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Robust Satellite Techniques (RST) for seismically active areas monitoring:

the case of 21st May, 2003 Boumerdes/Thenia (Algeria) earthquake.

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In the last 20 years several studies based on TIR (Thermal InfraRed) satellite observations have reported variations of Earth's emitted TIR radiation from weeks to days before earthquake occurrence. More recently a Robust Satellite data-analysis Techniques (RST) have been proposed as a suitable tool for satellite TIR surveys in seismically active regions. It has been already successfully tested in different cases of earthquakes of magnitude higher than 5.5 (Irpinia: 23rd November 1980, Athens: 7th September 1999, Izmit: 17th Agoust 1999) as well as in the cases of 9 medium-low magnitude (4<M$_b$ <5.5) events occurred in Greece and Turkey. Compared with other methods RST offers an unambiguous (statistically founded) definition of *TIR anomaly* and improved capability to identify anomalous space-time TIR signal transients even in very variable observational (satellite view angle, land topography and coverage, etc.) and natural ($e.g.$meteorological) conditions.

In this paper RST approach is applied for the first time to the African region in order to assess its performances in very different geographical and climatic conditions (*exportability*). Eight years of Meteosat TIR observations have been analyzed in order to characterize the unperturbed TIR signal behavior at each specific observation time and location. Space-time TIR signal transients have been analyzed, both in presence (*validation*) and in absence of (*confutation*) seismic events, looking for possible space-time relationships. The Boumerdes-Thenia (Algeria, May 21th2003, M$_b$ ∼6.8) earthquake has been considered as a test case for *validation*, and relatively unperturbed periods

(no earthquakes with $M_b > 4$) were taken for *confutation* purposes.

The observations show that the area of interest is affected by significant positive thermal anomalies (S/N>2.5-3) about one month before the main shock. Such anomalies are located in the vicinity of the major locally known fault (Thenia fault) and overlap the principal tectonic lineament of the region (African-Eurasian plate boundary). Other TIR anomalies observed in Spain and in the Straits of Gibraltar could be connected to minor seismic events occurred in June in those zones. As far as the *confutation* analysis is concerned, the results well highlight that no significant TIR anomalies were detected during seismically unperturbed periods.