

The following review report concerns the manuscript entitled “*Fault-Controlled Distribution of Pre-seismic Thermal Anomalies: Insights from the Dingri Earthquakes, Tibet*” submitted for publication to NHESS.

Though I think this manuscript features a very interesting research topic and methodology that is worthy of NHESS, I am afraid that it is not ready for publication.

The authors employ STL decomposition, RST methodology and a long time series (ten years) of land surface temperature (LST), based on 8-days MODIS composite images, to highlight anomalous variations of the thermal signal which are in possible connection with a strong earthquake (Tibet’s Tingri region, 20 March 2020, Ms5.9).

I would encourage resubmission only if the authors can make the following suggested improvements, which would dramatically change the current manuscript:

The principal issue of the article lies in the lack of clarity regarding data collection, and particularly the description of the datasets employed. Firstly, the authors do not justify the use of 8-day composites instead of daily MODIS LST images, nor do they discuss the potential advantages or limitations associated with this choice. Common practice typically involves selecting daily nighttime images to mitigate certain sources of noise, such as shadows, etc.

Moreover, the authors do not report the cloud coverage percentage of the images. Were all images included in the analysis, or were those with high cloud cover excluded? As demonstrated by several studies, e.g., Aliano et al. (2008) and Genzano et al. (2009), the spatial distribution of clouds over a thermally heterogeneous scene can significantly influence the measured signal values and lead to false thermal anomalies. It is unclear how many granules were ultimately used in the analysis.

Additionally, while the authors employed RST methodologies, they did not apply the RETIRA index, which the Tramutoli group has suggested as particularly suitable for detecting thermal anomalies associated with earthquakes; instead, they utilized the ALICE index. It would be highly valuable for the authors to consult the study by Eleftheriou et al. (2016), “Long-Term RST Analysis of Anomalous TIR Sequences in Relation with Earthquakes Occurred in Greece in the Period 2004–2013”.

Furthermore, it would be important for the authors to clarify what additional insights their proposed analysis method provides in comparison to the RETIRA index. The authors mention that

the suggested methodology minimizes seasonal interference via Seasonal-Trend decomposition. This is absolutely true but the RETIRA method also includes a seasonal interference reduction step, using a historical baseline for each pixel, to remove the normal seasonal behavior and identify only the actual deviations. A comparative evaluation of both methods in the same region would be of high interest.

Additional questions also arise. The authors report that 738 earthquakes were recorded between 2000 and 1 March 2025. Given this, it is highly likely that some seismic events with magnitude greater than 4 occurred in the broader region within the time window spanning six months before to six months after the main earthquake. If this is the case, how can we be certain that all the recorded thermal anomalies are attributable to the earthquake of 20 March 2020?

Regarding the 2025 earthquake, due to its very large magnitude, it is reasonable to expect both a foreshock and an aftershock sequence, which would be useful to capture in the thermal images in order to spatially and temporally correlate with the distribution of the thermal anomalies.

Finally, the authors could also consider other studies that have previously attempted to spatially correlate thermal anomalies with faults, such as:

Kouli, M.; Peleli, S.; Saltas, V.; Makris, J.; Vallianatos, F. Robust Satellite Techniques for Mapping Thermal Anomalies Possibly Related to Seismic Activity of March 2021, Thessaly Earthquakes. *BGSG*, 2021, 58, pp. 105–130.

Filizzola, C.; Corrado, A.; Genzano, N.; Lisi, M.; Pergola, N.; Colonna, R.; Tramutoli, V. RST Analysis of Anomalous TIR Sequences in Relation with Earthquakes Occurred in Turkey in the Period 2004–2015. *Remote Sens.* 2022, 14, 381.

Peleli, S.; Kouli, M.; Vallianatos, F. Satellite-Observed Thermal Anomalies and Deformation Patterns Associated to the 2021, Central Crete Seismic Sequence. *Remote Sens.* 2022, 14, 3413.

Some minor comments concern the improvement of the overall flow of the text;

The abstract should also refer to both earthquakes,

for example, lines 30–35 should be rewritten, with the references properly placed,

it is not clear whether the area is referred to as Tingri or Dingri,

both earthquakes' characteristics should be presented in the section *Earthquake Basic Parameters and Study Area Overview*,

in lines 80–85, it would be useful to provide examples of the different types of the different changes,

in Figure 6, the title is the same for both images.