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中山站高频雷达回波的日变化特征及地磁活动的影响

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Diurnal variation of the HF radar echoes at Zhongshan Station and the influence of geomagnetic activity

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摘要 利用新建中山站高频雷达2010年4月到2011年2月的观测数据,研究了中山站高频雷达回波的日变化特征以及地磁活动的影响. 研究结果表明,中山站高频雷达回波具有明显的日变化特征且受地磁活动影响较大. 雷达回波发生率的峰值在地磁活动较小时处于日侧;随着地磁活动的增强,峰值减小并向夜侧移动. 另外,平均多普勒视线速度具有明显的昼夜分布,夜侧主要为正向速度,即朝向雷达,日侧主要为负向速度,即远离雷达;随着地磁活动的增强,平均回波强度和平均多普勒视线速度的峰值都会增加,而多普勒谱宽则会减小.

关键词 高频雷达回波, 日变化, 地磁活动, 中山站

Abstract: The diurnal variation of Zhongshan HF radar echoes and the influence of geomagnetic activity on it have been analyzed from 241 days of Zhongshan HF radar data from April, 2010 to February, 2011. The result shows that the diurnal variation is very obvious and the influence of geomagnetic activity is significant. The peak echo occurrence occurs at dayside during geomagnetic quiet times, and shifts toward nightside and exhibits an obvious decrease with the increasing geomagnetic level. The result also indicates that the average l-o-s velocity has obvious diurnal variation. At nightside, the velocity is mainly positive and toward the radar, but negative and away from the radar at dayside. The average power and the l-o-s velocity are apparently higher in geomagnetic active times than that during quiet times. In contrast, the echo occurrence and Doppler spectral width are lower.

Keywords HF echoes, Diurnal variation, Geomagnetic activity, Zhongshan Station

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