Geophysical Research Abstracts
Vol. 17, EGU2015-9210-1, 2015
EGU General Assembly 2015

The central branch of the North Anatolian Fault In The Southern Marmara Sea: Evidence for a distributed, Holocene-active fault system

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The North Anatolian Fault (NAF) is a major right-lateral transform fault in northern Turkey that branches westward into several strands in the vicinity of the Sea of Marmara. The main northern branch bisects the Marmara Sea from east to west, and seismic reflection profiles acquired over the past 15 years have revealed its complex geometry. Further, the several basins that developed along that branch record stratigraphic sequences that provide the needed framework to interpret the relative timing of tectonic deformation in the Marmara Sea. In contrast, the central branch, which snakes across the shallow southern shelf of the Marmara Sea, has been much less investigated. Here, we analyze a comprehensive dataset of high-resolution multi-channel, sparker, and CHIRP seismic profiles, which were collected with the facilities of Seismic Laboratory (SeisLab) in the Institute of Marine Sciences and Technology and R/V K. Piri Reis belonging to Dokuz Eylül University, along the central branch in 2008 (TAMAM expedition) and in 2013-2014 (SoMAR expedition), within the framework of a bilateral TÜBİTAK - NSF project. In combination with other existing seismic profiles, these new data reveal that the Central Branch consists of multiple faults strands that are distributed across the broad southern shelf. They also reveal that many of these strands are Holocene-active, although they slip at slower rates than the northern branch and are associated with slower basin subsidence or local uplift. Lastly, seismic data image a system of half-grabens across the southern shelf that are associated with the strands of the central branch. Strata within these half-grabens are progressively tilted and consistently dip to the south. Further analysis will be conducted to determine whether the formation of these grabens are controlled by oblique slip on the strands of the central branch, or by slip on detachment faults beneath the southern shelf.