



A prototype of an automated high resolution InSAR volcano-monitoring system in the MED-SUV project

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Volcanic processes which produce a variety of geological and hydrological hazards are difficult to predict and capable of triggering natural disasters on regional to global scales. Therefore it is important to monitor volcano continuously and with a high spatial and temporal sampling rate. The monitoring of active volcanoes requires the reliable measurement of surface deformation before, during and after volcanic activities and it helps for the better understanding and modelling of the involved geophysical processes.

Space-borne synthetic aperture radar (SAR) interferometry (InSAR), persistent scatterer interferometry (PSI) and small baseline subset algorithm (SBAS) provide a powerful tool for observing the eruptive activities and measuring the surface changes of millimetre accuracy. All the mentioned techniques with deformation time series extraction address the challenges by exploiting medium to large SAR image stacks. The process of selecting, ordering, downloading, storing, logging, extracting and preparing the data for processing is very time consuming has to be done manually for every single data-stack. In many cases it is even an iterative process which has to be done regularly and continuously. Therefore, data processing becomes slow which causes significant delays in data delivery.

The SAR Satellite based High Resolution Data Acquisition System, which will be developed at DLR, will automate this entire time consuming tasks and allows an operational volcano monitoring system. Every 24 hours the system runs for searching new acquired scene over the volcanoes and keeps track of the data orders, log the status and download the provided data via ftp-transfer including E-Mail alert. Furthermore, the system will deliver specified reports and maps to a database for review and use by specialists. The user interaction will be minimized and iterative processes will be totally avoided.

In this presentation, a prototype of SAR Satellite based High Resolution Data Acquisition System, which is developed and operated by DLR, will be described in detail. The workflow of the developed system is described which allow a meaningful contribution of SAR for monitoring volcanic eruptive activities. A more robust and efficient InSAR data processing in IWAP processor will be introduced in the framework of a remote sensing task of MED-SUV project. An application of the developed prototype system to a historic eruption of Mount Etna and Piton de la Fournaise will be depicted in the last part of the presentation.