

カスプの質量密度異常の時定数

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Time constant of the cusp mass density anomaly

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Statistical properties of the cusp mass density anomaly have become clear, and several processes on this mass density anomaly have been proposed. However, what is the dominant process is still controversial. Further observational evidence is needed for the determination of the dominant process. In this study we clarify time constant of the cusp mass density anomaly by using data from the CHMAP and DMSP satellites. First, we searched for intervals (more than 8 hours) during which CHAMP traversed the cusp in successive orbits. We also required that IMF Bz was mostly negative. We then examined precipitating particle data from DMSP, which traversed the cusp similarly, to determine the cusp latitude exactly. The cusp latitude changes significantly in our events because of large IMF Bz variations. We found that the location of the CHAMP cusp anomaly, which is identified in its consecutive orbits, follows the particle cusp like a shadow. Analyses of these variations reveal that the time constant lies between 1 and 2 hours. We discuss how this time constant should be considered theoretically.