

Sentinel-1 for geohazards monitoring

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Abstract

This work is aimed at presenting the potentialities of Sentinel-1 as a supporting tool for geological risks prevention and management, showing the main results achieved in the framework of two European ECHO Projects: Safety (2016-2017) and U-Geohaz (2018-2019). In the last 25 years, the satellite Synthetic Aperture Radar Differential Interferometry (DInSAR) has given a great contribution in the monitoring of geohazards like landslides, subsidence or volcanos. A great step forward has been done with the satellites Sentinel-1 (S1) A and B, launched respectively in 2014 and 2016 by ESA. Ensuring a regular worldwide acquisition, over wide areas (250x250 km²), with a high temporal sampling (6-12 days) and providing free data, S1 represents an innovation in the use of DInSAR, allowing accomplishing long term monitoring planning, at a regional to local scale. By the way, the potentialities of S1 are under-exploited: DInSAR is not easy and intuitive for what concern both the data processing and the results interpretation and use. In this context, a methodology has been implemented with the aims of both fully exploit the 6-days repeatability of S-1 and making the DInSAR results suitable to be used by any actor involved in the risk management activities. Nowadays, approaches based on the presented methodology have been integrated in the activities of the Geographical Institute of Spain (IGN), within the Volcano Monitoring System (VMS), and of the University of Florence (UNIFI), within a project of deformations monitoring of the Tuscany Region, involving the Italian Civil Protection. The methodology and the main results in Italy and Spain will be presented.

Keywords: *Sentinel-1; DInSAR; Monitoring; Geohazards; U-Geohaz*

Presentation preference: oral