

Review report for Lukianova (2019)

The author has done substantial improvements of the manuscript through the revision, in particular their conclusion 2. However, the content related to the Conclusion 1 still needs to be improved. Therefore, a minor revision is suggested.

Detailed comments:

Section 4.1

First paragraph: Perhaps only need to introduce the distribution of tracks and not explain their relationships with the currents and electrojet.

Line 15: What do you mean by empty? Is it due to the range of your y axis (Not supported by your Figure 3b). Perhaps you could remove the expression “while ...”

Line 17: Please add the length of the sliding window in km after “51-point”

Figure 4: Perhaps you can use your error bar to represent the standard error (standard deviation divided by the square root of the number) instead of the standard deviation, so that your averages are more meaningful.

The expression “the night-time FAC densities primarily follow the substorm development”: Perhaps the evolvments of the nightside FAC are combinations of the modulations related the geomagnetic storm and substorm. The relative importance cannot be simply established only from the similarity of the evolvments of the FAC and AL index. In fact, one can argue that the similarity between the evolvments of FAC and SYM-H are not that bad. Perhaps you need to mention the contributions from both geomagnetic storm and substorm.

Section 4.2

Perhaps it is better not to include the content relevant to the “dawn-dusk asymmetry” in the manuscript. First, as mentioned in the last comment, the Swarm data are MLT-biased, and credit of the related content will be significantly degraded. Second, your methodology is questionable. From Table 2, it seems that you just simply added the all upward/downward FAC in a given sector. In fact, you need to take into account the area. Since the area of a latitudinal ring decreases as the latitude increase, so that the measurements at low latitude have larger weights than those obtained at higher latitude.

Section 4.4:

What are your definitions of mesoscale and small scale?

Conclusion:

Second paragraph, last sentence: Please add the standard deviations or standard errors after the number 3 and 0.2.