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## **Comment on angeo-2021-71**

Anonymous Referee #2

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Referee comment on "Study of the equatorial and low-latitude total electron content response to plasma bubbles during solar cycle 24–25 over the Brazilian region using a Disturbance Ionosphere index" by Giorgio Arlan Silva Picanço et al., Ann. Geophys. Discuss., <https://doi.org/10.5194/angeo-2021-71-RC2>, 2022

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### **Reviewer's Comments on 'Study of the equatorial and low-latitude TEC response to plasma bubbles during the solar cycle 24-25 over the Brazilian region using a Disturbance Ionosphere index' by Giorgio Arlan Silva Picanço et al.**

The authors use Disturbance Ionosphere index (DIX) to evaluate the ionospheric responses to Equatorial Plasma Bubbles (EPBs) between 2013 and 2020 over the Brazilian sector. The results of the DIX were compared concurrent EPB observations from ionosonde and All-Sky Imager data. The authors show that the DIX was able to detect EPB-related disturbances both in terms of intensity and occurrence times. Finally, it was shown that the magnitude of the disturbances depends on solar activity. The major points of this study are quite interesting and useful. However, there are some comments that the authors need to consider to strengthen the points presented in this work. Please find the comments below.

Line 89: There is the need to state the basis for selecting the EPBs under this study in the section 2, or are these the only EPB events between 2013 and 2020.

Line 97: There is no  $TEC_k$  in equation (1), the authors should revise this equation.

Line 115: It may be useful to have a third column on Table 1 describing the implication of column 2.

Line 252-254: "Such effect can be explained by the presence of the Equatorial Ionization Anomaly (EIA) southern crest, which produces a large amount of plasma in this region, making the TEC percentage changes also higher" .... Did the authors confirm this inference

from the TEC observations since some other cases did not follow this inference?

Line 237-239: The reason for the selection of the specific ASI snapshots and the ionograms under Figures 4 & 5 should be mentioned.

Line 237: There is the need for the authors to state the possible reason(s) why at times the response of the DIX is simultaneously observed at both the equatorial and low latitude stations while it's not at other times, does the authors have any explanation for this?

Line 355: Change '6 January 2015' to 6 January 2018

Line 394: It is not quite clear what the authors meant by '... while the ionosphere over low latitudes behaved similarly ...' This is with respect to what?

Line 415: For the presentation in Figure 6, it will be better to include more EPB events between 2013 and 2020 if there are, for more reliable statistics. The authors can also show the errorbars of the standard deviation for each year.

Line 446: change 'those results' to 'these results'.

Line 454-455: Can the authors expound on how they arrived at this conclusion: '*Finally, this feature can be directly associated with the physical mechanisms that control the production of electron-ion pairs in the ionosphere*'.

Line 474: The authors can mention the specific event being referred to here.

Line 484: Change '*The contribution of neutral atmospheric effects intensified some DIX disturbances observed during the EPB periods*' to '*The contribution of neutral atmospheric effects may have intensified some DIX disturbances observed during the EPB periods*'.

The authors did not provide full information of some of references, consider adding the issue and volume numbers to them: line 534, line 541, line 558, line 562, line 566, line 580.