

## **10 th of July, 1894 İstanbul Earthquake (Marmara Sea, Turkey)**

Cenk Yaltrak and Murat Şahin

Istanbul Technical University, Faculty of Mines, Geological Engineering, İstanbul, Turkey (yaltrak@itu.edu.tr)

The sea of Marmara is a region with the longest historical earthquake record of our planet. The earthquake of 10 July 1894 in Istanbul is the last earthquake of the historical period before the beginning of the instrumental period in the region. The magnitude and location of this earthquake and also its relationship with the North Anatolian Fault should be discussed in literature. Previous studies have not fully analyzed the historical data of 1894 earthquakes. For this reason, conflicting views are put forward regarding an earthquake in Marmara in the future. According to the historical records, the major damage was in the Istanbul Peninsula, Avcılar, Adalar, Karamürsel and Yalova. Due to its formation properties, it was effective in remote areas (İzmit, Gölçük, Adapazarı). It is clear that the most damage was in Old Istanbul and Prince Island. The tension cracks in different directions were observed in Heybeliada, Büyükada and Burgazada. There are observations to be interpreted as a tsunami wave about one and a half meter-height between Avcılar and Kartal. The submarine telegraph line extending from Kartal to Marmara Sea was broken at three points in the east of Büyükada. According to the damage assessment after the earthquake and other observations, it is understood that this earthquake was along the Adalar Fault. When considering seismic and multibeam data, it is apparent that the Adalar Fault was composed of echelon segments. The submarine landslides were mapped in front of the fault scarp. The Adalar Fault is a 45 km-long, 80° SW-dipping right-lateral normal oblique fault. The tsunami scenarios that we modelled along this fault are compatible with historical observations along the coast of İstanbul. Our GIS-based intensity scenario shows that the magnitude of the 1894 İstanbul Earthquake is Mw 7.