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The Postseismic deformation of the October 23, 2011, Mw 7.2 Van (Turkey) Earthquake from GPS and InSAR

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On October 23, eastern Turkey was struck by a large (Mw 7.2) earthquake with an epicenter located about 20 km north of Van city, causing heavy damage and over 600 deaths. Field observations did not reveal any prominent surface rupture. Focal mechanism solutions and analyses of coseismic interferograms however revealed that ENE-WSW striking and north-dipping, blind thrust fault was reactivated during the earthquake, giving rise to doming of the region between Van and Erciş over 1 m. Rapid early postseismic deformation captured by the TerraSAR-X satellite data suggests that the coseismic fault continues to slip. To monitor the postseismic deformation we have installed eight new GPS benchmarks in the near field about a month after the earthquake. The GPS benchmarks were reoccupied two months after. The preliminary results indicate that postseismic deformation continues to take place in the earthquake region. Space time evolution and the nature of the postseismic deformation will be studied with additional campaigns and detailed analysis of the TerraSAR-X data show postseismic motion along reactivated fault branches crossing the Van city. Using GPS and InSAR we have also captured the surface movements due to the Mw 5.6 aftershock of November 09. Preliminary modeling suggests that the aftershock is associated with an E-W trending right-lateral strike slip fault.