



Characterization of the Quaternary uplift in the Central Anatolian Plateau's southern margin: preliminary results

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The Quaternary evolution of the southern margin of the Central Anatolian Plateau (CAP) included a strong uplift phase starting in the Middle Pleistocene, which has been suggested to be related to a slab break-off that occurred after the Arabian and Anatolian Plate collision. The sedimentary sequences of the Gule and Tol sections in southern Turkey show that marine deposition occurred until at least 0.47 Ma, with the top of this Quaternary marine succession now located at around 1500 meters a.s.l. These observations imply a very high mean Quaternary uplift rate, estimated at around 3-3.5 mm/yr, which is significantly higher than the modern uplift rate of 0.8-1.5 mm/yr, based on GPS and Holocene marine markers.

Strong and rapid variations in landscape evolution are often recorded by the drainage system, and may be reconstructed through the analysis of long river profiles, chi (χ) index values, and normalized steepness index (ksn) values. Each can give information about transient elements of paleo-baselevels of the landscape (knickpoints) and estimations of the uplift rate by forward or inverse modelling of river profiles. By applying these methods to the southern CAP margin, we can obtain information that complements and potentially provides greater detail than the uplift rates estimated by stratigraphical analysis, and allow us to obtain a better characterization of the Quaternary landscape evolution. Such information provides an independent set of data that can be used to evaluate the proposed slab break-off mechanism and estimate how the uplift rates evolved through time.

In our analysis, each river shows a major knickpoint in the upper part of the river profile; the major knickpoint decreases in height going from the western to the eastern part of the margin. The χ plots, calculated for rivers that flow in lithologies with low differences in erodibility, also show a different pattern between the two sides of the southern CAP margin. Considering also preliminary data related to the evolution of marine terraces in the study area, we can suggest that a tilting occurred during the Quaternary uplift of the southern CAP margin, with uplift rates in the west higher than those in the east. Also, based on both χ plots (which show concave upward forms) and ksn values, river profiles in the west suggest that Quaternary uplift rates were initially very high and decreased toward the present, in agreement with geodynamic models that predict the evolution of surface uplift rates through time following slab break-off.