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Analysis of recent surface deformation at Ischia Island Volcano (South Italy) via multi-platform monitoring systems

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Ischia Island is a densely populated volcanic area located in the North-Western sector of the Gulf of Napoli (South Italy), whose activity is characterized by eruptions (the last one occurred in 1302 A.D.), earthquakes (the most disastrous ones occurred in 1881 and in 1883), fumarolic-hydrothermal manifestations and ground deformation.
In this work we carry out the surface deformation time-series analysis occurring at the Island by jointly exploiting data collected via two different monitoring systems. In particular, we take advantage from the large amount of periodic and continuous geodetic measurements collected by the GPS (campaign and permanent) stations deployed on the Island and belonging to the INGV-OV monitoring network. Moreover, we benefit from the large, free and open archive of C-band SAR data acquired over the Island by the Sentinel-1 constellation of the Copernicus Program, and processed via the advanced Differential SAR Interferometry (DInSAR) technique referred to as Small BAseline Subset (SBAS) algorithm [Berardino et al., 2002]. We focus on the 2014-2017 time period to analyze the recent surface deformation phenomena occurring on the Island, thus extending a previous study, aimed at investigating the temporal evolution of the ground displacements affecting the Island and limited to the 1992-2003 time interval [Manzo et al., 2006].
The performed integrated analysis provides relevant spatial and temporal information on the Island surface deformation pattern. In particular, it reveals a rather complex deformative scenario, where localized phenomena overlap/interact with a spatially extended deformation pattern that involves many Island sectors, with no evidence of significant uplift phenomena. Moreover, it shows a good agreement and consistency between the different kinds of data, thus providing a clear picture of the recent dynamics at Ischia Island that can be profitably exploited to deeply investigate the physical processes behind the observed deformation phenomena.

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