
Afterslip of the 1999 Izmit earthquake, implications for creep along the NAF in the Sea of Marmara

Ziyadin Cakir*¹, Semih Ergintav², Ugur Dogan³, Aslan Gokhan⁴, and Seda Ozarpaci⁵

¹Istanbul Technical University, Faculty of Mines, Istanbul Turkey (ITU) – Turkey

²Kandilli Observatory and Earthquake Research Institute – Turkey

³Yildiz Technical University (YTU) – Barbaros Bulvarı 34349 Yıldız-İstanbul, Turkey

⁴Geological Survey of Norway – Norway

⁵Yildiz Technical University – Turkey

Abstract

Previous studies based on Envisat, Sentinel and TerraSAR-X SAR data and GPS observations have shown that the central segment of the August 17, 1999 Izmit earthquake rupture on the North Anatolian Fault (NAF) had began slipping aseismically following the event. Recent SAR data of Sentinel 1A/B satellites and recently established GPS network of 35 benchmarks confirm the ongoing creep as one of the longest lasting afterslip (> 23 years) instrumentally recorded. Decaying logarithmically with time, afterslip appears to have reached a steady rate comparable to the pre- earthquake full fault-crossing rate, suggesting that it may continue for decades and possibly until late in the earthquake cycle. This suggests that the aseismic slip Along the NAF in western Marmara Sea may be the afterslip of the 1912 Ganos earthquake. In addition to the stable steady state creep, InSAR time series disclose transient creep events (creep bursts).

*Speaker