Comment on angeo-2022-20

Anonymous Referee #2

Referee comment on "Width of plasmaspheric plumes related to the level of geomagnetic storm intensity" by Zhanrong Yang et al., Ann. Geophys. Discuss., https://doi.org/10.5194/angeo-2022-20-RC2, 2022

Review comments to Yang et al. [2022].

This paper use upper hybrid frequency inferred electron density obtained from Van Allen Probes measurements together with test particle simulations to statistically study the storm dependence of plume width. The paper is clear and well written. The results are important for better understanding the evalution of cold plasma, especially the plume region, during storms, which is critical for wave and particle dynamics in/near the core region of the outer radiation belt. The reviewer suggest to publish the paper after addressing the following minor comment.

1. It is not clear how storms are selected in this paper. Some storms even have a minimum Dst of close to 0 nT (Figure 3), which seem to be very small ones and are normally not considered as storms. Please explain more on how storm events are selected.

2. In addition to the average plume width dependence on storm intensities, there is also a clear dependence of the upper limit of plume width on storm intensities. This seems to be an interesting feature as well. The plume width at each orbit may depend on MLT, L, and storm phase. However, it tend to show a stable trend that how wide it can be during a storm during multiple measurement.

3. Just to mention that Van Allen Probe is mostly short as RBSP instead of VAP, although it is optional to the authors.

4. Line 69, date 09 October 2016 is not consistent with Figure 1 caption.

5. Line 112, it is not nessecery to keep so many digits after the point. 2 or 3 digits should be good enough.

6. Lines 140 and 141, typo 'tthe' and 'ro'