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# Defining the Quaternary uplift trend at the southern margin of the Central Anatolian Plateau by marine terraces evolution modelling

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The southern margin of the Central Anatolian Plateau (CAP) records a strong uplift phase after the early Middle Pleistocene, which has been related to the slab break-off of the subducting Arabian plate beneath the Anatolian microplate. During the last 450.000 yr the area underwent an uplift phase with mean rates between 3.21 and 3.42 mm/yr, as suggested by the Ionian (Middle Pleistocene) marine sediments of the Sarıkavak Formation, with a paleocoastline now at 1500 - 1600 meters above sea level. These values are significantly higher than those obtained for the Late Pleistocene/Holocene at the southern Anatolian coastal area (1.0 – 1.5 mm/yr) and suggest substantial variations of uplift rates through time.
To estimate changing in the uplift rate during the Middle/Upper Pleistocene we performed a study on the morphology and stratigraphy of the marine terraces at the CAP southern margin. We firstly carried out a field work mapping remnants of abrasion platforms and their associated deposits. Then we used TerraceM, a MATLAB® toolbox for analysis and modelling of marine and lacustrine terraces, identifying the position of the shoreline angles at the intersection between paleo-cliffs and paleo-platforms. We used the elevation of shoreline angles and the timing of Quaternary marine sedimentation as chronological constraint for the Landscape Evolution Model (LEM). The LEM is based in the wave energy dissipation theory and allows simulating the evolution of marine terraces in response to Quaternary sea level variations. We applied random optimization algorithms to test set of random uplift rate variations; then, using minimization statistical approaches we found the solutions that better reproduce the morphology of marine terraces in the study area.
The best fit obtained for the marine terrace sequence display a fast increase from 1.9 to 3.5 mm/yr between 500.000 and 200.000 yr, followed by a fast and abrupt decrease to 1.4 mm/yr since 200.000 yr until the present. Our results agree with numerical models of slab break-off, which suggest similar Gaussian uplift increase during a very short time interval, at the moment of the slab rupture, followed by a decrease in the uplift rates towards the present.