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Comparing different approaches for an effective monitoring of forest fires based on MSG/SEVIRI images

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The remote sensing sensors on board of geostationary satellite, as consequence of the high frequency of the observations, allow, in principle, the monitoring of these phenomena characterized by a fast dynamics. The only condition for is that the events to be monitored should be enough strong to be recognizable notwithstanding the low spatial resolution of the present geostationary systems (MSG/SEVIRI, GOES Imager, MTSAT).
Apart from meteorological phenomena other events, like those associated with forest fires and/or volcanic eruption, are characterized by a very fast dynamics. These events are also associated with a very strong signal that make them observable by geostationary satellite in a quasi-continuous way.
However, in order to make possible the detection of small fires by using the low resolution multi-spectral imagery provided by geostationary sensor like SEVIRI (3x3 km2 at the equator) new algorithms, capable to exploit it high observation frequency, has been developed.
This paper is devoted to show the results obtained by comparing some of these algorithms trying to highlight their advantages and limits. The algorithms herein considered are these developed by CRPSM (SFIDE®), UNIBAS/CNR (RST-FIRES) and ESA-ESRIN (MDIFRM).
In general, the new approaches proposed by each one of them are capable to promptly detect small fires making possible an operational utilization of the satellite based fire detection system in the fire fighting phases.
In fact, these algorithms are quite different from these introduced in the past and specifically devoted to fire detection using low resolution multi-spectral imagery on LEO (Low Earth Orbit) satellite. Thanks to these differences they are capable of detecting sub-hectare (0.2 ha) forest fires providing an useful instrument for monitoring quasi-continuously forest fires, estimating the FRP (Fire Radiative Power), evaluating the burned biomass, retrieving the emission in the atmosphere.