

Recent Research and Development at MRI/JMA to Improve Typhoon Forecasts

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We will present recent research and development at the MRI/JMA to improve forecasts of tropical cyclone (TC) intensity, genesis and track, respectively. For intensity forecasts, with great support of guidance developers in the US, the MRI/JMA has transported the codes of SHIPS, LGEM, RI Index and CHIPS so that they can run from the outputs of the JMA Global Spectral Model (JMA/GSM). The JMA/GSM-based intensity guidance was then transported to the JMA's Forecast Division for a trial use in early 2016. In the presentation, the preliminary results of the new guidance will be shown. In addition, the impact of using microwave satellite-derived rainfall (i.e., GSMaP) in the vicinity of TCs as one of the explanatory variables of the SHIPS, and the verification results of typhoon intensity forecasts by the JMA Regional Nonhydrostatic Model (JMA/NHM) and a comparison with forecasts by the HWRF will be presented. For genesis forecasts, we have developed guidance using the Early Dvorak Analysis and global ensembles for 2- to 5-day forecasts. In addition, the feasibility of medium-range and one-month ensembles for forecasts on longer time scales were investigated using The International Grand Global Ensemble (TIGGE) and Subseasonal to Seasonal (S2S) data. For track forecasts, the benefit of multi-center grand ensemble (a combination of multiple ensembles) to optimize the size of the uncertainty cone, and the results of observing system experiments using a new geostationary satellite, Himawari-8, will be presented. Finally, a comparison of TC track forecasts by operational global models over the past quarter century, which has been performed under the Working Group on Numerical Experimentation (WGNE) since 1991, and recent forecast cases where many global models had larger position errors (e.g., Typhoon Halong (2014) and Hurricane Joaquin (2016)) will be briefly introduced.