R006-15
Zoom meeting B ：11/1 PM1 (13:45-15:30)
14:30-14:45

Importance of the northward IMF for the quasi-static mesoscale FACs embedded in the diminished large-scale Region 1 current

#Yoshihiro Yokoyama[1)], Satoshi taguchi[1)], Toshihiko Iyemori[2)]
[1)]Grad school of Science, Kyoto Univ.,[2)]Kyoto Univ.

Irregular mesoscale magnetic perturbations embedded in the diminished large-scale Region 1 current are observed almost all MLT except for the near-noon region during prolonged northward IMF conditions. The results of our recent event study have shown these irregular magnetic perturbations in the dusk sector are not simple remnants of the large-scale Region 1 current but a result of spatial structures of quasi-static field-aligned currents (FACs), which are persistently generated in the low-latitude boundary layer (LLBL) during northward IMF. To clarify the key parameters for the generation of these mesoscale field-aligned currents, we analyzed magnetic field data obtained by SWARM satellites during more than 3 years (from May 2014 to May 2017), and investigated the dependence of the occurrence on the solar zenith angle, IMF, and solar wind plasma parameters. Our statistical results have shown the FAC event can occur in a wide range of the solar zenith angles, indicating that whether the ionosphere is sunlit or dark is not crucial for the appearance of the event. The ionospheric conductivity appears to be less important for the generation of the event. The occurrence ratio clearly increases as IMF Bz increases. For positive IMF Bz, the event can be detected in the dusk sector at a ratio of more than 30%. Considering the possible longitudinal size, we can infer from this ratio that the events are almost always present in the dusk auroral oval when IMF has a northward component. This suggests that the duskside mesoscale FACs are generated in the LLBL through a mechanism related to physical processes that can be more easily attained as the northward component of IMF increases. We will show the result from the data in the dawn sector, and discuss the difference between the features in the dawn and dusk sectors in terms of the dawn-dusk asymmetry of the solar wind entry in the LLBL.