

Physics of a new transient generator in the vicinity of the dayside magnetopause: Energetics of traveling convection vortices

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Because of their solitary characteristics, traveling convection vortices (TCVs) are known as unique geomagnetic disturbances offering an opportunity to study the interaction processes among solar wind, bow shock, magnetosphere, and ionosphere. Recent studies revealed that the bow shock plays an important role for the generation of TCVs, via the production of hot flow anomalies or foreshock cavities. For typical TCVs, the total current intensity is estimated as 0.1-1 MA, and the total power supply into the ionosphere is estimated as 1-10 GW. The power supply of TCVs is comparable with that of sudden commencements or that of quasi-steady current system during quiet geomagnetic condition. Extending the energetics of TCVs, we report the idea of a new transient generator in the vicinity of the dayside magnetopause.