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Robust Satellite Techniques for monitoring earth emitted radiation in the Japanese seismic area by using MTSAT observations in the TIR spectral range

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Since eighties, the fluctuations of Earth's thermally emitted radiation, measured by satellite sensors operating in the thermal infrared (TIR) spectral range, have been associated with the complex process of preparation for major earthquakes. But, like other claimed earthquake precursors (seismological, physical, chemical, biological, etc.) they have been for long-time considered with some caution by scientific community. The lack of a rigorous definition of anomalous TIR signal fluctuations and the scarce attention paid to the possibility that other causes (e.g. meteorological) different from seismic activity could be responsible for the observed TIR variations were the main causes of such skepticism.
Compared with previously proposed approaches the general change detection approach, named Robust Satellite Techniques (RST), showed good ability to discriminate anomalous TIR signals possibly associated to seismic activity, from the normal variability of TIR signal due to other causes. Thanks to its full exportability on different satellite packages, since 2001 RST has been implemented on TIR images acquired by polar (e.g. NOAA-AVHRR, EOS -MODIS) and geostationary (e.g. MSG-SEVIRI, NOAA-GOES/W, GMS-5/VISSR) satellite sensors, in order to verify the presence (or absence) of TIR anomalies in presence (absence) of earthquakes (with M>4) in different seismogenic areas around the world (e.g. Italy, Greece, Turkey, India, Taiwan, etc.).
In this paper, the RST data analysis approach has been implemented on TIR satellite records collected over Japan by the geostationary satellite sensor MTSAT (Multifunctional Transport SATellites) and RETIRA (Robust Estimator of TIR Anomalies) index was used to identify Significant Sequences of TIR Anomalies (SSTAs) in a possible space-time relations with seismic events. Achieved results will be discussed in the perspective of a multi-parametric approach for a time-Dependent Assessment of Seismic Hazard (t-DASH).