Anonymous reviewer #2

The present work describes characteristics of occurrence of equatorial plasma bubbles as a function of longitude, local time, altitude and solar cycle, using COSMIC radio occultation data. The year to year variations of the longitudinal distribution of S4 index (Figure 3), Longitudinal difference of the seasonal variation of occurrence of S4 (Figure 6), and solar cycle dependency of maximum altitude of S4 (Figure 7) are new results and important contribution for scientific community.

Therefore, I would recommend that the present work could be published in Angeo.

Minor comments are to be considered by authors:

➔ We would like to thank the reviewer for his valuable comments and his perspective inputs for the significant improvement of the paper and immensely grateful for the encouragement on the manuscript. We have addressed all the minor comments that are put forth by the reviewer.

Page 3 line 27, "L2 signal is close to the critical frequency of the ionosphere„,": The authors will need to explain why they mention it. The frequency of L1 and L2 are 1.575 GHz and 1.227 GHz, respectively, are very close to each other, and these are far from the critical frequency of the ionosphere as far as I understand. If they have a special reason to not using L2, please explain it more detail.

➔ The L1 and L2 are close to each other. But L2 signal is relatively closer to the critical frequency of the ionosphere and is therefore more affected. Unfortunately, the L2 signal is much weaker and nosier to compared to L1 signal and therefore it is not always possible to distinguish between information and noise. Hence L1 signal is used for the occurrence climatology of bubbles.

Page 4, line 4, "S4max9sec denotes „„ 9 seconds interval": Please explain why they used 9 seconds to calculate S4, instead of the original S4 value of one second.

➔ We use raw 1Hz measurements from FormoSat-3/COSMIC, in which we get observations per one second. In order to compute S4 index, a running average is required and 9 second approximation proved to be favourable as seen from previous studies (Carter et al. (2013), Tsai et al. (2017)). The S4 value of one second which is mentioned by the reviewer is not obtained by raw 1Hz measurement, but they are retrieved from 50 Hz measurements recorded at 1 Hz (Syndergaard, 2006). Since we receive reduced number of 50 Hz data in the F-region (i.e. by factor of 5) when compared to raw 1 Hz measurement, we exploit and compute S4 index from the raw 1 Hz measurements.

Page 4, line 5-6, "A low pass filter is applied to the time series of these values„,": What time series? of 9 seconds interval?

➔ Thank you for your perspective comments. The time series refers to the average of 9 seconds interval according to the calculation of S4 index published by Syndergaard, 2006.

Page 6 line 9, "S4 index is derived „„ understanding the occurrence of plasma bubbles": The authors interpreted the observed S4 larger than 0.3 are all caused by plasma bubbles. The presence of scintillation (or spread F), however, does not mean that it is due to Plasma Bubbles. There are possibilities of other sources such as ionospheric waves (TID, MSTID). The authors could comment on it.

➔ We completely agree with the statement made by the reviewer regarding scintillation. Spread F is a more general term for plasma bubble and other ionospheric waves. However, through literature it has been known that the ionospheric waves originate at mid latitudes and therefore also called as "midlatitude spread F" (Kelley, M. C., and Miller, C. A. (1997)). Since we use SNR based RO data, which are sensitive to strong vertical changes in the electron density, we assume that it is unlikely to see a TID signature in SNR; since TIDs have long vertical wavelength of more than 100 km, we do not expect that they are able to compress ions into compact layers. In addition, some of the previous studies based on Europe and South America (Brazil) conducted by Otsuka et al. (2013) and Figueiredo et al. (2018) respectively show that, the MSTIDs mostly occur in winter and during day time. However, very low occurrence percentage of nighttime MSTIDs reported by Figueiredo et al. (2018) near equator could be neglected, while keeping in mind the relative local time occurrence of EPBs.

Page 9, line 3 "In order to have in detail „„ analysis was performed" which is shown in Figure 6?

➔ Thank you for pointing out this. The statement made corresponds to the Figure 6. We agree that there is not much detail explanation done contributing to the figure and therefore we plan to explain it in more detail. However as of now, the sentence" In order…" will be removed in the revised manuscript and replaced with a modified phrase.

Page 11, line 5 "in the African sector during June solstice": Isn't it March Equinox? (see Figure 6).

➔ Thank you for bringing this to our notice. It is actually the March Equinox, where in the scintillation activity is dominant when compared to rest of the seasons.

Finally, we would like to appreciate the reviewer for his time in reviewing this paper extensively and have considered all his comments in order to further improve the quality of the paper.

Reference:

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