Geophysical Research Abstracts
Vol. 14, EGU2012-240, 2012
EGU General Assembly 2012

The cumulative offset of North Anatolian Fault in the Marmara region, northwest Turkey

k. akbayram (1) and a. okay (1,2)

(1) İstanbul Teknik Üniversitesi, Avrasya Yerbilimleri Enstitüsü, 80626 Ayazağa, Istanbul, Turkey , (2) İstanbul Teknik Üniversitesi, Jeoloji Mühendisliği Bölümü, 80626 Ayazağa, İstanbul, Turkey

The North Anatolian Fault (NAF) is an over 1200 km long dextral strike-slip fault zone in the eastern Mediterranean. The cumulative offset of the NAF has long been a controversial issue, former estimates range from 7,5 km to 300 to 400 km. It has been estimated using Cretaceous suture zones, Mesozoic fold structures and young rivers, which are generally subparallel to the suture resulting in poor precision. In this study we used Cretaceous tectonic zones and faults perpendicular to NAF to calculate the cumulative offset along the main branch of NAF west of the Marmara Sea in northwestern Turkey. In the Armutlu peninsula west of the Marmara Sea there are three north-south trending metamorphic units, which extend 60 km in an east-west direction south of the NAF; these are a Proterozoic basement, a Cretaceous mélange and a Triassic metasedimentary unit. These metamorphic units are separated by steeply dipping north-south trending thrust contacts. This geometry makes the Cretaceous faults and tectonic zones reliable offset markers. Similar units and similar contacts exist east of Almacık Mountains, north of northern strand of the NAF, which allow a precise correlation. Based on these structures and zones we calculate the cumulative dextral displacement along the main branch of NAF as 55 ± 3 km. If we take into account the 22 to 26 km deflection of the Sakarya River along the southern strand, the total cumulative offset of the NAF must be 79 ± 5 km in northwestern Anatolia.