

Ensemble Forecast Experiment for Typhoon Quantitatively Precipitation in Taiwan

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ABSTRACT

The continuous torrential rain associated with a typhoon often caused flood, landslide or debris flow, leading to serious damages to Taiwan. Therefore the quantitative precipitation forecast (QPF) during typhoon period is highly needed for disaster preparedness and emergency evacuation operation in Taiwan. Therefore, Taiwan Typhoon and Flood Research Institute (TTFRI) started the typhoon quantitative precipitation forecast ensemble forecast experiment in 2010. The ensemble QPF experiment included 20 members. The ensemble members include various models (ARW-WRF, MM5 and CreSS models) and consider different setups in the model initial perturbations, data assimilation processes and model physics.

Results show that the ensemble mean provides valuable information on typhoon track forecast and quantitative precipitation forecasts around Taiwan. For example, the ensemble mean track captured the sharp northward turning when Typhoon Megi (2010) moved westward to the South China Sea. The model rainfall also continued showing that the total rainfall at the northeastern Taiwan would exceed 1,000 mm, before the heavy rainfall occurred. Track forecasts for 21 typhoons in 2011 showed that the ensemble forecast has a comparable skill to those of operational centers and has better performance than a deterministic prediction. With an accurate track forecast for Typhoon Nanmadol, the ability for the model to predict rainfall distribution is significantly improved. Similar situation occurred for Typhoon Nalgae (2011) which caused 1,621 mm accumulated rainfall during a 72-hours period (1~3 Oct) in I-lan area.

