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地磁扰动期间等离子体层顶结构的模拟研究

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The simulation of the plasmaspheric morphology during a magnetospheric disturbance event

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摘要

本文选取2001年6月8-10日的一个亚暴事件,模拟了在这期间等离子体层的结构演化过程.选取Weimer(2001模式)电场和Tsyganenko(1996模式)磁场作为背景电磁场,基于$E\times B$的漂移运动计算磁赤道面内的带电粒子分布,模拟磁扰期间的等离子体层变化.模拟了等离子体层顶的结构和形状,结果有羽状、肩状和通道状结构,与同一时间点的EUV/IMAGE探测结果一致.

关键词 等离子层结构, 等离子体层顶, 模拟, EUV

Abstract:

In this paper, we have simulated the evolution of the plasmaspheric formation during the geomagnetospheric substorm on 8 to 10 June, 2001. The simulation is based on the mechanism of $E\times B$ drift motion of plasmaspheric charged particles in the magnetic equatorial plane. We used the models of Weimer's convection electric field in ionosphere [2001] and Tsyganenko's magnetic field [T96] as the background fields. The results of the simulations have reproduced the structures of plasmaspause, such as plumes, shoulders and channels, which are in consistence with the EUV observations of IMAGE satellite.

Keywords Plasmaspheric formation, Plasmas pause, Simulation, EUV

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