



## **Postseismic Hanging-wall Subsidence of the 2003 Zemmouri (Mw=6.9, Algeria) Thrust Earthquake From InSAR Time Series**

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We have studied the postseismic deformation of the damaging May 21st, 2003 earthquake (Mw=6.9) that struck the Zemmouri region east of Algiers (Algeria) using Synthetic Aperture Radar Interferometry (InSAR) time series. 32 Advanced SAR images of European Space Agency's Envisat satellite between 12-July-2003 and 14-August-2010 were analyzed. Processing with the Small Baseline and Permanent Scatterers InSAR methods shows that while the epicentral region has subsided up to 10 cm the Cap Matifou has been uplifted up to 7 cm with an inflection point SW of the city of Boumerdes. This suggests that the Zemmouri reverse fault rupture is located 8-12 km offshore the coast near Boumerdes, aligning with the Blida Fault. The pattern of deformation and preliminary modeling suggest that the postseismic deformation is associated most probably with poro-elastic rebound or/and viscoelastic relaxation of the lower crust. Although the coseismic slip revealed an impressive coastal land uplift, a rapid (2-3 cm/yr) and wide spread subsidence has been taking place in the Mitidja basin, particularly south of the coastline and the Bay of Algiers, and mainly in Sidi Moussa, Haouch Ben Taraha and Oued Smar. This relatively long-standing postseismic process indicates the occurrence of a retro-deformation which is now reaching ~ 20% of the coseismic uplift. If this tectonic process occurs systematically on all reverse faulting earthquakes of the Tell Atlas, it implies a larger (shortening) slip deficit with respect to the 4 – 5 mm/yr convergence rate between Africa and Eurasia in the western Mediterranean.