

## ***Interactive comment on “Characteristics of ionospheric irregularities near the northern equatorial anomaly crest” by Jinghua Li et al.***

**Anonymous Referee #2**

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The aim of the paper is to present characteristics of ionospheric irregularities at Taoyuan (Taiwan), a site under the northern crest of Equatorial Anomaly Ionization (EIA) using the ROTI from GPS observations during 2003, 2008, and 2014. They proposed the monthly occurrence rate (MOR) and the local occurrence rate (LOR) parameters to clarify the characteristics of the irregularities at three latitude belts. Even though the authors made an exhaustive work this paper should not be accepted in the present form due to the following main reasons: -first of all the authors couldn't explain clearly how the parameters MOR and LOR are able to point out the irregularity characteristics and to differentiate irregularities from equatorial origin from those with non-equatorial origin; - the authors didn't provide the position of the EIA crest in relation to the 3 latitude sectors for the 3 years. This EIA position depends of solar flux level;

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- the time of occurrence of the non-equatorial irregularities is not provided; - the physical mechanisms, mainly for the non-equatorial irregularities are vaguely presented; - are the proposed parameters MOR and LOR created by the authors? This could be an original contribution from the paper, however at line 240 they mention that Kumar (2017) "also reported maximum MOR in June...". The authors should clarify this point. - at line 261-262 the authors stated: "Due to the day to day variability, the plasma bubble occurrence rate should decrease with latitude". Why? - MOR and LOR behaviors are presented repetitively at the "Results and discussion" section and at the "Discussion" section and this should be avoided to have a more objective paper; - the authors should discuss, at lines 295 to 300 as a suggestion, that even for high solar activity there are no irregularity events if the season is not favorable; - The English should be improved along the paper. Secondary but important improvements are suggested below: Line Corrections/suggestions 02 Inform dip latitude for Taoyuan 06 ..around the Equatorial Ionization Anomaly (EIA) 06-15 The text should be improved since MOR and LOR are not defined yet 15 near the EIA crest... 26 ..Differential Global Positioning System (DGPS) 28 Zheng et al., 2008 or 2009? 35 bubbles can easily reach even much more than 1000 km. Pls check this statement 44 equatorial ionization anomaly or use just EIA. 74 If the authors intend to describe GPS system, actually there are other frequencies 95 Aarons 104-106 Pls rewrite explaining better how the authors determine the threshold for the irregularity 105 average and 10 times... 107-109 Clarify the sentence Another irregularity...preceding event 117 Explain how: Higher local occurrence rate means the irregularity tends to exist with larger spatial and temporal scales. 120 Authors should use traverse irregularity (also along the paper) 127-128 Improve this phrase since it is not necessary to repeat 18:00-24:00 LT 131 The information that there are 38 traverse irregularities mostly from Feb. and Mar. cannot be seen from Figure 2. The authors should mention from which Figure they based to make this statement 132 Any reason to have less post-midnight irregularities during low solar activity? 137 Are the latitudinal bins in geographic coordinates? Please clarify 141 ...2003. In this year the value of... 157-159 Revise this statement since it is well

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known that frequency and spatial and temporal Scales are solar flux dependent. Also MOR and LOR should clarify this statement and not to give origin to doubts: "suggests whether". Figure 4 shows low ROTI values for low solar flux 162 Variation of Maximum ROTI 164 Was a careful TEC data quality control done? If not false maximum ROTI could be generated. 172 ..in March and it decreases with... 175 Any reason for maximum ROTI decreasing with latitude in Feb/Mar in 2014 when it Increases during 2003? 184 ROTI maximum variation with solar flux 186-187 Here the radio flux at 10.7 cm (F10.7) was used as an ... 203 Where are Nishioka et al (2008) data from? 219-221 Rewrite sentence since it is confusing 224 the EIA crest.. 228 Fig. 3 instead Fig. 2 231 and EIA crest 245 medium and minimum years. 249 Fig. 3 instead Fig. 2 250 in June when the largest... 253 February and November or February and October? 312 26-29 or 23-26.

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