for both basins.

Using surface and subsurface data, we have determined the geohistory of these two basins through a reconstruction of their subsidence curves. The Late Oligocene-Middle Miocene geohistory is similar for both basins and comprises the continental deposits recording the last tectonic phases associated with the Tauride orogeny in the area from upper Oligocene to lowermost Miocene time. Some differences are recognizable at the Middle Miocene/Late Miocene transition (late Serravallian, 12 Ma), likely due to the different position of the two areas with respect to the Arabia/Eurasia collision zone. At that time, the Adana Basin was uplifted and an erosional surface developed in the area cutting down to the deep marine marls of the mainly Serravallian Güvenç Formation. Lower Tortonian continental sediments were deposited just above this erosional surface. In contrast, the Mut Basin was not so clearly affected by uplift, and sedimentation continued in a fully marine environment.

After the Tortonian, the geohistories of the two basins show major differences. The subsidence curve for the Mut Basin stops at late Tortonian, the age of the youngest sample of the stratigraphic succession dated so far. In contrast, the subsidence curve for the Tortonian-Messinian interval of the Adana Basin shows an increase in the subsidence rate at about 5.6 Ma, corresponding to a period of increased sedimentation rate just after the unconformity associated with the drawdown of the Mediterranean base level and formation of the first regional Messinian erosional surface (MES1). At this stage, resedimented gypsum beds with thick intercalations of marls were deposited mainly due to debris-flows processes (first post-evaporitic stage, p-ev1). A major increase in subsidence rate is recorded at about 5.45 Ma, above another intra-Messinian unconformity (MES2), with the sedimentation of more than 1,000 m of fluvial deposits (conglomerates and marls of the Handere Formation). They are derived mainly from crystalline and sedimentary rocks of the Taurides and pertain to the second post-evaporitic stage of the Messinian Salinity Crisis of the Mediterranean (p-ev2; 5.45-5.33 Ma). The Messinian-Pliocene boundary corresponds a marked decrease in sedimentation rate due to the onset of a deep-marine clay deposition.

The study of the two sedimentary successions and the current position of the basins lead to the conclusion that the southern margin of the CAP has been uplifted after the Late Tortonian, and the southeastern margin specifically has been raised mainly during the p-ev2 stage. The total 2 km of surface uplift after 5.45 Ma indicates a long-term average uplift rate of 0.37 mm/yr.