

## ***Interactive comment on “Monitoring the geodynamic behaviour of earthquake using Landsat 8-OLI time series data: case of Gorkha and Imphal” by Biswajit Nath et al.***

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Dear Respected Anonymous Referee#2 Greetings and Happy to receive your valuable in depth comments regarding our paper. According to your provided comments we will start to rectify the manuscript, based on your suggestions, we are now considering another one image (one for each case) to represent there is no anomaly exist in absence of earthquake, while the anomaly was identified by the successive scenes before and after earthquake. We are planning to show the normal behaviour of lineament, compare to abnormal behaviour. However, it will clearly highlight the lineament change over the study areas when we overlay of lineament feature.

As the manuscript need improvement of English, so we can assure you, we will improve

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the text and change the maps accordingly wherever it required, So that, it can readable and understandable by the readers.

1. reply on Methodology: Yes, we used multiple commercial software to generate this data from multi-temporal Landsat scenes (i.e., from Preprocessing to final outcome). We will rectify the text regarding the Model builder explanation as it not required based on comments.

As we had observed that, most of the lineaments extraction relevant papers from numerous authors were developed purely based on ground water exploration and geological investigation in different parts of the world and very few papers found regarding lineament interaction with earthquake and no past research work found in our two case study areas.

However, we didn't develop any theory before conducting this research, if required we will try to develop a theoretical logic behind this present work according to our data extraction from successive satellite scenes of Landsat 8 OLI imageries. We are studying the lineament to observe the earthquake, with our question in mind, that, can lineament change observation through successive images helpful for earthquake study, and if it tell the abnormal behaviour, (i.e., whether the total number is increasing, decreasing or stable prior and after earthquake.) and if the total number changes then we adopt the logic that, can length vary and direction of lineament change as the earthquake progresses and advance to strike in the particular area, and if variation found and movement can be identified through the directional diagram( i.e, rose digram we used for it), along with vertical surface profile we drawn in three different parts of the image (based on false color 5, 4, 3 band combination to get the profile change in different bands) as we plotted one in the epicentre, and two others on left and right side of epicentre, (to observe if any surface change exist in those images along the epicentre and its surrounding zones) for that, we had constructed the vertical section profiles over these image. We will clarify it in the text and accordingly interpret the profiles why we considered this signature for earthquake investigation.

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There is no established model we follow for our research, its our own think tank to represents the data and try to establish our method based on the outcome we got from the generated figures and its corresponding statistics., However, we feel, we will improve all the figures and corresponding text to catch the general readers for easy understanding.

We will briefly clarify our aim why we investigate these two earthquake which already stricken in those areas, to know geodynamic behaviour of the earthquake through this lineament change observation.

We will compare with the another image which we believe is enough to find out the difference between normal sequence when no earthquake was observed in those areas, compare to abnormal condition which we observed, however, we will prepare and demonstrate the maps according to compare with each other, thereafter it can be visualize through maps and for scientific soundness we will take care of it through out the manuscript.

Cloud and snow presence was not highly deteriorate our lineament data, though it exist in the images, its a common phenomena during the earthquake as we investigated through the image for these two cases. So we can't masking the cloud and snow, and automatic lineament extraction process using PCI Geomatica Line algorithm method have enough potentiality to extract the data, however, we will clarify it in our revised manuscript as the work need to add new image result and comparison based on your suggestions. First we visually observe and then decide to extract the data and created the consequences result from lineament (i.e, lineament length, directions) and vertical transect profile for surface change signature which also indicate the abnormal behaviour prior to the earthquake compare to post earthquake scenario and after getting our new image result, we will according revised our manuscript and clarify wherever it necessary. and we will discuss further the lineament extraction processing steps as a whole which we performed by considering multiple softwares platforms where one image output was considered by another software (Remote sensing and GIS integration)

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We will finally modify and improve our text and figures including interpretation results will be shown in sequential way for better understanding.

We will clarify through the normal and abnormal behaviour of lineaments in the presence of earthquake or in absence and also through the profile where circle will be used to mark the abnormality of the and same we will apply on lineament maps to represents the normal and abnormal sequences.

Later, at the end we checked with buffer analysis based on epicenter and non-epicentre of the image to check the lineament change in closely around the epicentre through the successive imageries and can the anomaly exit outside 100 km buffer zone to see the particular change of lineament during the earthquake phase.

However, we will clarify all the above mentioned issues which we observed through your valuable comments and need few weeks to improve further our manuscript and thereafter we will submit to you the revised version where you will surely find our clarification what improvement done on the manuscript.

Once again, on behalf of all authors, I am giving you especial thanks for your close observations on our manuscript and happy to receive your nice comments for further improvement of this time oriented research.

Thanking You

Sincerely Yours Biswajit Nath (Author)

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