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Testing of Typhoon WRF (TWRF) Initial Field and Its Application to Operational Typhoon Prediction at Taiwan

D.-S. Chen (1), L.-F. Hsiao (2), T.-C. Yeh (3), and Y.-R. Guo (4)

(1) Central Weather Bureau, 64 Kung Yuan Rd., Taipei, Taiwan (song@rdc.cwb.gov.tw), (2) Taiwan Typhoon and Flood Research Institute, Taipei, Taiwan(lfhsiao@ttfri.narl.org.tw), (3) Central Weather Bureau, 64 Kung Yuan Rd., Taipei, Taiwan (yeh@cwb.gov.tw), (4) National Center for Atmospheric Research Boulder, Colorado(guo@ucar.edu)

Typhoons are the most significant weather systems in Taiwan, and they cause considerable damage there every year. The associated rainfall of typhoons is also one of the most important water resources in Taiwan. The numerical prediction models provide necessary guidance on typhoon track forecast. However, for a numerical model to predict accurate rainfall and wind field are still a highly challenging task. In addition, the two major factors that lead to challenge on typhoon forecasting in the vicinity of Taiwan are resulted from the lack of observational data over the Northwest Pacific Ocean and the significant interaction between typhoon circulation and Taiwan Central Mountain Range. In order to provide subjective guidance for the forecast team in the Central Weather Bureau (CWB) on typhoon track and precipitation, the numerical typhoon model is needed for more accurate typhoon predictions. Improve the skill of typhoon prediction is the highest priority for Taiwan's Central Weather Bureau (CWB). To achieve this goal, one key component is to improve the accuracy of model initial condition.
More recently, the community model such as Weather Research and Forecasting (WRF) modeling system is widely applied to tropical cyclone forecast. A version of WRF model, called TWRF (Typhoon WRF) in the Central Weather Bureau, was developed from 2010. In the TWRF system, including the partial cycling approach, typhoon initialization scheme, outer loops in WRF 3DVAR system are used to examine the ability on the typhoon prediction. The ultimate aim is the construction of real-time forecasting of typhoon track and rainfall prior to and affecting Taiwan, to improve the typhoon warnings and provide local officials with the comprehensive information in the hardest hit areas as soon as possible. The detail performance of TWRF during 2010, 2011 typhoon season and the improvement strategies in the near future will be presented in the conference.