



## **ESR dating marine terraces along the Mediterranean coast of the Antakya Graben, SE Turkey: Sea level change and tectonic implications**

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In southeastern Turkey, NE-trending Antakya Graben forms an asymmetric depression filled by Pliocene marine siliciclastic sediment, Pleistocene to Recent fluvial terrace sediment and alluvium. A multi-segmented, dominantly sinistral fault lying along the graben possibly connects the Cyprus Arc in the west to the Amik Triple Junction on the Dead Sea Fault (DSF) in the east. Normal faults, bounding the southeastern margin caused the graben to tilt southeastward and these faults are younger than the sinistral ones. Westward escape of the continental İskenderun Block along the sinistral faults belonging to the DSF in the east and to the Eastern Anatolian Fault in the north caused Antakya Graben to open since Pliocene. In the later stages of this opening, normal faults developed along the southeastern of the graben, leading to differential uplift of the Mediterranean coastal terraces. Tectonic uplift coupled with sea level fluctuations has produced several stacked marine terraces at elevations ranging from 0.25 m to 180 m above current sea level along the Mediterranean coast. In this study we dated these terrace deposits by using electron spin resonance (ESR) method.

In the NW part of the graben, terraces at 30 m above mean sea level (amsl) yield  $63 \pm 8$  ka and correlate with Marine Isotope Stage (MIS) 4. Older units dating to MIS 7 and 5 likely were being eroded to supply some fossils found in this terrace. On the 45 m amsl terrace dates to  $114 \pm 7$  ka, which is the MIS 5d/5e boundary. Terrace deposits at 105 m amsl belong to MIS 5c boundary at  $91 \pm 13$  ka. At Samandağ site at 39 m amsl, molluscs deposited in a large tidal channel indicate MIS 5d/5e boundary at  $116 \pm 5$  ka.

Contemporary sediments are seen in different elevations in the SE part of the graben. The youngest samples suggest an age  $14 \pm 1$  ka in the late MIS 2 for the slump topping the 8 m amsl terrace. At the 50 m amsl terrace dates to  $89 \pm 5$  ka and correlate with MIS 5a/5c. Here 180 m amsl terrace gave a preliminary age of  $398 \pm 24$  ka, correlating with MIS 11.

These data support that differential uplifting occurred in the Antakya Graben during the Quaternary and eustatic sea level changes in the Mediterranean have controlled the morphological evolution of the region. Uplift on the Mediterranean coast probably still continues, since the Paleolithic Merdivenli Cave sits at  $\sim 50$  m amsl and the Middle Paleolithic Üçağızlı Cave sits at  $\sim 20$  m amsl, and the ancient harbour, Seleucia Pierria now sits above sea level.