

## ***Interactive comment on “Variability of the lunar semidiurnal tidal amplitudes in the ionosphere over Brazil” by Ana Roberta Paulino et al.***

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**REVIEWER: “The variability in the amplitudes of the lunar semidiurnal tide is investigated using TEC maps over Brazil from January 2011 to December 2014. The authors find evidence of strong annual variation. Semiannual and intra-seasonal oscillations are found to be the second and third largest components, respectively. Among the short-period oscillations in the amplitude of the lunar tide, the most pronounced ones were concentrated between 7-11 days, which the authors ascribe to the normal mode westward propagating quasi 10 days planetary wave with horizontal wavenumber equal to 1. The presented results suggest a possible coupling process by modulation of the lunar semidiurnal tidal amplitudes that allows the propagation of the 7-11 days waves into the thermosphere-**

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**ionosphere system.”**

**AUTHORS:** We are grateful for the dedicated time in reading and suggesting improvements to our paper.

**REVIEWER: “While the manuscript contains some interesting results, I cannot recommend publication in the present form for the following two reasons: (1) The language should be improved. (2) Additional observational and/or modeling work is needed to demonstrate that the ~9-day oscillation is indeed consistent with a westward quasi-10-day normal mode.”**

**AUTHORS:** The reviewer is right that the results are not conclusive at all. We have revised the manuscript excluding the non-conclusive results. We have tried to investigate the horizontal propagation of the wave using data from stations separated by ~ 3,600 km, but the results were not conclusive as well. Maybe we need use receivers located in Brazil, Africa, India and Indonesia to be reach confident results. We understand that this is out of the scope of this manuscript and we will not have enough time to do this kind of analysis within the schedule of publication of ANGEО. Therefore, we kindly ask to the reviewer to check whether the modification implemented in the manuscript can address his/her concerns. We have also revised the language according to the suggestions from the reviewer.

**REVIEWER:**

**“Line 4 (and throughout): Intra-seasonal variability is usually referred to variations less than 90 days.”**

**“Line 6: in special – > in particular”**

**“Lines 19-20: need reference”**

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**“Line 22: Ozone – > ozone”**

**“Lines 26-27: these ranges are not consistent with other studies. Need reference.”**

**“Lines 48-49: define what is meant with long and short period.”**

**“Line 60: reference for the filter needed.”**

**“Line 91: 30 days or 25 days as reported in the legend of Figure 4?”**

**“Line 131: maiximuma – > maxima.”**

**“Line 161: thermosphere misspelled.”**

**“Line 171: to notice – > to note.”**

**“Line 201: preset – > present.”**

**“Line 208: though – > through.”**

AUTHORS: All those minor points have been corrected according to the suggestions.

REVIEWER: **“Lines 9-10 (see comment before): This sentence and result is highly speculative. More modeling or observational work should done to demonstrate a link to the 10- day normal mode.”**

AUTHORS: We agree with the reviewer and we have revised it.

REVIEWER: **“Section 2: More details on how the lunar tide is calculated are needed.”**

AUTHORS: We have added a subsection to explain the determination of the lunar tide as suggested.

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REVIEWER: **“Line 77-78 and Figure 3: need to discuss the 70- to 80-day variations and 120 variations.”**

AUTHORS: We have added the description of these oscillations as mentioned.

REVIEWER: **“Wavelet plots: need to include a confidence level.”**

AUTHORS: We have included it. Thank you for the suggestion!

REVIEWER: **“Lines 133-134: the oscillation at 70-80 days is almost at large. Need to comment on this.”**

AUTHORS: Thank you. We have commented it.

REVIEWER: **“Lines 144-148: this statement is highly speculative. Need additional modeling work or analysis of concurrent observations at different longitudinal locations.”**

AUTHORS: We have also revised this statement. Thank you for this contribution.

REVIEWER: **“Lines 192-194: can the observed intra-seasonal variability be related to Madden-Julian Oscillation?”**

AUTHORS: It is very difficult correlate these events without further analysis.

REVIEWER: **“Lines 197-198: need to further elaborate this point.”**

AUTHORS: We have removed the analysis about the symmetry of these oscillations

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because it was discussed considering the magnetic latitudes instead of geographic ones. We are not sure how is the behavior of the symmetry of the planetary waves using magnetic coordinates, primarily in Brazil where there is a strong magnetic declination.

REVIEWER: **“Lines 209-210: analysis insufficient to support this statement.”**

AUTHORS: Yes, we have revised it.

Please also note the supplement to this comment:

<https://angeo.copernicus.org/preprints/angeo-2020-34/angeo-2020-34-AC1-supplement.pdf>

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Interactive comment on Ann. Geophys. Discuss., <https://doi.org/10.5194/angeo-2020-34>, 2020.