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Assessing and improving the measuring capability of the Etna_NETVIS camera network for lava flow rapid mapping

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This work is aimed at improving the performance of the ground NEtwork of Thermal and VIsible and cameras located on Mt. Etna volcano (Etna_NETVIS) by optimizing its observational capability on lava flows evolution and by developing dedicated tools for systematically measuring quantitative parameters of known accuracy.

The first goal will be achieved through the analysis of the geometrical configuration and its improvement by means of the establishment of additional observation sites to be equipped with mobile stations, depending on the area of interest. This will increment the spatial coverage and improve the observation of the most active areas for surface sin-eruptive processes.

For the second objective we will implement new processing tools to permit a reliable quantitative use of the data collected by the surveillance sensors of NETVIS, extending their capability in monitor the lava flow thermal and spatial evolution and by providing georeferenced data for rapid mapping scope. The tool will be used to automatically pre-process multitemporal datasets and will be tested on both simulated and real scenarios. Thanks to data collected and archive by the NETVIS INGV team, we will have the opportunity to develop and test the procedure in different operational conditions selected among the large number of lava flows coupled to lava fountan events occurred between 2011 and 2013.

Additionally, Etna_NETVIS data can be used to downscale the information derived from satellite data and/or to integrate the satellite datasets in case of incomplete coverage or missing acquisitions (both due to low revisiting time or bad geometrical conditions). Therefore an additional goal is that of comparing/integrating quantitative data derived from visible and radar satellite sensors with the maps obtained using Etna_NETVIS. The procedure will take into account the discrepancy among the different datasets in terms of accuracy and resolution and will attempt to provide a combined approach (based on error analysis and data weighting) to evaluate the final results reliability.

Preliminary results on the procedure and algorithm adopted for geometric and radiometric sensor calibration, definition of optimized configurations through simulation and for extracting updated mapping data from multi-temporal dataset will be presented.

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