

An Impact of the Assimilating FY-3D MWTS-2 Upper Air Sounding Data on Forecasting Typhoon Lekima - 2019

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Abstract

In this case study, the Fengyun-3D (FY-3D) clear-sky microwave temperature sounder-2 (MWTS-2) radiances were directly integrated in the regional mesoscale Weather Research and Forecasting (WRF) model using the Grid point Statistical Interpolation (GSI) data assimilation system. The assimilation experiments researched to compare the track errors of typhoon Lekima from uses of the Advanced Microwave Sounding Unit-A (AMSU-A) radiances (EXP_AD) with those from FY-3D MWTS-2 upper-air sounding data at the channels 5–7 (EXP_AMD). The clear-sky meaning bias-corrected observation-minus-background (O-B) values of FY-3D MWTS-2 channels 5, 6, and 7 are 0.27, 0.10 and 0.57 K, in the respectively, which are smaller than those without bias corrections. Compared with the control trial, which was the forecast of the WRF model without use of the satellite data, the assimilation of satellite radiances can progress the forecast performance and decrease the mean track error by 8.7% (~18.4 km) and 30% (~58.6 km) beyond 36 h through the EXP_AD and EXP_AMD. The path of simulated steering flow changed from southwest in the EXP_AD to southeast in the EXP_AMD, which can be a pivotal to forecasting the landfall of typhoon Lekima (2019) in the span of three days in advance. Assimilation of MWTS-2 upper-troposphere channels 5–7 has great potential to advance the track forecasts for the typhoon Lekima..

Biography:

Zeyi Niu working as a researcher in Key Laboratory of Numerical Modeling for Tropical Cyclone of the China Meteorological Administration and Shanghai Typhoon Institute. His research papers published more than ten journals and he attended international conferences.

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