Changing firefighting strategies thanks to new early detection capabilities offered by Robust Satellite Techniques

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Timely detection of forest fires can enable rapid counteraction before they become uncontrolled and wipe out entire forests. Remote sensing, particularly when based on geostationary satellite data, can be successfully utilized for this purpose. Unlike sensors on polar orbiting platforms, instruments on geostationary satellites guarantee very high temporal resolution (from 15 to 2.5 minutes), which can be usefully employed for continuous monitoring over large areas and to detect fires at their early stages. This allows for quite a different, more effective, and less expensive management of firefighting resources. Smaller, lightly equipped but rapidly responding teams can intervene on small fires and extinguish them well before they become so extensive and dangerous as to require more expensive efforts (such as helicopters or Canadair aircraft).

This proactive approach, however, comes up against the limitations of current fire-detection algorithms (mostly based on fixed thresholds approaches), which are still unable to identify nascent fires while simultaneously avoiding the proliferation of false alarms. The result is low algorithm sensitivity, generally meaning that only large and/or extremely intense events are detected. This work describes the experience gained so far by implementing and validating an original change-detection technique (the RST-FIRES approach) to overcome these issues. Its performance in terms of reliability and sensitivity, already verified using SEVIRI data (the Spinning Enhanced Visible and Infrared Imager sensor on board the Meteosat Second Generation geostationary satellite), is currently being tested on the new FCI (Flexible Combined Imager on board the new Meteosat Third Generation satellite) within the framework of the TECH4YOU (funded by Next-Generation-EU) project.

After approximately 1,000 near-real-time ground and aerial checks of the RST-FIRES detections, the added value of the RST-FIRES technique in detecting small fires is demonstrated, with a sensitivity ranging from 3 to 70 times higher than that of any other similar SEVIRI-based product.

In this paper, we present results achieved after long-term collaboration with the Regional Civil Protection Departments and Local Authorities of the Basilicata, Lombardy, and Sicily regions. Preliminary results achieved after implementing a similar approach for MTG (with heavily enhanced instrumental and observational capabilities) within the framework of the TECH4YOU project (covering the Basilicata and Calabria regions) will also be presented.