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Nisyros volcano monitoring through ground based InSAR, GPS, seismology and thermal sensing

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Nisyros, a quaternary volcanic island in the Aegean sea, is characterized by a central caldera with historic craters and domes together with localized fumarolic areas and boiling ponds. Nisyros experienced the last phreatic eruption in 1887, the last seismic crisis occurred during 1995-1998, active faulting continuous until now. Continuous hydrothermal activity and recent unrest point out that this volcano can still pose hazard to the local population and to the numerous daily tourists.
In an attempt to better understand the nature of hydrothermal activity, we performed a field survey in fall 2010. Instrumentation deployed included a ground based InSAR (GB-InSAR), a forward looking infrared camera, seismometers and a GPS network.
By targeting the most active areas within the caldera (Stephanos crater and Lofos Dome) we are aiming to explore and correlate deformation and temperature changes. We observe fumarole temperatures generally close to the boiling temperature, with localized and pronounced temporal fluctuations. Further preliminary data analysis suggests also displacements occurring, with pronounced transient uplift and subsidence on the centimeter scale, being in agreement with the GPS and GB-InSAR data. This work shows that Nisyros is a volcano in unrest, and highlights the strength of dense spatial deformation monitoring on similar volcanic craters elsewhere.