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COSMO-SKYMED ACTIVATION FOR CENTRAL ITALY'S 2016 EARTHQUAKE

Abstract

Starting from the first M6.0 disastrous earthquake that hit the Apennine areas in Central Italy on 24th August 2016, COSMO-SkyMed (Constellation of Small Satellites for Mediterranean basin observation) system has been promptly activated in order to acquire high-precision radar images, pointing towards the affected areas both in terms of single build-up area or the entire vast territory hit by the earthquake. This accurate daily monitoring continued for a long time over the next months, in accordance with the requests of the Italian Department of Civil Protection and its pool of expertise: the National Institute of Geophysics and Volcanology (INGV) for the seismologic analysis and the Institute for Electromagnetic Sensing of the Environment (IREA) of the National Research Council (CNR) in Naples for the satellite SAR data processing. The research team paid great attention to the geological and physical phenomena related to the earthquake focusing, in particular, on the study of the ground deformation and seismic sources. To this purpose COSMO-SkyMed images allowed to identify active fault lines and monitor the effects of the sequence of shocks that followed the initial one. In addition, the development of advanced processing techniques enabled the synergic exploitation of SAR data coming not only from X-band sensor, such as COSMO-SkyMed, but also from other satellite missions (the Japanese ALOS-2 operating in L-Band and the C-band Sentinel-1 satellite of the European Copernicus program), so to quickly provide a unique set of information in support of relief. In this framework, COSMO-SkyMed satellite constellation represents a fundamental tool at the disposal of Italian authorities and International community for the earthquake damage assessment and subsequently the development of the geophysical pattern of the affected areas. COSMO-SkyMed's real strength lies indeed in its extraordinary flexibility, the radar being able to provide images ranging from the wide field of the ScanSAR mode to the narrow field of the Spotlight mode. Furthermore, the system has an unmatched short revisit time, which allows to constantly monitor the evolution of the situation over a specific area. It can be said that no similar constellation exists in the current Earth Observation operational scenario. This paper aims to report on the contribution provided by COSMO-SkyMed satellite system for the emergency management related to Central Italy earthquake, highlighting the added value results obtained by COSMO-SkyMed data in the decision-making of national Civil Protection.