S²IGI: an integrated system for forest fire management

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Forest fires are one of the main sources of threat and degradation of vegetated and anthropic areas in the Mediterranean Basin. In the last decade, Italy experienced about 5500 forest fires per year, which burned about 50.000 hectares per year, although a high interannual variability characterizes this phenomenon. Supporting wildland fire prevention and management is the key objective of the S²IGI (Sistema Satellitare Integrato Gestione Incendi) project, which aims to provide a short and medium term forecasting of wildfire danger, an early detection of wildland fires, a real-time forecast of wildland fire propagation, and an assessment of fire damages, based on the use of advanced technologies as Earth observation (EO) data exploitation.

In more detail, the main goal of S²IGI is the development of added-value products based on satellite images, weather numerical predictions and in-situ ancillary data, together with a dedicated decision support system. Therefore, S²IGI can support the wildland fire management activities along the following three phases: (1) forecast and prevention, (2) monitoring, detection and suppression, (3) damage assessment and vegetation recovery.

The products delivered by this project derive from previous EU and national RTD projects, in which, for many years, the project partners have been involved; the same products have been extensively evaluated during the training and the demonstration period of the past projects. Crowd sourcing data will be also tested as additional source of information during the emergency phases.

S²IGI project is being developed encompassing the following main principles:

a) to define, make and demonstrate a functional architecture, accounting for all types of operational scenarios of fire-related emergencies at local, regional and national level, respectively;

b) to customize and implement into the system the whole set of unsupervised, fire-oriented EO techniques prioritizing the exploitation of the Copernicus data and products;

c) to explore, test, and implement into the system innovative unsupervised techniques and algorithms for fire detection and burn scar mapping;

d) to provide the overall system with relevant, quantitative decision support functionalities, as the near-real-time straightforward modeling of fires in controlled environments under known boundary conditions.

This paper is devoted to introduce the S²IGI pilot project, and to describe the main products and the related validation methods. S²IGI is a three years lasting project supported by the Regional Administration of Sardinia under the POR (Programma Operativo Regionale) FESR (Fondo Europeo di Sviluppo Regionale) Sardegna 2014– 2020.