This paper studies the ionosphere response to the solar eclipse on Dec 14, 2020 using observations from ionosonde and TEC measurements, as well as MIRE numerical simulations. The F region and E region behavior are investigated accordingly. The authors attempt to highlight some interesting phenomena such as EIA reduction and Es enhancement, which could be an incremental contribution to the widely-carried subject of solar eclipse analysis. However, there are some issues with the current interpretation of observations that needs to be carefully addressed. Thus, a moderation revision is suggested before the paper can be recommended for publication. The detailed comments are as below.

1. It is nice to see that the authors add modeling results in their study since extensive solar eclipse studies are based merely on observations. There are some prior modeling studies of the solar eclipse that the authors can refer to or compare with.


2. Line 18-21, page 13. The major concern is the interpretation of the EIA crests reduction from TEC observations in Figure 7. The inhibition of the southern crest is of expectation since it is directly covered by eclipse obscuration with reduced photo-ionization. However, the TEC around the northern crest with no eclipse coverage also exhibited a large reduction. The authors claimed that “minor TEC reduction around the magnetic equator locations was enough to cause a plasma density decrease in both EIA crests”. This description is a little bit misleading since the ionosphere has large day-to-day variability and it is arbitrary to simply ascribe the conjugate EIA reduction to the remote solar eclipse that did not cover the equatorial region. The authors are suggested to add TEC results for control days around eclipse (e.g., Dec 13 and Dec 15). This will provide important information to interpret the behavior of EIA crests.
3. The authors are suggested to be cautious in making such an arbitrary conclusion with no clear interpretation: “although this solar eclipse event almost did not reach the equatorial regions, we suppose it was enough to influence the fountain effect”. What mechanism and how enough a remote solar eclipse can influence the equatorial fountain effect? The authors are suggested to make a preliminary discussion on possible reasons for EIA reduction for both crests, if they believe it is related to the solar eclipse. In fact, there are some prior studies (e.g., Le et al., 2009; Zhang et al., 2021; Aa et al., 2021; Huba et al., 2017) that discussed the possible mechanism in causing the conjugate TEC reduction, such as thermal cooling along the flux-tube, inter-hemispheric mapping of electric field, modified plasma pressure gradient and wind effect. The authors are suggested to refer to these studies to provide discussion. Of course they can validate the hypothesis in the future with new available equipment, but a preliminary interpretation and discussion are necessary.


4. Figure 9. It is hard to visually notify the difference between a and b. The authors are suggested to add differential results to make a better illustration.

5. Figure 11. (1) How the slant dashed lines are derived? Do the authors mean that there are downward phase propagation trends to indicate the existence of gravity waves as indicated by Abdu et al.? However, the peaks and valleys of three curves at different frequencies almost occurred at the same time. (2) Whether the oscillation is related to solar eclipse since it seems to be appeared before the local eclipse.

Minor:

Line 27, page 2: electronic (electron)

Equation 3, page 12: Exchange TEC(SE) and TEC(ref) terms.

Figure 7c. The color scale can be adjusted. It is hard to identify the positive/negative values between -50~50 with yellow-greenish color.