

Near real-time monitoring of Taal volcano from space by means of an automated hot spot detection system

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An automated satellite monitoring system, based on the RST_{VOLC} detection algorithm, has been designed, developed and implemented at laboratories of Institute of Methodologies for Environmental Analysis (IMAA) of the National Research Council (CNR) to monitor Taal volcano (Philippines) in near real time. This system, developed in the framework of a collaboration project between PHIVOLCS (Philippine Institute of Volcanology and Seismology) and EMSEV (Electromagnetic Studies of Earthquakes and Volcanoes, <http://www.emsev-iugg.org/emsev/>), automatically processes infrared data provided by Japanese geostationary satellites (MTSAT - Multifunctional Transport Satellites) to promptly identify anomalous variations in the MIR (Medium Infrared) and TIR (Thermal Infrared) signals, associated to possible thermal unrest phases of volcano. The system is capable of analyzing the infrared satellite signals at 1 hour of temporal sampling. In addition, in case thermal anomalies are detected, e-mail alerts reporting position, date, time and relative intensity of anomalies (in terms of RST_{VOLC} index values) are produced and sent a few minutes after data acquisition, providing timely information about possible thermal activities in progress at volcano. From January 2011 to October 2012, the system has worked in almost continuous way, processing more than 18 months of data. In this period, no statistically significant thermal anomalies were detected, although some seismicity activity was recorded. But during that period, no large thermal anomaly was detected on the ground.

In this work, a summary of the activities carried out and the results achieved is reported. In particular, performances of the system are analyzed, also assessing operational capabilities, drawbacks and potential of satellite observations as an additional tool contributing to provide prompt and accurate information about possible unrest of active volcanoes, in the framework of an integrated and operational warning system.