

Morphotectonics and Paleoseismology of the Çaldıran Fault, Eastern Turkey

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One of the most remarkable tectonic feature at the Eastern Anatolia region is a strike-slip fault system formed of ~WNW trending en-echelon dextral faults extending from 42E to 48E longitude with the Tutak and Çaldıran Faults at west in Turkey to the North Tabriz Fault at east in Iran. This system is defined to be the southern boundary of the Caucasian block moving towards NNE with ~13 mm/yr slip rate based on the GPS based block models (Reilinger et al, 2006; Djamour et al., 2011). The activity of this system is marked by the 1976 earthquake (Ms:7.2) rupturing the Çaldıran Fault causing ~5000 fatalities which is close to half of the inhabitants along the fault at that time. The subsequent reconnaissance studies mapped the surface rupture; slip distribution and damage along the rupture in detail, attributing 3.75 m maximum lateral slip with some contributing dip slip component (Şaroğlu et al., 1983).

The Çaldıran Fault has a very fresh and distinct morphological signature along its ~50 km course from Iran-Turkey border at east and extends beyond the Çaldıran Town to the west where it gradually changes its strike from N35W to N70W. The deformation zone of the fault is very narrow leading to the formation of textbook morphological features (such as offset valleys, creeks, alluvial fans, shutter ridges) and also apparent lithological offsets among the Pliocene-Quaternary volcanics and also Cretaceous ophiolitic rocks (limestones and serpentinites). However the fault fades abruptly at its eastern and western tips where the slip is most probably transferred to the other (mentioned) faults in the system along the strike.

This study will detail segmentation and surface expression of the Çaldıran Fault and also introduce the preliminary results on the ongoing palaeoseismological research concerning the age, cumulative offset, Holocene-Pleistocene slip rate and earthquake recurrence period.