

A Preliminary Study on the Sensitivity of the Typhoon Track Model Forecasts to the Initial Fields

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ABSTRACT

In operational environment, it is not easy to analyze the typhoon structure correctly from the current observation networks. Typhoon track forecast models usually require a bogussing procedure in the model initialization for simulate the typhoon circulation. This study examines the sensitivity of the model track forecasts to the model initial fields. Cases selected are typhoons Cam (00UTC 22 May), Gloria (00UTC 24 July), Dale (12UTC 7 November), and Herb (12UTC 29 July) of 1996. The model used is the operational typhoon track forecast model of Central Weather Bureau. Different initial fields are obtained by changing the parameters of the size, the strength, the radius of the maximum wind, and the location of the bogussing vortex. Different large scale environments are also examined. The simulation results show that the track forecast does sensitively depend upon the small change of the initial field. The mean distances between the forecast centers of the control forecasts and the forecast centers of the simulations with various specifications of the bogussing vortex are 55/68 km in 24/48 hours forecast. Among those cases, larger distances between forecast centers are found for the cases of typhoons in the environment with large horizontal or vertical wind shears. The results also show that some of the cases with large model track forecast errors are due to the incomplete removal of the model analyzed typhoon structure before adding the bogussing vortex. For those cases, by changing the vortex specifications in the bogussing procedure could not improve the forecast result effective. Applying the approach of modifying the environmental flow such as that proposed by DeMaria (1987) can, sometimes, produce a better forecast.

Keywords : Typhoon Track Forecast, Sensitivity of the Track Forecast to the Model Initial Field