

Abstract Submitted  
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**Small-scale variabilities in the electric field and particle precipitation and their impacts on Joule heating**<sup>1</sup> QINGYU ZHU, YUE DENG, University of Texas at Arlington , ASTRID MAUTE, AUTHUR RICHMOND, National Center of Atmospheric Research — In this study, the electric field and the particle precipitation at different spatial scale sizes have been investigated by utilizing the Dynamic Explorer 2 (DE-2) satellite dataset, focusing on conditions of moderately strong southward interplanetary magnetic field. DE-2 data have been binned over geomagnetic latitude and local time. It is found that, as compared with the large-scale average electric field and particle precipitation, the variabilities (i.e., departures from the large-scale average) of electric field and particle precipitation are not negligible. Moreover, the electric field variability tends to be anti-correlated with the particle precipitation variability in the auroral regions on small scale. The impacts associated with the small-scale electric field and particle precipitation variabilities on Joule heating have also been addressed in this study by using the Global Ionosphere and Thermosphere Model (GITM). It is found that although Joule heating can be significantly enhanced by the small-scale electric field variabilities, the corresponding change in the particle precipitation tends to depress such enhancement, which is not negligible on the dusk side.

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