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## 暴时低纬电离层不规则体响应特征的多手段观测

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Multi-instruments observation of low latitude ionospheric irregularities response to Oct 2010 storm

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摘要

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摘要

2010年10月11日发生了一次中等强度的磁暴. 本文利用三亚(18.4° N, 109.6° E)数字测高仪、VHF雷达和GPS TEC/闪烁监测仪数据以及120° E子午线附近我国漠河(53.5° N, 122.4° E)、北京(40.3° N, 116.2° E)和武汉(30.6° N, 114.4° E)的数字测高仪和GPS TEC/闪烁监测仪数据, 分析了磁暴期间我国中低纬地区电离层不规则体的响应特征. 结果表明: 这次磁暴触发了10月11日午夜前后两个时段低纬(三亚)电离层不规则体事件, 而在较高的纬度地区(武汉及以北), 并没有观测到电离层不规则体与闪烁. 在午夜前, 电离层不规则体的发生受磁暴主相期间快速穿透电场激发; 在午夜后, 电离层不规则体受磁暴恢复相的扰动发电机电场触发, 该时段伴随行星际磁场北向翻转的过屏蔽穿透电场也可能是扰动源之一. 此外, 磁暴期间不同尺度的电离层不规则体会伴随发生.

关键词 磁暴, 电离层不规则体, 赤道扩展F, 电离层闪烁, VHF雷达

Abstract:

A moderate storm occurred on 11 Oct 2010. In this study, utilizing multi-instrument (Digisonde, VHF radar and GPS TEC/scintillation receiver) observations over Sanya, and the Digisonde and TEC/scintillation measurements at Mohe, Beijing, and Wuhan located along 120° E, the response characteristics of low and middle latitude ionospheric irregularities to the storm are investigated. Observational results show that F region ionospheric irregularities were triggered by the storm during post-sunset and post-midnight hours at Sanya, but it was not observed at higher latitude (Wuhan, Beijing and Mohe). During post-sunset hours, the ionospheric irregularities producing moderate scintillations were initiated by the prompt penetration electric field at the main phase of the storm. However, ionospheric irregularities observed during post-midnight hours were caused by the disturbance dynamo electric field at the recovery phase of the storm. The over-shielding electric field with the same polarity as disturbance dynamo could be another disturbance source. Ionospheric irregularities with different scales could occur simultaneously during the storm.

Keywords Storm, Ionospheric irregularities, ESF, Ionospheric scintillation, VHF radar

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