

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

### **Anonymous Referee #2**

Received and published: 8 July 2020

The authors examined seasonal and intraseasonal variability of the semidiurnal lunar tide in TEC over Brazil. The main finding is that the amplitude of the semidiurnal lunar tide in TEC often shows 7-11 day variations. The authors speculate that these variations are associated with the quasi-10-day wave in the middle atmosphere.

Although the results are interesting, I am not totally convinced that the authors were able to extract 7-11 day variations of the semidiurnal lunar tide. The authors used the technique of Paulino et al. (2017) to derive the amplitude of the semidiurnal lunar tide. This technique involves a 27 day window, which enables to distinguish between the semidiurnal lunar tide (12.42h) and semidiurnal solar tide (12.00h). The technique should largely eliminate variations with periods less than 27 days, even though the amplitude is calculated for each day. Thus, it is unclear whether the presented short-

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period variations are meaningful. The authors are advised to check the spectrum of the original TEC data (instead of the spectrum of the semidiurnal lunar tide) to confirm that a spectral peak exists at the semidiurnal lunar tide (12.42h) as well as the sideband frequency corresponding to the quasi-10-day wave modulation of the semidiurnal lunar tide.

Other comments:

## 1. Equation (1)

This needs more explanations. What is "filter" on the left-hand side? How is it applied to the data?

## 2. Lomb-Scargle periodogram

Since the authors show wavelet spectra in Figures 3 and 5-8, Lomb-Scargle periodograms in Figures 2 and 4 do not seem necessary. I suggest to remove them.

## 3. Figure 9

The antisymmetric mode such as the quasi-10-day wave has the phase structure that is antisymmetric about the equator, but not the amplitude structure. That is, when there is a strong quasi-10-day wave, we should expect the amplitude of the wave to be large in both northern and southern hemispheres but with the opposite phase. What is shown in Figure 9 is the anti-correlation of the amplitude between the northern and southern hemispheres, which does not necessarily support the involvement of the quasi-10-day wave.

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

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