In this study, we perform Magnetotelluric method (MT hereafter) in the Sea of Marmara which is an inland sea located at north western Turkey as different from previous marine electromagnetic studies performed in open oceans. Turkey is seismically very active country that has hosted large destructive earthquakes throughout the history. Westward migration of big events along the North Anatolian Fault Zone (NAFZ), one of the main fault zones in the region of interest, and occurrence of the last two demonstrative earthquakes (Mw7.4 Izmit and Mw7.2 Duzce, 1999) at the eastern edge of the Sea of Marmara indicate that the next big event is most likely expected to occur at the Sea of Marmara. Previous MT studies clearly show the relation between the seismicity and resistivity variation near fault zones. In order to reveal the extension of the NAFZ and crustal structure within the Sea of Marmara, Ocean Bottom Electromagnetic (OBEM) data at 16 sites were collected during three campaigns between 2008 and 2009. Transfer functions were obtained from continues electric and magnetic fields (three components) using Chave and Thompson code (1987). Comparison of 3D and 2D forward modeling results demonstrates the significant effect of the bathymetry on data set. Therefore, we performed 2D inversion modeling using Ogawa and Uchida (1996) code modified by us to account for the bathymetry effects on the measurements. This presentation shows the resistivity variation along the eastern profiles within the Sea of Marmara.