

Towards an Earlier Fire Detection by using Advanced Geostationary Satellite Data and Methods

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Early detection of fires is of paramount importance to promptly activate the countermeasures required to extinguish them before they become so intense and extensive that to get out of control, increasing damages and risks to persons and properties. Moreover, fighting against smaller fires requires minor human and instrumental resources that can be more easily and quickly activated even in remote areas. To detect and monitor short-living events, or fires characterised by very rapid evolution times, geostationary satellites must be used, the only ones offering the required very high observation frequency from 30 to 2,5 minutes.

Among the number of fire detection techniques based on this technology, the RST-FIRES, a multi-temporal change detection approach, has already demonstrated a significant improvement in terms of small/starting fire detection using EUMETSAT Meteosat Second Generation (MSG) SEVIRI data with 15 minutes (0deg) of temporal resolution. In the framework of the Tech4you project, the RST-FIRES portability on the MSG-SEVIRI Rapid Scan Service (RSS) data, offering 5 minutes of revisit time, has been preliminarily examined. The impact on early fire detection has been assessed and quantified - also by comparison with the results achieved by the implementation of RST-FIRES on SEVIRI 0deg data - over Calabria Region (Southern Italy) devastated by wildfires in the 2022 summer. Results obtained suggest that RSS data could allow for a quite systematic earlier detection and a better sensitivity than MSG 0deg data because of the improved temporal (and spatial) resolutions. Thanks to the intrinsic exportability of the RST approach, its application to different geographic areas and satellite sensors (easy and immediate) can contribute to the reduction of a phenomenon representing one of the worldwide major emergencies (increasing because of, and contributing to, climate change) with local and global effects.

As an example, the remarkable results expected by its application to the new Meteosat Third Generation/Flexible Combined Imager (MTG-FCI) sensor - with an improved spatial (1, 2 km) and temporal (10 minutes) resolution as well as a more suitable dynamic range for high temperature sources in the MIR region (saturation at ~ 450 K @3.8 micron) – will be also discussed.