

Characteristics of the active deformation zone within the central convex bend of the North Anatolian Fault

Erturaç M.K.(1)

(1) Sakarya University, Department of Geography, Sakarya, Turkey
Corresponding Author: (erturac@sakarya.edu.tr)

Although the morphology of the northern Anatolian range is formed after the collision related compression until the early Neogene, it is currently retouched and deformed by the North Anatolian Fault Zone (NAFZ). Along its course, the deformation zone related with NAFZ widens at its the central convex bend at 34-37°E longitude, letting the formation of two main synthetic splay faults named Ezinepazar-Sungurlu Fault (EzSF) and Taşova-Suluova Fault (TSF) which bifurcate successively from the main strand. These main dextral faults are also accompanied with sinistral conjugate fault sets together defining a broad wedge shaped active deformation zone called Amasya Shear Zone (ASZ).

The ASZ hosts prominent large-scale morphological features (such as wide basins and narrow uplifts) within the high relief of the north Anatolia. These basins are studied in detail and dated using micro-mammals accurate enough the mark the timing of initiation of the faults and also the changes in kinematics during the Plio-Quaternary evolution of ASZ.

The study area also hosts the developing cities of the Central Anatolia such as Amasya, Çorum and Tokat which are subject to earthquake hazard. During the instrumental period the easternmost segment of EzSF has ruptured with 1939 Erzincan earthquake and also moderate sized earthquakes (M:5.6-6.0 Kızılırmak Valley; M:5.6 Salhan and M: 6.0 Orta events) occurred marking the activity of the deformation zone. The microseismic activity of the region shows clustering concentrated on the active faults, especially at the eastern and central part. On the other hand, this activity seems to decrease and scatter to the southwest, where the width of the shear zone exceeds 100 km's. Geological and geomorphological offset markers measured along the splay faults indicate that the long-term slip of the faults also decrease towards the west. This interpretation is also supported by geodetic GPS studies regarding the main dextral faults forming the ASZ as free-tip ending fault systems.

This study details the active fault segmentation, basin stratigraphy and overall kinematic evolution of a wide deformation zone related to the NAFZ.