Reviewer's comment #3:

The paper is about identification of seismo-electromagnetic anomaly as an earthquake precursor from the geomagnetic field time series recorded using digital fluxgate magnetometers at an observatory. Earthquakes occurring around 250 km radius of this observatory are considered for their precursory signature. Analysis of data is presented through two methods namely diurnal ratio and polarization ratio. In the diurnal ratio method authors have considered hourly mean, thereby filtering high frequency variations and considered mean from quiet day variation for defining diurnal ratio. Similarly, for polarization analysis local night time data is utilized and polarization ratio (S_Z/S_H and $S_Z/S_{G)}$ is calculated. For the calculation authors have used frequency band from 0.001 to 0.01 Hz. Amplitude variation beyond $\mu + 0.25\sigma$ for diurnal ratio and beyond $\mu + 0.5\sigma$ for polarization ratio is considered as anomalous variation.

Comment 1: The major problem is considered amplitude anomalies are correlated with individual or group of earthquakes of different magnitude, earthquakes from different epicentral distances, earthquakes from different depth. How an amplitude anomaly is giving directional indications? Further it is not clear how the variation of earthquake parameters are affecting identified anomaly. I suggest rather than associating anomalies to particular earthquake, it would be better to say that there exist seismo-magnetic anomalies in the data but relating it with particular earthquake require some kind of directional analysis of these signatures, which further require datasets from more than one observatory.

Answer 1: It is doubtless true that association of individual anomalies to earthquakes is not viable; neither the data statistics, nor the underlying physical mechanism of fracturing under stress accumulation allows such correlations. As suggested, we have discussed the anomalous signatures prior to the earthquakes with their azimuth from station and confirmed only the presence of seismo-electromagnetic signatures. Further, as we have only one observatory in the study area, we focused on qualitative analysis of anomalies with events and their azimuth, and have not attempted any quantitative analysis like relation or variability in amplitude of anomalies with the direction of earthquake events. We have modified the manuscript text accordingly.

Comment 2: Whether polarization ratio is calculated for discrete frequencies or for entire frequency range 0.001 to 0.01 Hz. If it is for discrete frequencies, then frequencies need to be mentioned and their variations must be shown for individual frequency. If it is calculated for entire ulf frequency range, then a rational must be given why it is done? I suggest to analysis polarization ratio at different discrete frequencies or small period bands. This would be helpful relating any seismomagnetic signature to depth.

Answer 2: We appreciate the approach suggested by the reviewer. Based on suggestion of reviewer, we have computed the polarization ratios (Z/H and Z/G) in frequency bands as in 0.001-0.002 Hz, 0.002-0.003 …… 0.009-0.01. The anomalies traced from whole frequency band are correspondingly traced in the different frequency bands. For each anomaly, a gradual increase in amplitudes of polarization ratios (PR) are noted in frequency band from 0.001 to 0.006, while gradual or steep decay of PR are noted in frequency band from 0.006 to 0.01. The energy in Z-component is very low due to location of observatory at lower latitude (shown in Figure 4), hence the preference of choosing full frequency range for PR analysis provides significant enhancement in amplitudes for better analysis. Since, we could not find any change in pattern of anomalies from the two approaches, we prefer to compute and analyse the PR in full frequency range. The PR computed in full frequency range and in band 0.001-0.002, 0.006-0.007, and 0.009-0.01 is shown in Figure 1, Figure 2, and Figure 3 respectively.

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Figure 1. Polarization ratio Z/H computed from all frequency and from frequency band 0.001-0.002. Similarly, Polarization ratio Z/G computed from all frequency and from frequency band 0.001-0.002 (From top).

