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论文

新墨西哥州SOR中间层钠层结构的季节和夜间变化

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摘要 利用1998年1月至2000年5月美国新墨西哥州Starfire Optic Range (SOR：35°N,106.5°W)钠风场、温度激光雷达共46个观测夜的数据，分析大气中间层钠层结构的季节变化特征. 结果表明，钠层丰度变化显示出很强的年振荡现象，其平均值为5.06×109cm-2，最大值出现在11月份，最小值出现在6月和7月份. 钠层均方根宽度的平均值为4.30km，中心高度的平均值为91.60km. 均方根宽度和中心高度变化显示出较明显的半年振荡特征. 年平均钠层夜间变化显示出潮汐的影响，丰度夜间变化在午夜前最小，日出前达到最大. 白天光离化作用和夜间复合过程，与潮汐动力学一起，导致钠层丰度发生较大的夜间变化.

关键词 钠层结构 钠激光雷达 季节变化

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SEASONAL AND NOCTURNAL VARIATIONS OF THE MESOSPHERIC SODIUM LAYER AT STARFIRE OPTICAL RANGE, NEW MEXICO

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Abstract The seasonal variations of the mesospheric sodium layer structure over Starfire Optic Range, NM (35°N,106.5° W) are characterized using 46 nights data of Na wind/temperature lidar observations collected from Jan. 1998 to May 2000. The column abundance has a mean value of 5.06×109cm-2 and strong annual oscillations with a maximum in November and a minimum in June and July. The annual mean rms width of the sodium layer is 4.30 km and the mean centroid height is 91.60 km. Semiannual oscillations are evident in seasonal variations of the rms width and the centroid height. Their mean nocturnal variations show effects of tides. The photo ionization during daytime and recombination processes of Na at night, as well as tidal dynamics, induce strong nocturnal variations in the sodium abundance with a minimum just before midnight and a maximum just before sunrise.

Key words Sodium layer structure;Seasonal variations;Na Wind/Temperature lidar.

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