

# ***Interactive comment on “A case study of the day-to-day occurrence of plasma irregularities in low-latitude ionosphere from multi-satellite observations” by Weihua Luo et al.***

**Anonymous Referee #2**

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The paper studied the occurrence of ionospheric plasma irregularities (bubbles and blobs) on days 17 and 18 of August 2003 over the longitude of 170° using data of the ROCSAT-1, DMSP, Grace and CHAMP satellites. They successfully detected these irregularities as signatures on the ion density measured by these satellites and they also used the ratio [O/N<sub>2</sub>] from GUVI to support the presence of vertical neutral wind. Even though the authors presented many discussions about the physical mechanisms responsible for the irregularities they need to consider the following points/suggestions: - the authors presented many well-known (for decades) physical mechanisms and conclusions; - the paper doesn't present any new insight and data do not support the suggestions for these mechanisms; - the authors observed (line 157) westward bubble

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movements for the quiet (17 th) and for the disturbed day (18 th). Normally the bubbles drift to east during magnetically quiet days and this movements reverts to west during disturbed days. How the authors explain this? - the authors observed plasma irregularities on both quiet (17 th) and disturbed day (18 th). For the quiet day they suggest that waves (LSWS, PW, GW) propagating upward (from down) contributed to trigger the irregularities while during the disturbed day they attributed the PPEF as the main cause for the irregularities generation. They pointed out that there were no irregularities on the other days of August 2003 (non-irregularity season at that longitudinal sector). Why these upward waves were so active on day 17 and not at the other days of August? No support for these upward waves is presented. - at Figure 4, using DMSP data at 840 km large ion density is observed on day 18 at geomagnetic equator while large ion densities are observed at the EIA crests (see Figure 5 , CHAMP and Grace data) with no ionization at magnetic equator. Even though the altitudes of DMSP and CHAMP/GRACE satellites are different it is expected that high density peaks at the EIA crests comes from magnetic equator. How authors explain this? Here also another comment: there are differences between geomagnetic equator (Figure 4) and magnetic equator (Figure 5). The authors should standardize this or was it a typo error? -at Figure 6 why CTR is higher at day 18 compared to day 17 in the CHAMP data while CTR is higher at day 17 compared to day 18 in GRACE data if the satellite had just 90 km difference in altitude? - the authors pointed out that "the plasma bubble is preferable to occur when the EIA is symmetric" (and here some papers are referred) however on day 17 and especially on day 18 larger asymmetries (lines 230 to 232) were observed (see Figure 6) on these EIA crests when compared to days 16 and 19. As large occurrence of bubbles was observed on days 17 and 18 how the authors explain this fact? - at Figure 7 please clarify the white background. Is this lack of data coverage? - at Figure 9 is advisable to use SYM H (if available) to have more time resolution what can help to associate it's variation with the other parameters. - English should be improved at some papers (below some parts are pointed out).

Minor but not less important suggestions/comments/questions are:



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Line Suggestions/comments/questions 25-27 Well known for many decades (as pointed out above) 55 The word enigma is too strong since many works were already done on this subject 71-72 Clarify 78-79 Discuss here the effect of the magnetic declination 86-88 Confused. Rewrite 112-113 Check if it is 0600 LT and 0900 LT since there are no irregularities during daytime (normally) 220 It is ... 230 71 instead of 710 236 Instead of around please specify the latitudinal range 241 Specify here that this irregularity preferable season is for the 170° 249 nq should be lower case 252 Explain  $\beta$  276 were observed .. 278 What is the mean for "Supplement"? 284 Check signal for this equation 301 Explain from upper 318 Improve: driving the crests move to the equator 321-325 Improve 330 Same of line 301 354 while the .. 370 result that should ... 378 EIA is enhanced 382 EIAs during days 17 and 18 were ... 391 upper, and the ...

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