地球物理学报 2003 46 (6): 731~735 ISSN: 0001-5733 CN: 11-2074/P

论文

地磁静日期内北半球电离层NmF2的结构分布

沈长寿

1 北京大学地球与空间科学学院, 北京100871 2 中国科学院空间天气开放实验室, 北京100080

收稿日期 2002-9-26 修回日期 2003-5-19 网络版发布日期 接受日期

摘要 用北半球陆地上48个地面电离层垂测站资料，以及国际参考电离层IRI 90模式，考察1985年1月6～7日F2层电子密度最大值日变化的纬度剖面和经度效应. 结果表明，在亚洲地区的20°N～30°N内，F2层赤道异常“喷泉效应”产生的NmF2“北驼峰”最高，其最大值出现在中午，或稍迟时间. 30°N ～50°N区域内，NmF2的白天峰值幅度逐渐下降，峰值时间移至午前约10:00 LT. 更高纬度(50°N～62°N)台站上，中午前后NmF2出现双峰，傍晚有谷值，夜间又再次抬升. 欧、美地区的低纬台站很少，但借助IRI 90模式分析可发现，在270°E经圈上，“喷泉效应”造成的“北驼峰”幅度最小，而且随纬度增大时，NmF2白天幅度下降也不明显，即纬度剖面的经度效应非常显著. 对中国、日本地区台站资料的小范围经度差异分析表明，在驼峰区的90°E～140°E内，各站NmF2无明显差别；但在中纬地区30°N～50°N内，中国西部上空NmF2白天变化幅度较大，且较为陡直，而中国东部和日本台站上空则相对平缓.

关键词 电离层NmF2的结构分布 纬度剖面 经度效应 F层赤道异常的“驼峰”

分类号

DOI:

STRUCTURE DISTRIBUTION OF NmF2 IN THE IONOSPHERE OF THE NORTHERN HEMISPHERE DURING A GEOMAGNETICALLY QUIET PERIOD

SHEN CHANGSHOU

1 School of Earth and Space Sciences, Peking University, Beijing 100871, China 2 Laboratory of Space Weather, Chinese Academy of Sciences, Beijing 100080, China

Received 2002-9-26 Revised 2003-5-19 Online Accepted

Abstract Using the data from 48 ionosondes in the Northern Hemisphere and the model of IRI 90, the latitude profiles of variations of NmF2 on Jan. 7, 1985 at sunspot minimum are investigated. The results show that for the F2 layer equatorial anomaly the “fountain effect” is strongest at Asia region and the “northern crest” at (20°N～30°N) is highest with a maximum value of NmF2 at noon, or a bit later. At the range of 30°N～50°N the F2 peaks decrease gradually and the peak times move to about 10:00 LT, while in the high latitude region (50°N～62°N) two peaks appear around noon, followed by a valley at dusk and the peak values increase again during the night. There are very few ionosondes at low latitude in the European and American regions. Nevertheless, using the model of IRI 90, it can be still found that the northern “crest” produced by the “fountain effect” is weakest at longitude 270°E. The decrease of daytime F2 peaks at higher latitude is not evident in these regions. It means that the longitude change of latitude profiles of NmF2 diurnal variations is obvious. On the other hand, analysis of data measured by ionosondes in China and Japan (in a narrower range of longitude)shows that NmF2 diurnal variations in the region of 90°E～140°E has no great longitude difference, or so called longitude effect, at “crest” region (20°N～30°N). However, at middle latitude (30°N～50°N) the variation amplit udes of NmF2 are larger and steeper in the west of China than that in th e east of China and Japan.

Key words Structure distribution of ionospheric NmF2;Latitude profile;Longitude effect;“Crest” of the F layer equatorial a nomaly.[

通讯作者:
shenchsh@sohu.com
作者个人主页: 沈长寿