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Comment on angeo-2021-32

Anonymous Referee #1

Referee comment on "Dynamics of variable dusk–dawn flow associated with magnetotail current sheet flapping" by James H. Lane et al., Ann. Geophys. Discuss., <https://doi.org/10.5194/angeo-2021-32-RC1>, 2021

In this work, the authors try to argue that the local process override the IMF in affecting dawn-dusk flow in current sheet. The analysis and conclusion are based on a single case from Cluster observations. Although the authors do so many analyses to support their conclusion, the referee can not accept the present paper for publication. The reasons are follows:

First, the case locates at the dusk side of magnetotail where magnetic fields have strong positive/negative Y component. So that is not good place to estimate the little IMF By effect on the process at the magnetotail.

Second, the IMF penetration and the polar convection are the process in global scale, while the dusk- dawn flow associated with current sheet in this case is at much less scale. So the analysis of IMF and polar convection can not support inconsistency between the expected By in current sheet and the observed By during the crossing of current sheet.

In summary, the analysis and discussion of IMF penetration and polar convection are not reasonable to support the conclusion. However, the dusk dawn flow associated with current flapping and the abnormal By during the crossings are still interesting. These observations maybe deserve a publication after a deep investigation.