



Sentinel-1 InSAR: first results from seismic and volcanic applications

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After the launch of Sentinel-1 mission on April 3, 2014, the first monitored natural events were the Mw 6.0 Napa (California, USA) earthquake and the Fogo (Cape Verde) Volcano eruption. The available data were in Stripmap (ERS-Envisat like) and TOPSAR Interferometric Wideswath (IW) mode, respectively. In particular, the new TOPSAR mode is suitable to monitor large areas thanks to the wide coverage and the medium-high (about 12 m per pixel) spatial resolution.

We have estimated the coseismic surface deformation field of Napa earthquake, a Mw 6.0 event occurred on August 24, 2014, by applying InSAR on two images taken before (August 8) and after (August 31) the mainshock. In addition, the offset tracking and split-beam techniques were applied in order to retrieve 3-D surface movements. We used the detected InSAR coseismic displacement field to infer the seismic source features through an analytical inversion analysis assuming a homogeneous elastic half-space. The source geometry (position and orientation of the fault plane) has been obtained with a nonlinear optimization scheme, assuming uniform slip on the fault plane; then we obtained the best-fitting slip distribution on the fault plane by means of a linear inversion.

Last November 23, 2014, an eruption started on Fogo Volcano (Cape Verde), almost 20 years from the previous one. A pair of Sentinel-1 images in TOPSAR mode and along ascending path, dated November 3 and November 27, 2014 were used to investigate deformations occurring on the caldera and volcano edifice during the first sineruptive phase. Source inversions were carried out in order to simulate the effect of the feeding dyke on the surface displacements. Moreover, an estimate of the lava field extension was performed.