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Using the motion of Pulsating Aurora Patches to investigate the change in magnetospheric convection

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Magnetospheric convection, the main process of the acceleration and injection of energetic particles into the magnetosphere, plays an important role in the study of Earth's magnetosphere. One of our previous studies has compared the motion of Patchy Pulsating Aurora (PPA) patches with the corresponding ionospheric convection inferred from the SuperDARN radar measurements. The result shows that the motion of the PPA patches follows the convection and suggests that the motion of PPA patches could be a great new tool to remote sense the magnetospheric convection with high temporal and spatial resolution. We later have compared the patch velocities with the corresponding magnetospheric convection velocities inferred from the electric field measurements from RBSP. Although the result shows a great consistency between these two velocities, with small values of electric field measurements there might be a great uncertainty introduced into the derivation of convection velocities. In this study, we look into the PPA events with changing velocities and compare their variations with the changes of the corresponding electric field measurements from RBSP. The result not only can show us whether the motion of PPA patches follows the magnetospheric convection but also suggest the variation in convection is due to the change in large-scale or small-scale electric field.

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