The AMSU Observation Bias Correction and Its Application Retrieval Scheme, and Typhoon Analysis

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Abstract

Since most of AMSU channels have beam position-dependent bias, therefore it is crucial to remove such bias for providing useful profiles of atmosphere. The measurement errors are estimated from the differences between satellite observations and the simulated satellite observations, which were obtained from a radiative transfer operator with 12-hours forecasts as their input. The measurement errors estimated in this way will contain the forecast error of 12 hours forecast. The NMC method assumed that the statistics of difference between forecasts at different ranges valid at the same time are the representative of forecast error statistic. The differences used in NMC method have been transfer to brightness temperature in each AMSU channels with the radiation transfer operator. This data can be used to obtain the value of 12 hours forecast error in brightness temperature for each AMSU channels. So that the effect from the 12 hours forecast errors in each AMSU channels can be removed when the measurement errors are estimated as mentioned above. In this study, we carefully examined the AMSU beam near Taiwan area. A bias correction method, which concerns about the beam position-dependent bias and the effect of 12 hours forecast error used on the regression equations has been built. A data retrieval method based on one-dimensional variational schemed has also been developed. Through the comparison of the retrieved profiles and the background fields, we found that the method worked well near Taiwan area. Even with quite accurate background fields, the retrieved profiles have show positive impact to improve the fields, The result show that the improvement made in the retrieval scheme over background error is about 0.45K in the temperature profiles above 780 hPa. Using corrected AMSU data to identify thermal anomalies and estimate tangent winds that are successfully analysis typhoon structure.