



Ongoing satellite remote sensing monitoring of Vesuvius - Campi Flegrei Supersite by the INGV Remote Sensing Group

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As largely known the Neapolitan Volcanic District, consisting on Campi Flegrei caldera, Mt. Vesuvius and Ischia island, is potentially one of the most dangerous worldwide because of the high density of inhabitants. Currently, Campi Flegrei is at the “yellow” alert level according to the Emergency Plan issued by the Italian Civil Protection Department. Several activities were carried out by the INGV Remote Sensing group and are still ongoing to guarantee a continuous monitoring of such volcanic areas by satellite data. In particular, we focused our analysis on surface deformations and temperature variations due to volcanic inflation/deflation and magma recharging. Surface deformation rate maps and time series are estimated by X-band Synthetic Aperture Radar (SAR) data acquired by Cosmo-SkyMed (CSK) missions along both ascending and descending orbits and processed by the Interferometric Point Target Analysis (IPTA) approach.

Further perspectives in this sense concern the development of semi-automatic procedures for optimizing data processing and computational burden. In addition to the Supersite space-borne data provision, based on the acquisition plans and data access policies of the space agencies (ASI, ESA, DLR, JAXA, CSA) it would be desirable to increase the available dataset (both in the number and the acquisition modes) to improve the reliability of the estimations.

On the other hand, temperature maps are obtained by processing thermal channels of nighttime acquisition of optical satellite data (ASTER and TIRS Landsat8). These data have an high spatial resolution (90 m for ASTER and 100m for Landsat8), offering the capability to detect thermal signatures especially analysing the nighttime data. The choice to process only nighttime satellite data is due to the absence of the solar contamination and the data more clearly shows the temperature difference between hottest areas (Solfatara di Pozzuoli and Vesuvio crater) and the surroundings. The surface temperatures are obtained by processing the data at sensor radiance acquired by ASTER - Landsat8 and removing the atmospheric effects. The 100 m resolution TIRS L8 data are re-sampled to correspond to the ASTER 90m spatial dimensions by using the nearest neighbor resampling method, in order to have the same spatial pixel resolution for all data.

The goal for the future is to correlate the deformation trend and the temperature variations thus evaluating an associated hazard level.