

GPS Measurements on the Western Marmara Segment of the North Anatolian Fault System

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SUMMARY

The North Anatolian Fault (NAF) is one of the most important active continental strike-slip fault systems in the world. The system strikes ~1200 km from Karliova at east through the Aegean Sea which ruptured almost completely in the last century causing destructive earthquakes. The major earthquakes occurred at the study area (the Marmara Sea region) are 9th August, 1912 Saros Gulf: Ms=7.4, 22nd July 1967 Mudurnu-Adapazarı: Ms=7.1, 27th March 1975 Saros Gulf: Ms=6.6, 17th August 1999 Kocaeli: Ms7.4 and 12th November 1999 Düzce: Ms=7.2 where 1999 events attracted international scientific interest and multidisciplinary collaboration to a fore coming large earthquake proposed to occur inside the Sea of Marmara. The project “The Determination of Deformations Along The Western Marmara of North Anatolian Fault and Characterization of Earthquake Hazard”, founded by The Scientific and Technical Research Council of Turkey (TUBITAK) and Istanbul Technical University (ITU) Research Fund investigating the western part of the NAF from Ganos Mountains to Gulf of Saros covering the area from Balıkesir (southeastern Marmara) to Gökçeada (northeastern Aegean Sea). The single strand Ganos segment which is ruptured in 1912 earthquake is reported to be bifurcating inside the Gulf of Saros indicating the transition between strike-slip NAF and extensional Aegean tectonic regimes. The aim of the project is to obtain information of the segmentation, kinematics and strain accumulation of the fault zone using GPS measurements and to determine the earthquake potential. Having such information on the fault zone may allow to evaluate future probabilities of regional earthquake hazards and to develop earthquake scenarios for specific faults. Three years of GPS measurement campaigns starting in 2003 have been carried out with 15 sites in 3 days periods. The data processed using GAMIT/GLOBK software. Daily solutions, combination of daily solutions, repeatabilities and annual combinations have been obtained. In this study, the GPS velocity vectors with the local field studies will be presented with geological interpretations for the research area. The quality of the measurements and the results will be presented according to the geological requirements.

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