Geophysical Research Abstracts
Vol. 13, EGU2011-11575, 2011
EGU General Assembly 2011

Reducing atmospheric effects on RST analysis by exploiting TIR split windows channels on MSG/SEVIRI satellite sensor: the case of Abruzzo earthquake (April 6, 2009; Ml∼5.8)

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The Abruzzo earthquake (ML∼5.8) occurred on 6 April 2009 other than be considered one of the major natural disasters occurred in recent years over Italian peninsula, can be account as a "natural laboratory" for better understanding the preparatory phases of seismic events. In fact, several study based on different approach (seismological, geodetic, geochemical and remotely sensed) have been performed. In this work the results achieved using an original remote sensing approach, like Robust Satellite Technique (RST), will be discussed.
In the past, a Robust Satellite data analysis Technique (RST) was proposed to investigate possible relations between earthquake occurrence and space-time fluctuations of Earth's emitted TIR radiation observed from satellite. In fact RST approach was implemented on different satellite system (e.g. MSG/SEVIRI, GOES/IMAGER, NOAA/AVHRR, etc.) for study the preparatory phases of various earthquakes with a wide range of magnitudes (from 4.0 to 7.9) occurred in different continents (Europe, Asia, America and Africa) and in various geo-tectonic settings (compressive, extensional and transcurrent).
The RST analysis guarantees a statistically based definition for "TIR anomalies" and a suitable method for their identification even in very different local (e.g. related to atmosphere and/or surface) and observational (e.g. related to time/season, but also to solar and satellite zenithal angles) conditions. In order to control possible "false alarms" proliferation it has been always carried out by using a validation/confutation approach, in order to verify the presence/absence of anomalous space-time TIR transients in the presence/absence of seismic activity.
In this paper, for the first time, RST analysis is performed by coupling the advantage (low observational noise) offered by geostationary satellite measurements (MSG/SEVIRI in this case) with the one (low natural noise) expected by using LST (Land Surface Temperature) products (less affected by atmospheric water vapour variations) instead than simple TIR radiances at the sensors.
Results achieved in terms of increased S/N ratio (in validation) and reduced "false alarms" rate (in confutation) will be discussed in the case of the Abruzzo earthquake (April 6, 2009; ML∼5.8) comparing results obtained by applying RST to LST products with the ones achieved by applying an identical RST analysis (using the same MSG-SEVIRI data-set 2005-2010) to the TIR radiances at the sensor.