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Measuring NWP Skill of Tropical Cyclones in Shanghai Meteorological Service

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A WRF based typhoon NWP system for operations, namely, the SMS-THRAPS (Shanghai Meteorological Service-Tropical cyclone High Resolution Analysis and Prediction System), has been developed in Shanghai Typhoon Institute (STI). It mainly consists of the Gridpoint Statistical Interpolation (GSI) data assimilation, a complex cloud analysis (CCS) package and the WRF3.5. A significant number of local observations such as SYNOP, SHIP, BUOY, METAR, AMDAR, CINRAD and AWS can be assimilated into the system. The model is configured with a mesh of 9 km horizontal resolution covering an area about 6000km$\times$5000km and a moving nest of $7^\circ \times 7^\circ$ at 3 km grid distance.

Numerical experiments for Super typhoon "MEGI" (2012) during landfall stage indicated that assimilation of local observations is very important for improving the accuracy of typhoon track, intensity forecasts, particularly, local rainfall distribution. The SMS-THRAPS performance in 2013 was evaluated and compared with ECWMF and JAPAN global numerical forecasts. The results show that SMS-THRAPS's track forecast is similar to ECWMF and better than JAPAN. SMS-THRAPS is the best in sea level pressure forecast at leading time < 42 hours, and worse than ECWMF, better than JAPAN at leading time > 42 hours.

Key words: High resolution, Typhoon, Assimilation