

Referee Report for
***Solar Eclipse-Induced Perturbations at Mid-Latitude During the
21 August 2017 Event***

Submitted to *Annales Geophysicae* by Adekoya et al., 2018 (Manuscript #angeo-2018-35)

Adekoya et al., 2018 presents observations of ionospheric impacts of the 21 August 2017 Total Solar Eclipse using measurements from a network of ionosondes across the United States. The authors then relate these observations back to theory by fitting the observations to a Chapman-type ionosphere. This paper has the potential for being a good contribution to the literature by relating observations during a highly-publicized eclipse event to a well known ionospheric model. However, I believe that the manuscript requires substantial revision before it can be published in *Annales Geophysicae*.

Major Comments

1. Section 2 (Data source, methodology, and path of the eclipse) would benefit greatly by being expanded and broken into sections. Suggestions include:
 - a. Add a figure that shows the path of the eclipse, the percentage of maximum obscuration, and location of the ionosondes. This is especially important as you cannot guarantee that the websites you list for path information will always exist.
 - b. Add a figure using actual data from the event showing how you fit the Chapman profile, and identify the parameters derived (H , B_0 , B_1). Add text explaining how this allows you to draw conclusions relating the topside ionosphere to bottomside measurements.
2. Figures 1 & 2:
 - a. I don't understand why you ordered the ionosondes in the manner that you did. Could you please order them from west (top) to east (bottom)? This is also the order in which the eclipse progressed across the UT.
 - b. Instead of using LT as your X-axis, try using time relative to eclipse maximum, with 0 in the center. This way, it will be easy to compare the effect at all stations. To show local time, add another dashed or dotted line to each panel showing the local solar zenith angle. Put the solar zenith angle on the right-hand y-axis.
 - c. In the caption, add some text guiding the reader of what eclipse signature to look for and why.
3. Figure 3
 - a. The biggest problem here is that the Point Argello panel is dominantly green, but there are no green values in the colorbar. This absolutely must be fixed. For the colorbar, consider using a symmetric, diverging colormap. Say, red-white-blue (like below) with the range -65% to +65%.



- b. I'd recommend fixing the Y-axis to some symmetrical value (say +/- 25) for all stations for easy comparison.
 - c. As for figures 1 & 2, I'd recommend plotting the x-axis in hours relative to eclipse maximum.
 - d. Order the panels from west to east (or some other way that makes sense according to what you are trying to show).
4. There are numerous grammatical errors. Some are minor, but some are major. For example, line 284 does not make sense. It currently reads, "Hence their relationship in describe one another is established."

Minor Comments

1. Line 56: "This," → "Thus,"
2. Line 59: "result and discussion were" → "results and discussion are"
3. Line 83: Kp is unitless (not nT)
4. Line 152: "recombination too" → "recombination, too"
5. Line 200: "This imply" → "This implies"

Thank you for your submission. Good luck with the revisions!