

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

### **Anonymous Referee #2**

Received and published: 24 April 2019

#### General comments:

Presented in this manuscript is an analysis of an event in which postmidnight equatorial plasma irregularities occurred over Brazil during the June solstice of 2011. The peculiar feature of this event is the fact that the irregularities drift from east-to-west, as opposed to west-to-east. Such a phenomenon is typical of a geomagnetic storm, in which the disturbance dynamo results in a westward thermospheric wind at the equator that has any equatorial plasma bubbles (and the plasma irregularities therein) imbedded among the neutrals. A good level of observations supports the overall conclusions in this work, including ionosondes, Fabry-Perot Interferometers and all-sky cameras.

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The potential role of atmospheric gravity waves and background neutral winds are discussed as potential candidates for the presence of plasma irregularities during this particular evening. It is concluded that departures from the typical thermospheric wind system could be to blame for the increase in R-T growth conditions. The manuscript is mostly very well written and is easy to follow, and the examination and discussion of observations presented in the results section is relevant to the field and is acceptable for publication in Ann. Geophys. in the view of this referee, following the consideration of a few minor comments and suggestions, as detailed below.

#### Specific comments:

1. Line 37 – F10.7 values need units
2. Lines 59-60 – Please be more specific than “distinct longitudinal sectors”; where do these PMIs occur?
3. Line 123 – again, please specify which longitudinal sectors
4. Lines 221-222 – “appeared during these oscillations” This feature isn’t obvious in Fig 2. Can you please elaborate?
5. Lines 238-239 – FZ and SL are indicated in all panels, are they not?
6. Lines 239-240 – These two depletions are particularly difficult to see, particularly for readers unfamiliar/inexperienced in examining all-sky-camera data. Is there a way to make these features more obvious?
7. Figure 4 – Axes on these plots require labelling (i.e., N-E-S-W)
8. Lines 260-261 – there is a rather sparse distribution between 2 and 5 LT as well, is there not? Related to this figure, are the two color panels on the left and right indicate the directions on the left and right of the plot, respectively? This isn’t entirely clear.
9. Lines 265-266 – are the echoes in the NNE direction also at 23:30 LT and 415 km? The presence of these echoes is not clear to this reader.

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10. Line 280 – the maximum upward velocity appears closer to 30 m/s to this reader.
11. Line 285 – the circles are not clearly visible, have they been removed?
12. Lines 299-301 – more discussion/description is needed for the wave structures in Figure 7. These features are highlighted and discussed later in the discussion section, but they should first be highlighted here.
13. Lines 320-322 – The authors should specify here what makes this event “distinct”; i.e., they should mention their non-customary westward propagation.
14. Figure 8 caption – “The shaded region is the monthly average” is rather misleading. I assume that the shaded region indicates the mean +/- one standard deviation. If this is the case, both the caption and the manuscript text (i.e., lines 306-307) should be clarified.

Technical corrections:

1. Line 52 – “small-scale” and “large-scale”
2. Line 157 – “small-speed”
3. Line 186 – “that” instead of “which”
4. Line 190 – “late-time”
5. Line 199 – “night and low”
6. Line 201 – “low-latitude”
7. Lines 279-280 – “|V| represents the zonal drift Doppler velocities are less than 50 m/s” does not read well. Please reword
8. Lines 310-311 – Sentence beginning with “Additionally” also does not read well. Please reword.
9. Line 321 – “low-latitude”

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10. Line 330 – “post-sunset”
11. Lines 386-387 – “However, it is observed a secondary occurrence peak...” does not read well. Please reword.
12. Line 390 – “discussed”, not “discussing”
13. Lines 437-438 – “This condition leads to a negative RT-instability growth rate.”
14. Lines 445-446 – It isn’t clear to this reader what the authors mean by “may hands out”. Please rephrase.
15. Line 462 – “Low-latitude”
16. Several references listed in the references section do not appear within the manuscript (e.g., Abdu et al., 1981b; Abdu et al., 1982; Bastia et al., 2004; and Carter et al., 2013, there could be others). The authors are encouraged to make sure that each paper listed has been cited at an appropriate location within the manuscript text. Also, Dao et al., 2016 appears in the text as “Dao et al., 2017”.

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

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