

## **Creeping along the North Anatolian Fault at Ismetpasa (Western Turkey): Rate and extent from InSAR**

Ziyadin Cakir (1\*), Ahmet M. Akoglu (2), Semih Ergintav (3), Samir Belabbes (4), and Mustapha Meghraoui (4)

(1) Department of Geology, Faculty of Mines, ITU, Maslak-Istanbul, Turkey

(2) Eurasian Institute of Earth Sciences, ITU, Maslak-Istanbul, Turkey

(3) TUBITAK Earth and Marine Research Center, Gebze-Izmit, Turkey

(4) Institut de Physique du Globe 5, rue René Descartes, Strasbourg, France

\*[cakirz@itu.edu.tr](mailto:cakirz@itu.edu.tr)

### **Abstract**

We study the surface creep along the North Anatolian Fault (NAF) at Ismetpasa (NW Turkey) using Synthetic Aperture Radar Interferometry (InSAR) and elastic dislocation models. Interferograms with temporal baselines ranging between 1.25 and 5 years show that creeping section starts at the western termination of the 1943 (M=7.6) earthquake rupture. It continues about 70-km to the west, overlapping with the eastern part of the 1944 (M=7.3) earthquake rupture. Line of sight measurements along the fault indicate a maximum creep rate of  $11\pm 3$  mm/year near the mid point of the creeping section decreasing gradually towards the edges. Near Ismetpasa, InSAR data yield  $7.7\pm 3$  mm/year of creep rate, consistent with the recent instrumental (triangulation and creepmeter) measurements. Modeling of the InSAR and GPS data suggests that the fault-creep occurs most probably at a shallow depth (0-7 km). Our analysis combined with the previous studies suggests that creeping might have commenced following a large earthquake, and thus may be a long-lasting transient deformation.