



Implication of drainage offsets to reconstruct the tectonic history of the eastern North Tehran fault, Central Alborz, Iran

N. Mozaffari Amiri (1), M. Pourkermani (1), M. Shahpasandzadeh (2) and A. A. Matkan (3)

(1) Faculty of Geosciences, Shahid Beheshti University, Tehran, Iran (2) International Institute of Earthquake Engineering and Seismology, Tehran, Iran (3) Faculty of Remote sensing and GIS, Shahid Beheshti University, Tehran, Iran (nasim_mozaffari_sbu@yahoo.com / Phone: +98 911 114 3359)

The Alborz Mountain is accommodated between the Caspian Sea and the Iranian Plateau which is tectonically active as a consequence of Arabia-Eurasia convergence. ENE-WSW to NW-SE striking North Tehran fault with about 108 km length is immediately located in the north of Tehran megacity and extended to farther west along the southern edge of Central Alborz. We have applied both field studies and rivers displacement extracted from geological maps, satellite images and aerial photos to better understand the tectonic evolution of the ENE-WSW trending eastern part of fault.

In the most eastern part of the North Tehran fault zone on the NE outskirts of Tehran, three more or less parallel rivers exist that display up to 400 meters sinistral hairpin-shaped deflection crossing the fault. Restoring the offsets to initial form manifests about 500-800 meters residual dextral deflection that reveals the North Tehran fault has had right-lateral movement in its prior tectonic history. Striations, tension cracks, conjugate faults and S-C fabrics verify the left-lateral strike-slip mechanism that is compatible with rivers deflection. Obtained from our observations, a significant change has occurred in the regional stress field during the Neogene time as if a NE transpressional regime which is probably provoked by southwestward motion of the South Caspian basin relative to Iran presently dominates in our studied area. Farther west,

in the northcentral of Tehran city, several rivers have been deflected dextrally 100-300 meters across the fault. Our field studies confirm that in this segment the right-lateral movement has lasted longer and during the time between Neogene to at least 4000 years ago -coincident with the end of settling Tehran alluvial Formation- there has been dominated by a local NE transtensional stress regime contrary to the other parts. Presence of abundant faults which have displaced the Pleistocene-Holocene alluvial deposits accompanied by other geological evidence lead us to account the North Tehran fault zone as an active and seismic prone area.