Thermal InfraRed satellite surveys over Japanese seismic area applying Robust Satellite Techniques on MTSAT observations

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Since 2001, the general change detention approach, named Robust Satellite Techniques (RST), has been applied to explore the fluctuations of Earth's thermally emitted radiation, observed by satellite sensors operating in the thermal infrared (TIR) spectral range in possible relationship with the preparation phases of major earthquakes. Used in combination with RETIRA (Robust Estimator of TIR Anomalies) index, RST data analysis approach showed good ability to discriminate anomalous TIR signals possibly associated to seismic activity, from the normal variability of TIR signal due to other causes (e.g. meteorological).
Up to now, RST has been implemented on different TIR satellite sensors on board polar (NOAA and EOS) and geostationary (like, MSG, GOES, GMS and MTSAT) platforms, to investigate the preparation phases of earthquakes of different magnitudes occurred in several seismogenic areas around the world (e.g. Italy, California, Greece, Turkey, 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). RETIRA index was used to identify Significant Sequences of TIR Anomalies (SSTAs) on a long observation period. Significance of the correlation existing among SSTAs and earthquakes (with M≥4) occurrence was investigated in order to evaluate the possible contribute of such observations to a multi-parametric t-DASH (time-Dependent Assessment of Seismic Hazard) system for short-term seismic hazard forecasting.

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