

# ***Interactive comment on “Postmidnight equatorial plasma irregularities on June solstice during low solar activity – a case study” by Claudia M. N. Candido et al.***

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Received and published: 7 March 2019

Comment #1: Answer: Thank you. We agree that the reference by Y. Otsuka (2018) is relevant to the topic. We have included it in the revised paper.

Comment #2 Answer: We understand that the reported spread-F, as seen in the ionograms is unusual with relation to the well-known sunset spread-F, since they appear at the higher frequency edge and progressively evolves to a mixed (range and frequency) spread-F. Earlier reports showed that PMIs occur during very quiet geomagnetic conditions in June solstice and during low solar flux conditions as it is discussed in the present case. They are commonly reported as as FAIs in the observations taken from

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coherent and incoherent radar (Otsuka et al., 2009; Yokohama et al, 2011; Nishioka et al., 2012; Dao et al., 2017; Zhan et al. 2018), as well as are observed as depletions in the plasma density taken from satellite measurements (Dao et al., 2013; Yizengaw et al., 2013) or mild frequency spread-F seen in ionograms taken from off-equator stations. From our knowledge our PMIs observations were made using ionosondes and airglow simultaneously for the first in Brazil in the context of spread-F morphology and evolution.

Comment #3 Answer. Sure. This hypothesis is plausible and it was considered. However, there are no depletions in the OI 630.0 nm images neither spread-F in ionograms earlier in the night.

Comment #4 Answer. The anomalous patterns are related with its first appearance of spread-F echoes at the higher frequency edge of F-layer trace. Generally, the first spread-F echoes can appear as satellite trace at post sunset times or in the lower frequency edge. This anomalous pattern could be addressed as spur traces in the ionograms. Westward drifts are not rare, as mentioned by Otsuka et al., 2008. In Brazil westward depletions were observed during low solar activity and associated with previous depletions drifting eastward by Paulino et al., 2011. It is not the case studied in this work.

Comment #5: Answer. Please, see the answer 4.

Comment #6: Answer. It is currently accepted that a combination of factors can be responsible by the generation of PMIs or of these transient irregularities, especially owing the quiescent ionosphere. I personally agree that simulations could be useful to better investigate PMIs. However, we are performing analysis of other recent cases using the same instrumental approach and the simulation will be considered.

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Interactive comment on Ann. Geophys. Discuss., <https://doi.org/10.5194/angeo-2018-115>, 2018.

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