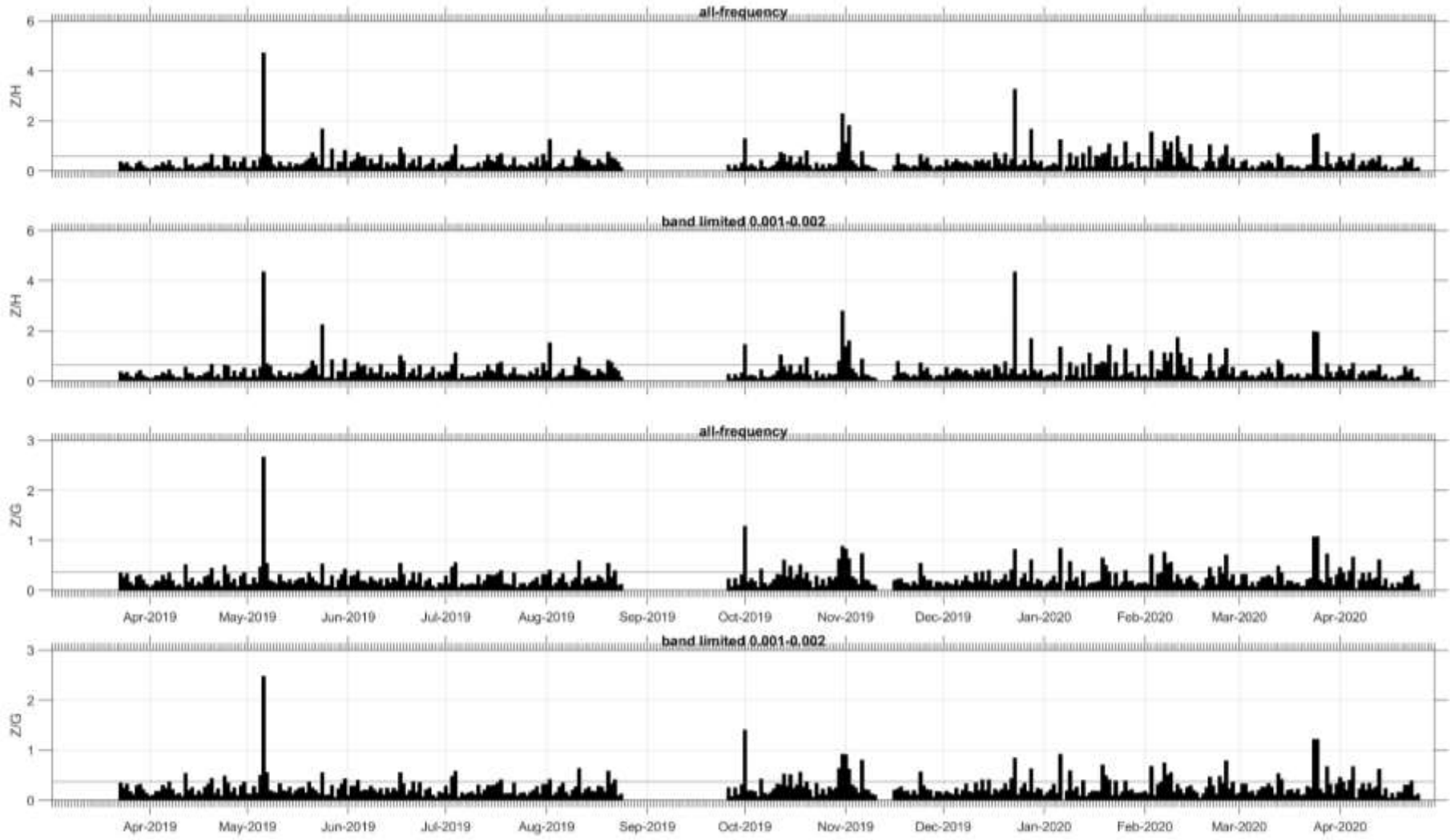

Figure 2. Polarization ratio Z/H computed from all frequency and from frequency band 0.006-0.007. Similarly, Polarization ratio Z/G computed from all frequency and from frequency band 0.006-0.007 (From top).

