地球物理学报 2007 50 (6): 1623~1631 ISSN: 0001-5733 CN: 11-2074/P

一次行星际磁场南向突变的高纬电离层对流响应特征

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收稿日期 2007-4-4 修回日期 2007-8-16 网络版发布日期 2007-11-20 接受日期

摘要 本文利用北半球的超级双极光雷达网数据，考察了一次行星际磁场南向突变时高纬电离层对流的响应特征，着重分析了响应的时间尺度. 对所研究的事件，行星际磁场南北分量在1.5 min内从+7 nT突变到-8 nT，而在突变前后约40 min内都保持相对稳定. 结果表明，电离层对流的初始响应发生在磁正午附近，相对于行星际磁场突变到达磁层顶的时间有大约3 min的滞后；响应与磁地方时有明显依赖关系，离磁正午越远，响应的滞后时间越长，晨昏两侧的对流响应比磁正午滞后约6 min，磁午夜的对流响应比磁正午滞后约12 min；对流重新趋于稳定的时间与磁地方时没有明显的依赖关系，该时间尺度约为10～14 min.

关键词 高纬电离层,行星际磁场,等离子体对流,响应时间,超级双极光雷达网

分类号 P353

DOI:

The response of high-latitude ionospheric convection during a southward IMF turning event

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Received 2007-4-4 Revised 2007-8-16 Online 2007-11-20 Accepted

Abstract Convection data from SuperDARN radars in the northern hemisphere are utilized to investigate the response of high latitude ionospheric convection during a southward IMF turning event, focused on the response timescale. In this event, IMF B_z component changed from +7 nT to -8 nT in 1.5 min and had been relatively stable for 40 min before and after the IMF turning, respectively. The initial ionospheric convection response started near magnetic local noon about 3 min after the IMF turning. The response was delayed by increasing amount s away from noon. The delay of the convection response is about 6 min around dawn and dusk, and 12 min around midnight. There is no clear MLT dependence for the reconfiguration time of the convection response and such timescale is 10～14 min.

Key words High-latitude ionosphere IMF Plasma convection Response time SuperDARN

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