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Limits, achievements and perspectives of the RST (Robust Satellite Technique) approach in monitoring seismically active areas after ten years of applications

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Robust Satellite Techniques (RST), firstly proposed by Tramutoli in 1998 as a general approach for monitoring natural and environmental risks, significantly improved present capabilities to investigate possible relations between an earthquake occurrence and space-time fluctuations of Earth's emitted Thermal Infra-Red (TIR) radiation observed from satellite.
This work tries to offer an assessment of main achievements, residual limits and perspectives of the RST approach starting from results which were achieved by applying different RST-based algorithms to different satellite sensors (both on polar and geostationary platforms) and to tens of earthquakes occurred in different continents, in various geo-tectonic settings (compressive, transcurrent and distensive fault zones) and with a huge range of magnitudes (from 4.0 to 7.9).
A critical reading of such studies seems to demonstrate that, even if it is not possible to surely relate (or to exclude) observed anomalous TIR transients to impending earthquakes, it is crucial the role played by a space-time persistence test in order to select TIR anomalies candidate to be associated to impending earthquakes. The long series of test cases allowed us to highlight a strong improvement of the signal/noise ratio moving from polar to geostationary satellites as well as using TIR sensors with split-windows channels. In addition, it was possible to identify (and correctly discard) TIR anomalies related to clouds and to image navigation errors.
Finally, the numerous analysed earthquakes permitted us to verify the poor importance of spatial resolution of observations which encourages the use of passive MW sensors less affected by atmospheric conditions.