

Interactive comment on “Contribution of Meteor Flux in the Occurrence of Sporadic-E over Arabian Peninsula” by Muhammad Mubasshir Shaikh et al.

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Reviewer: The paper presents a topic of sure interest that can stimulate the curiosity of a number of scientists because it poses questions still unsolved and because the analysis is based on measurements taken in a region scarcely reported in the open literature. This is the reason why I would be in favour of the paper publication.

Authors' Response: Authors would like to thank reviewer for spending his/her precious time to read and comment on the paper. The comments from the reviewer have certainly helped improve the quality of the paper.

Reviewer: Nevertheless, my major concern is about the Es definition: are the authors considering the foEs or the appearance of Es? I see some confusion in the manuscript

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between the two quantities and I wonder why the authors are accounting for foEs instead of focusing on the occurrence of Es.

Authors' Response: In this work, the foEs has been used as an indicator of the intensity of the presence of Es over the observed region. Authors had considered comparing individual events of Es with the presence of meteor counts but could not find a scientific way to do so since the meteor counts are done only during nighttime because of visual camera observations. At the other end, the Es is mostly present in the daytime hours and recorded through ionograms every 15 minutes. In order to compare the nighttime meteor count to the day/nighttime Es occurrences, it is understood that average daily Es intensity and daily meteor count would be appropriate measures to compare the trends of the number of meteors present and their impact on the presence of Es. This is not the first time that the comparison has been done in this way. Other authors (such as Haldoupis et al., 2007) have also used the same strategy to compare the two independent data sets for analysis. In order to make it clear for the reader, following sentence has been added at the end of 'Data and Methodology' section (highlighted in red in the revised manuscript):

“Since the data from meteor towers are only available from nighttime observations and the data from ionosonde is observed throughout the day and night, the daily Es intensity (average foEs value) has been used to compare with the daily meteor count to study the impact of the number of meteors present and their influence on the presence of Es (Haldoupis et al., 2007).”

Reviewer: Here follow some major issues that the authors might consider. In the Discussions: You write “A constant presence of Es can be observed throughout the year and all hours of the day”, but the persistence throughout the year is not visible from your plot in which you identify the hourly average foEs as function of the day time. To show such consistency you should include the count.

Authors' Response: As per reviewer's request, the plot (attached as Fig. 1) shown

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below has been included as Fig 3(a) in the revised manuscript to show consistent presence of Es occurrences (number of Es events) observed from the ionosonde; throughout the year as function of local time. Figure below clearly shows that a constant presence of Es occurrences can be observed on all hour of the day.

In order to be clear that the intensity of Es (average foEs values) shown in Fig 3(b) (Fig 3(a) in the original manuscript) is much higher around midday hours compared to early morning or evening hours, regardless of the number of Es occurrences. The sentence mentioned by the reviewer in the comment above has been rephrased as follows (highlighted in red in the revised manuscript):

“Fig 3(a) and 3(b) show that a constant presence of Es can be observed throughout the year and all hours of the day with higher intensity (average foEs) around midday hours and with lesser intensity at early morning and nighttime hours”.

Reviewer: You write “The trend of monthly averages of Es clearly shows a rise in summer months and a decline in the autumn and winter months.” From the plot I can see an increase in springtime and a decrease from early summer.

Authors' Response: The intention here was to convey that the trend of Es shows higher values in summer and lower values in winter months. Off course, the in-between transitions occur during in-between seasons of spring and autumn, respectively. However, authors agree with the reviewer that the statement is not stating the idea clearly and needs rephrasing. The rephrased sentence has been included in the revised manuscript as follows:

“The trend of monthly averages of Es layer intensity shows a maximum in late spring and early summer months and a minimum in winter months (except for a slight peak in January)”.

Reviewer: In figure 5 are you reporting the foEs or the count of Es occurrence?

Authors' Response: Fig 5 is a relationship between Es layer intensity i.e. monthly

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averages of foEs values. To clarify it, the caption of the figure has been modified with an indication that the Es intensity is actually monthly averages of foEs values (highlighted in red in the revised manuscript).

Reviewer: Minor revisions Fig.3 caption: meteor instead of metero Lines 106-110 page 4: replace o with ôÛ Line 119 page 4: Fig 4 shows

Authors' Response: Corrected.

Please also note the supplement to this comment:

<https://angeo.copernicus.org/preprints/angeo-2020-74/angeo-2020-74-AC2-supplement.pdf>

Interactive comment on Ann. Geophys. Discuss., <https://doi.org/10.5194/angeo-2020-74>, 2020.

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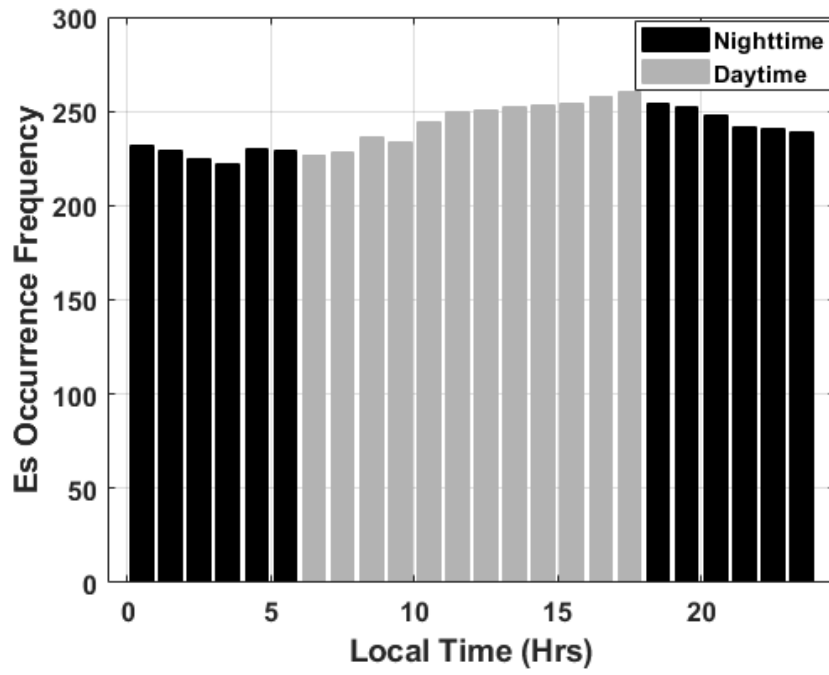


Fig. 1.