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Uplift Rate Histories of Eastern Part of the Anatolian Scholle: Inferences from Bedrock Channel Longitudinal Profiles

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Bedrock rivers are one of the fundamental morphologic structures that record information about tectonic and climatic systems. Therefore, analyzing the bedrock river profiles provide good insight to understand the past tectonic and climatic history. Examining these profiles, which can be obtained from DEM, with GIS and some specific software allows improving our understandings of tectonic settings where structural or geodetic data are unavailable or insufficient. Recent studies focus on to extract/isolate the specific signals from the river profiles to infer the deformation history of the tectonic settings. Under the framework of TÜBİTAK project no:115Y684, we concentrated our attention on the region at the eastern part of the Anatolian Scholle that represents one of the most outstanding examples of intraplate deformation in the eastern Mediterranean Region. The studied area delimited by the dextral North Anatolian Fault Zone (NAFZ) to the north, the sinistral East Anatolian Fault Zone (EAFZ) to the southeast, the sinistral Malatya-Ovacık Fault Zone (MOFZ) to the west, and the dextral Nazımiye Fault Zone (NFZ) to the south. In order to understand recent deformational characteristics of this structurally complex area, we extracted 61 drainage systems by using a digital elevation model (DEM) with 10 m ground pixel resolution that is derived from 1:25k scale digital topographic maps of the region. Hypsometric integral analyses of the basins indicate youthful topography and normal range of concavity with anomalously high values of channel normalized steepness indices point out that the current uplift rate of the region exceeds the erosion rate. We also calculated chi-steepness indices by using the LSDTopoTools. Although we have tightly and poorly constrained m/n ratio in different drainages area, the river profile in chi-elevation space detect the sections of the channel network responding to at least three different uplift rates, regardless of the m/n ratio. Investigated bedrock rivers show that eastern part of the Anatolian Scholle deformed with not only lateral displacement but also with an important amount of vertical uplift.