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COSMIC数据验证AMSU平流层低层观测的初步分析结果

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摘要 基于Global Positioning System (GPS)掩星数据在平流层具有较高准确性、稳定性的优势，本文尝试用新一代GPS掩星观测——the Constellation Observing System for Meteorology, Ionosphere, and Climate (COSMIC)资料验证不同卫星平台上先进的微波探测仪（AMSU）的平流层观测结果.通过COSMIC大气温度廓线与AMSU辐射传输模式结合，得到模拟亮温，然后与AMSU平流层观测进行匹配比较.分析表明GPS掩星数据能够作为一个相对独立的参量检验NOAA15、16、18卫星平台内部的偏差.通过一年数据的比较验证，初步显示不同卫星平台的AMSU观测亮温在平流层低层都偏低，并且NOAA18平台的亮温偏低程度明显大于NOAA15、16.AMSU亮温偏差在极地冬季较为显著，尤其南极地区NOAA18的偏差幅度达到1.8 K.结合24小时内AMSU观测亮温偏差变化及其样本分布特征，可以看到明显的太阳辐射差异可能是导致AMSU观测亮温在极地偏差显著的主要原因.

关键词 GPS 掩星 COSMIC AMSU 亮温 卫星平台

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Validation of AMSU measurements in lower stratosphere using COSMIC radio occultation data: preliminary results

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Abstract Global Positioning System (GPS) Radio Occultation (RO) data from the Constellation Observing System for Meteorology, Ionosphere, and Climate (COSMIC) mission is used to validate the measurements of advance microwave sound unit (AMSU) on different NOAA satellite platforms due to high accuracy and stability of RO data in lower stratosphere. The atmospheric temperature profiles derived from COSMIC RO data are combined with the AMSU radiative transfer model to simulate the microwave brightness temperatures (Tb). The comparison of the matched simulated and observed Tb of AMSU in lower stratosphere show that RO data can be used as an independent reference to valid the measurement of AMSU on different NOAA platforms. The preliminary validating results from one year's Tb comparisons show that all the measurement of AMSU on three NOAA satellites in lower stratosphere are underestimated, and the Tb bias on NOAA18 is more significant than those on NOAA15, 16. The bias of AMSU measurements in lower stratosphere is more significant in polar region during the winter time, especially in south pole region the variation range of Tb bias on NOAA18 about 1.8 K. Combining with the variation of Tb bias and the samples' distribution within 24 hours, it implies that the significant solar radiation difference might be the main cause for large Tb bias in polar region.

Key words GPS;Radio occultation; COSMIC; AMSU; Microwave brightness temperature;Satellite platform

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