



Post-Miocene Deformation in Central Anatolia and its link to Horst and Graben System of Western Anatolia, Turkey

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The western Anatolian multi-directional extensional terrain developed as a result of the anti-clockwise westward migration of the Anatolian Block onto African Plate along the Mediterranean Ridge in between the North Anatolian Fault in north and East Anatolian-Dead Sea Fault in south-southeast. The multi-directed horst-graben system of the western Anatolian neotectonic domain is bisected by NW-SE to WNW-ESE extending faults.

To understand the deformational pattern in the western Anatolia, five tectonic domains are differentiated in the area between Central Anatolian in the northeast and Kucuk Menderes sector in the southwest; i. central Anatolian domain (S of Galatian Volcanic province and Kazan Basin), ii. Eskeşehir-Cihanbeyli Fault Zone, iii. Kütahya Fault and Simav-Afyon-Akşehir Fault Zone, iv. Gediz-Alaşehir Graben and v. Küçük Menderes basin.

The results of the slip data analysis for the post-Late Miocene to Quaternary period from the northeastern sector (central Anatolia) to southwestern sector (K. Menderes) of the five domains indicate that the style and tectonic setting of deformation phases are similar. In central Anatolia, the deformation is expressed by three distinct stages as (i) post-Late Miocene - pre-Pliocene NW-SE to N-S compression, (ii) Pliocene almost E-W extension and (iii) NNE-SSW to NW-SE multi-directed extension since the Pliocene. Similarly, the history of deformation in the Kucuk Menderes area is expressed by three distinct episodes as: (i) post-Late Miocene-pre-Pliocene N-S compression, (ii) ENE-WSW extension during Plio-Quaternary and (iii) NE-SW extension since the Quaternary. The fault-slip analyses from the five domains are consistent with continuum of continental extension since Pliocene which follows the post-Late Miocene - pre-Pliocene compression. The s_1 - s_3 relationship manifests a rotation of principal stress s_1 axes from either NE-SW to NNE-SSW extension or converse, in multi directed extensional system. In western Anatolian extensional system, the post-Miocene - pre-Pliocene exhumation as manifested by low angle normal faults was followed by orogenic collapse as manifested by the existence of high angle normal faults which are crosscutting the low angle normal faults.

Key words: Post-Miocene deformation, multi-directed extension, fault-slip data analysis, western Anatolia.