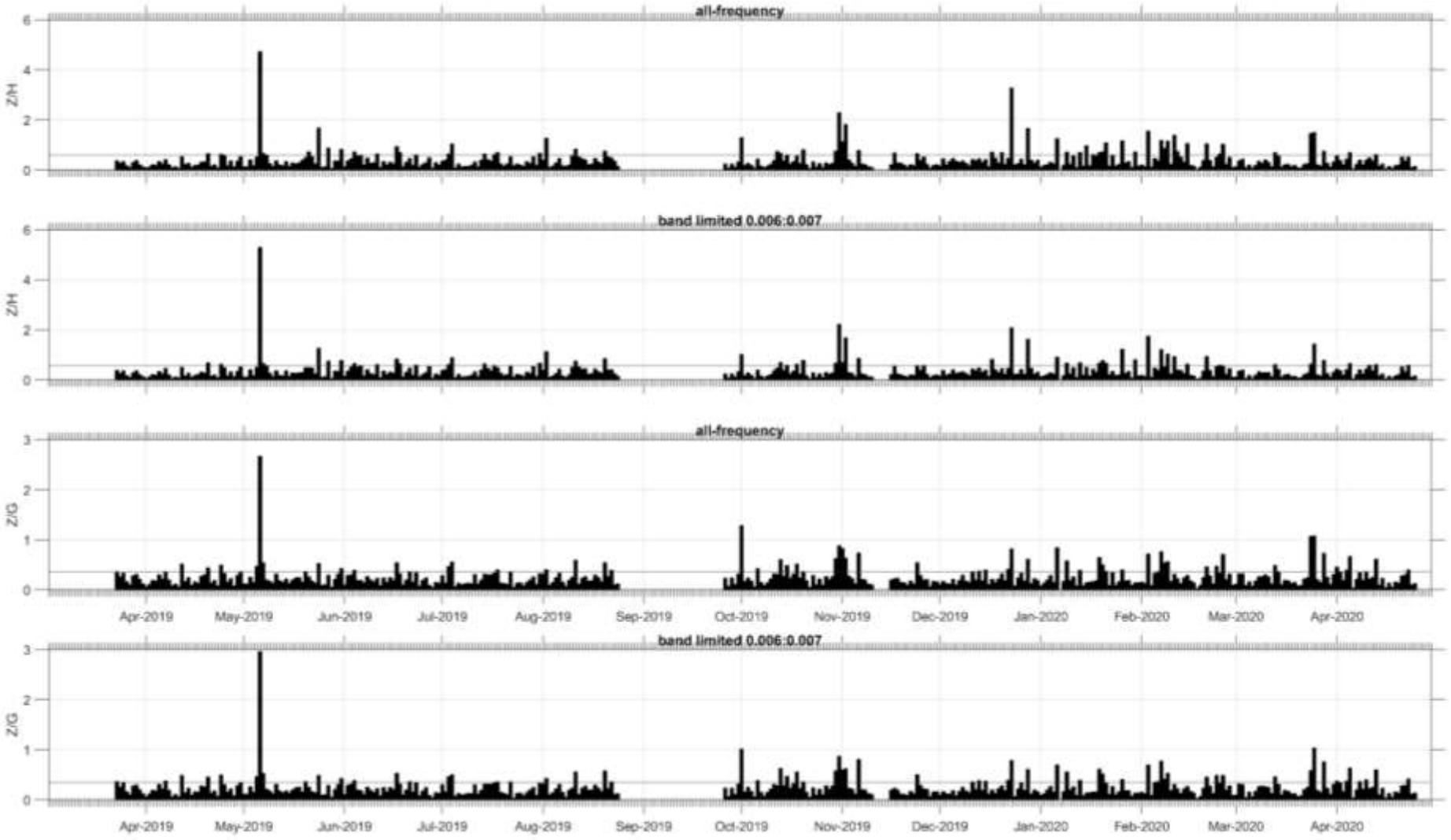

Figure 3. Polarization ratio Z/H computed from all frequency and from frequency band 0.009-0.01. Similarly, Polarization ratio Z/G computed from all frequency and from frequency band 0.006-0.007 (From top).

