



8 January 2013 Mw=5.7 North Aegean Sea Earthquake Sequence

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The deformation of the North Aegean Sea is mainly controlled by the westernmost segments of North Anatolian Fault Zone (NAFZ). On January 8, 2013, a moderate earthquake (Mw= 5.7) occurred in the North Aegean Sea, which may be considered to be a part of westernmost splay of the NAFZ. A series of aftershocks were occurred within four months following the mainschock, which have magnitudes varying from 1.9 to 5.0.

In this study, a total of 23 earthquake moment tensor solutions that belong to the 2013 earthquake sequence have been obtained by using KOERI and AFAD seismic data. The most widely used Gephart & Forsyth (1984) and Michael (1987) methods have been used to carry out stress tensor inversions.

Based on the earthquake moment tensor solutions, distribution of epicenters and seismotectonic setting, the source of this earthquake sequence is a N75°E trending pure dextral strike-slip fault. The temporal and spatial distribution of earthquakes indicate that the rupture unilaterally propagated from SW to NE. The length of the fault has been calculated as approximately 12 km. using the afterschock distribution and empirical equations, suggested by Wells and Coppersmith (1994). The stress tensor analysis indicate that the dominant faulting type in the region is strike-slip and the direction of the regional compressive stress is WNW-ESE.

The 1968 Aghios earthquake (Ms=7.3; Ambraseys and Jackson, 1998) and 2013 North Aegean Sea earthquake sequences clearly show that the regional stress has been transferred from SW to NE in this region. The last historical earthquake, the Bozcaada earthquake (M=7.05) had been occurred in the northeast of the 2013 earthquake sequence in 1672. The elapsed time (342 year) and regional stress transfer point out that the 1672 earthquake segment is probably a seismic gap. According to the empirical equations, the surface rupture length of the 1672 Earthquake segment was about 47 km, with a maximum displacement of 170 cm and average displacement of 107 cm. These values indicate that the 1672 earthquake segment is a potential earthquake hazard for this region.