



Active geodynamics of the Marmara Sea region: How to combine all geophysical observations?

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The Marmara Sea region is presently hosting a major seismic gap along the North Anatolian Fault (NAF). The region is located at the western termination of a unique sequence of large earthquakes initiated by the 1939 Mw 7.9 Erzincan earthquake and propagated westwards over 1000 km. Understanding the active geodynamics of the Marmara region is essential to assess the seismic behaviour of the Main Marmara Fault (MMF) and its related structures. We therefore have taken an initiative to give a comprehensive view of the regional lithosphere and the geomechanical response of the fault trying to combine all important geophysical observations. Using the broadband seismic data acquired between 2007-2015, we computed crustal seismic velocity distribution (from ambient noise tomography), crustal thickness map (from receiver function analysis) and uppermost mantle velocity distribution (from Pn tomography). The vast amount of data provides a good spatial coverage of the region and high resolution of images. Along the Main Marmara Fault (MMF), we present the seismicity below the Marmara Sea for the period the 2006-2015 to provide insights on the seismic response of the fault. The analysis shows that the seismic behaviour is varying along the fault. In addition, long term repeating earthquakes are searched along the MMF and found in the western part of the MMF. In the light of accurate and extensive observations, several open questions emerge from this compilation: Is the cumulated seismic moment released by the repeaters comparable to tectonic rate of the fault in the region? Are there any correlations between the rheology of the crust and the seismic response of the fault? Is there an influence of the fault asymmetry on the fault rupture?