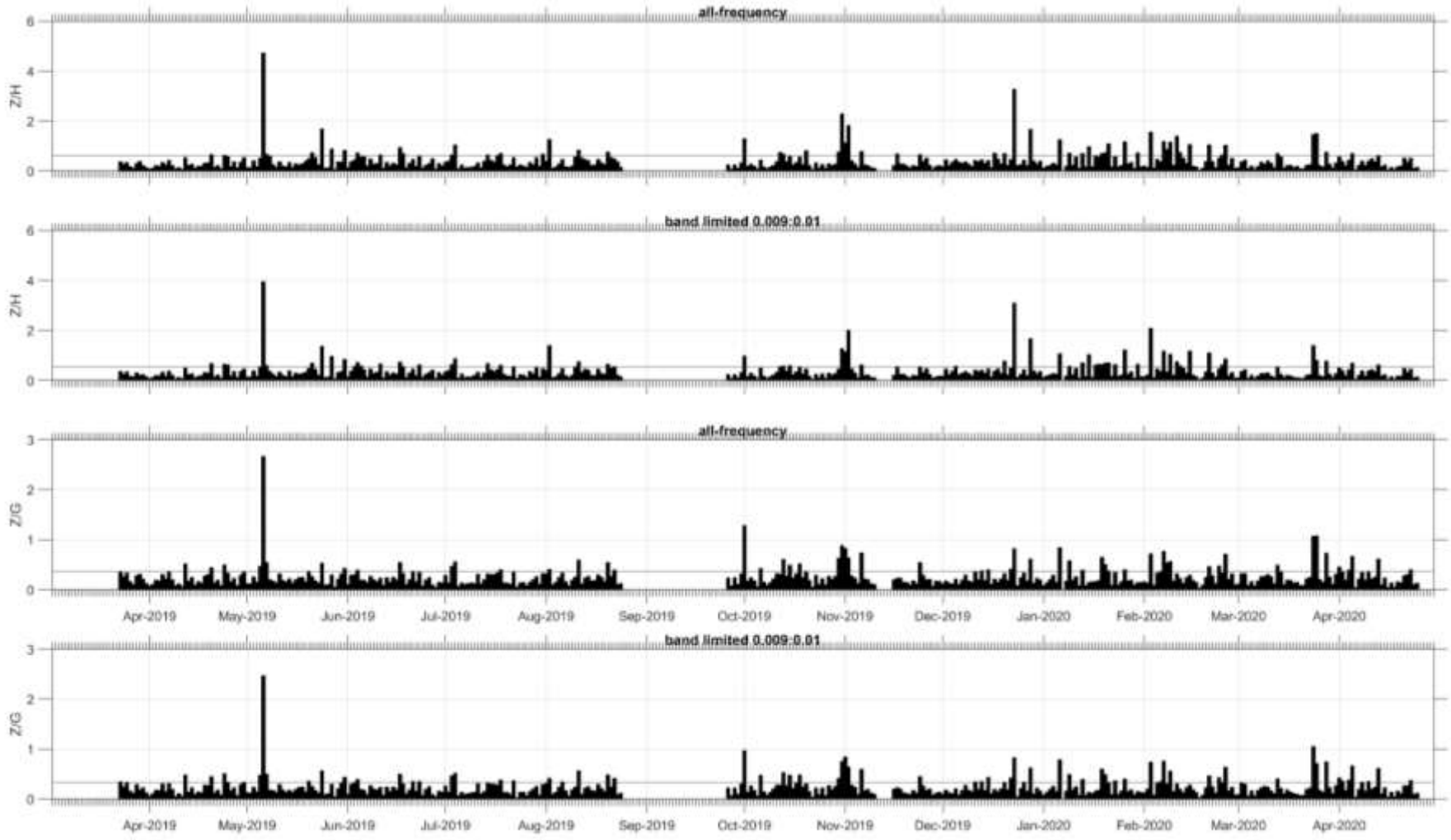

Figure 4. Amplitude (left) and energy (right) spectrum for one day data (27 Mar, 2019