

Launching seafloor geodetic monitoring for the North Anatolian Fault in the Marmara Sea, Turkey

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The North Anatolian Fault (NAF) is known to be activated sequentially from east to west in the last century. NAF passes through entire Anatolian peninsula, Turkey, including the most populous city, Istanbul, where no significant earthquake has been occurred for long time. Unfortunately, NAF is submerged beneath the Marmara Sea near Istanbul, which prevent us to monitor the coupling state of the fault by land-based geodetic means, such as GNSS or triangulation. Under the SATREPS project between Japan and Turkey promoted by JICA, we have started seafloor geodetic monitoring of NAF in the Marmara Sea since 2014. We employed acoustic transponders, called extensometer, which can precisely measure ranges among instruments for short-baseline. Relative horizontal motion of the fault can be monitored as variation in baseline length across the fault. The system is designed as permanently installed for more than five years until their batteries run out. The recorded data can be obtained through acoustic modem communication without pop-up recovering of the instrument. In September 2014, we deployed four extensometers along the NAF at the Western High in the Marmara Sea, where no prominent branching faults are observed and the strain should be concentrated along the main fault. The beginning of the monitoring, we put high-frequency measurement (5 min) for 24 hours to check the accuracy of the ranging and recovered the data. Then measurement frequency has been turned into low-frequency (12 hours) for long-term monitoring. Examining the initial data, we confirmed the repeatability of the ranging is less than 5mm, which encouraged us to continue the monitoring to detect any signal in the next couple of years. In the presentation, we also show the first long-term data (6 months), which is to be recovered in the research cruise scheduled on March 2015.

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