Interactive comment on "Spread F occurrence features at different longitudinal regions during low and moderate solar activity" *by* Abimbola O. Afolayan et al.

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Good day Dr,

Thank you very much for your insightful comment and time taken to contribute meaningfully to the improvement of this manuscript.

We have started working on the corrections listed in your comments and we hope that we can provide a satisfactory response for your approval of the manuscript. Meanwhile, we have attempted to expatiate on some of the issues before the official comment from the editor;

1. The year 2013 was considered as an MSA based on the description of the solar flux intervals as specified by past studies including Abdu et al.,2003; wang et al., 2017. furthermore, the vertical plasma drift is the major controlling parameter in the study of ESF occurrence and the solar flux dependence of this parameter is well understood (Abdu et al.,2010; Oyekola et al., 2007). Thus, the focus is mainly the varying ESF pattern with the changing solar flux interval and we will like to cite the similar analysis of ESF occurrence (Aswathy et al., 2018 and Li et al., 2016), where the year 2013 was described as MSA.

3. Thanks for your observation. We have compared the occurrence rate during the equinoctial months of March and September with the presented results. We found out that the occurrence rate does not vary significantly at these longitudes as you have assumed except during March at the Brazilian station. Where an occurrence percentage of ∼70% was observed instead of the ∼35% recorded during April of the LSA. However, a similar equinoctial asymmetry pattern is still highlighted in this region.

6. Thanks. We will make the necessary correction to the figure caption (Figure 7b should represent the LSA).

9. No. This error was made while converting geographic lat. to geomagnetic lat. using the wdc model (http://wdc.kugi.kyoto-u.ac.jp/cgi-bin/kp-cgi). We have changed it to the quasi-dipole latitude (deg) in the attached figure. Thanks

29. We sincerely appreciate your observation with regards to our analysis of the probable influence of ITCZ on the seasonal distribution of ESF activities. We have attempted to demonstrate the complementary role of the gravity wave (GW) in the solstitial asymmetry observed at the low declination angle region using OLR measurement as a proxy for the seasonal distribution of the GW activities at each region. We assume your reservation about this approach might be connected with the results from Su et al., (2014). However, a recent study has attributed the poor correlation at some of the regions with the averaging of OLR value over a wide longitude range (Li et al.,2016). Furthermore,

we have also discussed the major factors that could have contributed to the small ESF occurrence percentage at the CPN longitude in spite of the large OLR frequency. The GW induced polarization electric field is considered sufficient to enhance the irregularity initiation process under weak background ionospheric condition. This instability growth is dependent on the local electron density value which supports the E field (Krall et al., 2013).

We hope that we have provided a satisfactory response to your comments but we are open to further suggestions in order to ensure that our little contribution to the study of ESF is accepted by the journal.

Thanks for your time and willingness to share your expert opinion with us.
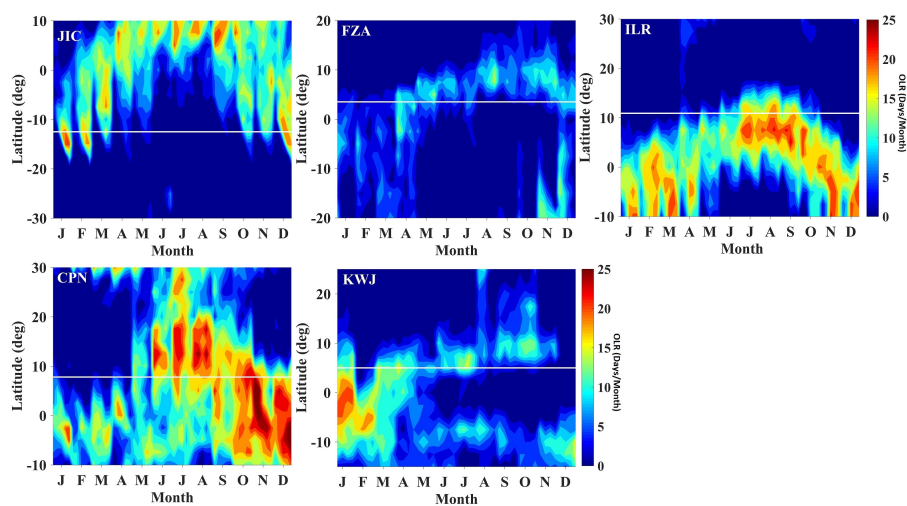
Fig. 1. OLR occurrence frequency (Figure 8)