The May - June 2012 seismic sequence in Emilia Region (North Italy). An overview of surface effects from satellite images and ground survey.

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The Emilian sector of Po Plain (North Italy) has been hit by a M 5.9 earthquake on May 20, 2012, at 02:03 GMT. The seism occurred in the northern boundary of the Apennine chain compressive area, interested by a moderate seismicity and where few historical earthquakes below M 6 occurred. The earthquake provoked some major damage and collapses of ancient and historical buildings in the small villages within the epicentral region. In this sector of the Po Plain a huge number of industrial facilities are concentrated. Some of them were built to face mainly vertical oscillations, so that collapsed because experienced horizontal movements. On May 29, at 7:00 GMT, a second mainshock (M 5.8) occurred some km to the W along another seimogenic source roughly parallel to the May 20. Further events having M>5 occurre on May 29 and June 3. Moreove in the time period up to June 5 about 2000 shocks have been registered by the Italian Seismic Network.

The large dataset used for investigating the surface effects caused by the seismic sequence, it is composed by SAR data from the COSMO-SkyMed and Radarsat satellite missions.

We have applied the well known Differential Interferometry Synthetic Aperture Radar (DInSAR) technique for measuring the surface deformation along satellite LOS (Line Of Sight) due to the earthquakes. If on one hand the higher temporal sampling of COSMO-SkyMed constellation allows to measure the contribution of each events (for the first event the COSMO interferogram cover only half part of the deformation), on the other hand the higher temporal coherence provided by Radarsat C-band makes possible to capture the cumulative deformation of the entire seismic sequence, providing an interesting synoptic view of the event.

Thanks to the very high spatial resolution, COSMO-SkyMed data have also been used for detecting wide area of subsidence and surface cracks, which are reasonably related to pervasive liquefaction phenomenon. To this purpose the SAR coherence and intensity features features have been exploited highlighting well-defined areas of loss of coherence in Sant'Agostino, San Carlo and

The coseismic deformation field obtained from SAR images has been used to infer the parameters of causative rupture planes by means of a non-linear inversion.