EGU23-729, updated on 05 Dec 2023
https://doi.org/10.5194/egusphere-egu23-729
EGU General Assembly 2023

Active tectonics of Spil Mountain, Western Anatolia: Implications from morphometric and paleoseismic studies

Taner Tekin[1], Taylan Sançar[2], Erhan Altunel[3], Hüsnü Serdar Akyüz[4], and Bora Rojay[1]
[1]Department of Geological Engineering, Middle East Technical University, Ankara, Türkiye
[2]Department of Geography, Munzur University, Tunceli, Türkiye
[3]Department of Geological Engineering, Eskisehir Osmangazi University, Eskisehir, Türkiye
[4]Department of Geological Engineering, Istanbul Technical University Istanbul, Türkiye

The internal deformation of Anatolia, where neotectonic provinces are characterized, are formed by the structures that are controlling the geodynamic evolution. One of the main provinces is known to be Aegean Extensional Province under which evolution has controlled mainly by the interaction of northward subducting African plate beneath the Anatolian continental fragment and extrusion caused by relative motion of two major continental transform faults, dextral North Anatolian Fault (NAF) and sinistral East Anatolian Fault (EAF). The extrusion resultant crustal extension formed almost E-W trending horst and grabens. One of which is known to be The Gediz-Alaşehir Graben (GAG) where southwestern part of the graben is bounded by NW-SE trending active fault called Manisa Fault of Spil Mountain Horst. The faulted margins of the horst have preserved overprinted slip surfaces which makes the faulted margins target for paleoseismic and morphometric applications.

The study of dynamic morphology along Spil Mountain Horst is being displayed by river profiles and catchment responses. To process dynamic effects, total of 66 drainage basins are selected and morphometric indices are applied to selected catchments. Preliminary results from both Hypsometric Integral, Hypsometric Curve and Relief Ratio are indicating the young topography. Mountain front sinuosity and Valley floor width to valley floor ratio indicates that the faults exist on both side of the horst have different rate of deformation. Moreover, indicators related to basin asymmetry, transverse topographic symmetry factor and asymmetry factor, show weak signals of fault control. Similarly, Concavity, Chi Analysis and Knickpoint distribution point out that basin bounding faults have less prominent effect in the area which is consistent with basin asymmetry. Five paleoseismic trenches along Manisa Fault represent similar outcomes with preliminary results from morphometric analyses. The ages from ongoing dating of the samples are going to assist for better understanding about the active tectonics of Spil Mountain Horst.

The dynamic topography of Spil Mountain Horst is most likely reflecting the influence of regional tectonics rather than the basin bounding faults based on morphometric and paleoseismological studies.

Key words: Aegean Extensional Province, Spil Mountain Horst, morphometric indices,

paleoseismic trench