

Responses to the Comment and/or Suggestions from Referee 1

Manuscript 'A multi-instrumental and modelling analysis of the ionospheric responses to the solar eclipse of December 14, 2020, over the Brazilian region' by Resende et al. submitted to the *Annales Geophysicae*.

General Comments

This paper describes the different aspects of ionospheric response to solar solar eclipse in a very precise way. I strongly recommend this manuscript to get published in this journal. I really appreciate that authors have included the modelling study for E-region response to eclipse.

Firstly, we appreciate the time the referee spent reviewing this article, and we thank the comments given by the referee. We have revised the manuscript taking into account all the referee's comments.

Questions

1. Whether f_{min} values showing any changes?

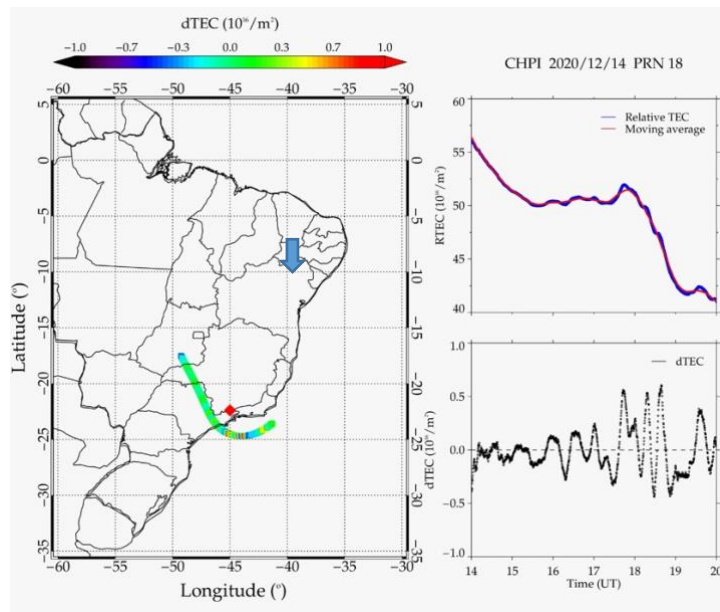
Our response:

In fact, during some hours of the solar eclipse (around 1700 UT), we observe that the F1 layer disappears completely in both analyzed regions (Campo Grande and Cachoeira Paulista). This behavior lasts around one hour, and we believe it is due to the solar eclipse event and the Es layer presence, which can block the F region together. We clarify this fact in the new version of the manuscript.

2. Is there any wave activity observed in TEC data?

Our response:

To answer the reviewer's question, we calculate the perturbation components of TEC ($dTEC$) from relative TEC ($rTEC$), subtracting the TEC trend obtained from a 1 h running average for a ground receiver and GNSS satellite as described in Figueiredo et al. (2017). The results were very interesting, showing the intense wave activity during the eclipse hours. In the figure below, we have presented the $dTEC$ over Cachoeira Paulista (CPHI), and the wave activity is apparent. In fact, we noticed an increase in the amplitude of these waves in these hours. We will add this new analysis in the article as supplementary material.



Reference: Figueiredo, C. A. O. B., C. M. Wrasse, H. Takahashi, Y. Otsuka, K. Shiokawa, and D. Barros (2017), Large-scale traveling ionospheric disturbances observed by GPS dTEC maps over North and South America on Saint Patrick's Day storm in 2015, *J. Geophys. Res. Space Physics*, 122, 4755–4763, doi:10.1002/2016JA023417.

Finally, we would like to take this opportunity to thank the reviewer for kindly evaluating our paper helping to greatly improve its quality.