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利用AMSU-A亮温估测西北太平洋区域热带气旋强度

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摘要 先进的微波垂直探测器AMSU（Advanced Microwave Sounding Unit）能接收到穿透一定厚度云层的微波辐射信息，适合于分析热带气旋暖核特征.由辐射传输方程和静力学方程可知，气旋暖核强度同中心海平面气压距平相关联. 本文利用搭载于极轨气象卫星NOAA-16/17/18上的AMSU A亮温资料，根据2002～2006年之间发生在西北太平洋区域热带气旋的移动路径，匹配出47个热带气旋的183时次个例，并将各时次的暖核最大亮温距平同气象业务部门发布的热带气旋强度报告值建立统计回归方程. 为进一步提高估测精度，在计算亮温距平过程中，提出用于修正扫描点分辨率不均匀所带来取样偏差的方法，并综合利用AMSU-A的7、8双通道信息来进行估测，利用修正后算法得到暖核亮温距平同气旋强度之间的相关系数为0.80，标准偏差为12.2 hPa，对近年来影响我国较大的两个台风（0414“云娜”和0608“桑美”）进行个例估测，平均偏差约6 hPa.

关键词 AMSU-A, 西北太平洋, 热带气旋强度, 海平面气压, 暖核

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Estimating the intensity of tropical cyclone in Western North Pacific basin with AMSU-A brightness temperature

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Abstract Advanced Microwave Sounding Unit （AMSU）is well suited to analysis the warm core structure of tropical cyclone (TC) because certain wavelengths of microwave energy are able to penetrate the cirrus above TC. Through the radiative and hydrostatic equation, the upper tropospheric brightness temperature anomalies of TC are related to surface pressure anomalies. With the track of each TC happened in Western North Pacific basin during the 2002～2006 seasons, 47 TCs and 183 cases were collected according to the overpass of AMSU-A flown aboard NOAA-16/17/18. They were used to develop a linear statistical relationship between the warm core anomalies and the TC int
ensity report from operational centers. Further improvements in correlation, an
d intensity estimate accuracy, were possible through application of combining th
e information from AMSU-A channel 7 and 8 together and a proposedalgorithm, which was devised to try to correct the bias from receiving warm core microwave radiation due to the unevenly distribution of AMSU-A footprints，and the correlation coefficient and standard deviation were found to be 0.80 and 12.2 hPa, respectively. Independent application of the corrected algorithm in two typhoons (0414 Rananim and 0608 Saomai), which influenced China heavily in recent years, showed the mean absolute errors were about 6 hPa.

Key words AMSU-A Western North Pacific Tropical cyclone intensity Sea level pressure Warm core

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