Long-term experience gathered on Etna for volcano monitoring using optical and radar remote sensing, in preparation for Sentinel Missions

Maria Fabrizia Buongiorno (1), Pierre Briole (2), Fabiano Costantini (3), Francesco Guglielmino (4), Mattia Marconcini (3), Antonios Mouratidis (3), Giuseppe Puglisi (4), Francesco Sarti (3), Claudia Spinetti (1), and Salvatore Stramondo (1)

(1) Istituto Nazionale di Geofisica e Vulcanologia, Rome, Italy , (2) Ecole Normale Supérieure Paris, France, (3) ESA/ESRIN, Frascati, Italy , (4) Istituto Nazionale di Geofisica e Vulcanologia, Catania, Italy

The implementation of the future Sentinel mission represents a unique opportunity for improving the capabilities of the EO systems form monitoring active volcanoes. The different satellites and sensors planned in the mission will greatly increase the amount and quality of information available on volcanic areas. In this paper the experience gathered on applying the past and current EO system on Mt. Etna volcano during the last decade are discussed in view of providing essential guidelines for the Sentinel mission. The large data sets available for this volcano, both for optical and radar sensors, together with its almost continuous volcanic activity gave the opportunity to scientists to implement, test and apply many algorithms and methods for processing EO data, confirming the role of natural laboratory for Mt. Etna. A few study cases, relevant to significant eruptive periods, are considered for showing the capability of EO system to provide valuable data for studying active volcanoes. Particular care is also devoted to discuss the extension of Envisat mission through 2013, considered as a bridge between the current and the future missions for Mt. Etna volcano and many other significant geodynamic areas located at +/- 38°+/-4° of latitude. Finally, the new possibilities offered by the sensors boarded on Sentinel mission are discussed, focusing particular attention on radar (Sentinel 1) and optical (multispectral; Sentinel 2 and 3) sensors, performing also some simulations considering similar data already acquired on Mt. Etna during past airborne missions.