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## **The use of surveillance camera for lava flow rapid mapping: an application to Mount Etna Volcano**

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In order to improve the observation capability in one of the most active volcanic area of the world, Mt. Etna, we developed a method for employing the existing network of surveillance cameras for a quasi real-time mapping of sin-eruptive processes. Following a preliminary evaluation of the present configuration of Etna permanent ground NETwork of Thermal and Visible Sensors (Etna\_NETVIS), its possible implementation and optimization was investigated for defining the optimal location for additional observations sites to be set up during emergencies, thus supporting a rapid assessment of the most favorable locations. Then a procedure for processing time series of ground-acquired images and extracting a coherent multi-temporal dataset of orthophotos was developed. The processed datasets can be adopted for extracting 2D features such as evolutions maps of active lava flows. The tool was adopted to map the evolution of two recent lava flows and validated through the comparison with in-situ and satellite data. The achievable accuracy (about 3 times the original pixel size) and the short processing time makes the tool suitable for rapidly assess lava flow evolutions, especially in case of recurrent eruptions like occurred during 2011-2015 Etna activity. The tool can be used both in standard surveillance activities and during-emergency phases (eventually extending the fixed network with mobile stations) when it is mandatory to carry out a quasi-real-time mapping for supporting civil protection actions. The adoption of the processing tool and its possible integration in the control room allows to implement the Etna\_NETVIS for mapping purposes and not only for surveillance functions. This work is part of MEDSUV project funded by European Commission in FP7 programme.