



The mapping of the Quaternary geological and geomorphological units between Aydın Block and Mentеше Mountains (Central Menderes Massif) for tectonic implications

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Quaternary geological and geomorphological units are crucial to trace active tectonic deformation. Mapping of the Quaternary units in tectonically active areas greatly contributes to understand active tectonic and also landscape evolution. The Western Anatolia extensional province is a rapidly deforming and seismically active domain in the World. Menderes Massif in Western Anatolia is actively undergoing uplift since Neogene. However, Quaternary geological units has not yet been mapped in detail.

The principal goal of this study is the mapping the Quaternary geological and geomorphological units between Aydın Block and Mentеше Mountains using the Red Relief Image Map (RRIM) technique and high resolution DEMs. This map provides a basis for the defining of the morphotectonic features at the basin scale, the detection of tectonic control on the landscape, and the reconstruction of paleo-landscapes.

Geological and geomorphological mapping was performed at a scale of 1:10,000 using TanDEM-X (12.5 m spatial resolution), high resolution DEM (10 cm), unmanned aerial vehicle, D-GPS and field observation. Firstly, we produced the Red Relief Image Map (RRIM) using the TanDEM-X and we mapped geomorphic units such as river terraces, alluvial fans, colluvial fan, landslide, facets, hanging valley, flood plain from RRIM. In particular, we focus upon river terraces and alluvial fans as target units to extract information about active tectonic deformation along the southern flank of the Aydın Block. We mapped at least 6 levels (from 92 m to 3 m) deformed river terraces and 3 different alluvial fan segments among 145 in total. These river terraces and alluvial fans are on footwall block of high-angle active normal faults bordering between southern mountain-front of Aydın Block and Büyük Menderes Graben as geomorphic marker of regional deformation. This study is supported by TÜBİTAK #116Y077 project and Turkish Academy of Sciences within the framework of the Distinguished Young Scientist Award Program (TÜBA-GEBIP-2016).

Keywords: Quaternary, mapping, Red Relief Image Map, river terrace, alluvial fan, Western Anatolia, Menderes Massif