Typhoon-ocean coupled predictions using the MPAS global model and the western North Pacific regional model

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The typhoon track forecast of global model is improved by the development of model performance and data assimilation skill. However, simulating detailed structures of typhoon in global models is still challenging due to the low model resolution by the limitation of computing resource. Regional models, which obtain initial conditions from the coarse global model, are required to adopt a bogussing scheme to reproduce realistic typhoon vortex. Recently, the MPAS (Model for Prediction Across Scales) global model, which allows simulating specified regions with a high resolution, is being developed to overcome those resolution problems in NCAR. In this study, we investigate the performance of the variable-resolution MPAS global model and link regional modeling in simulating typhoon over the western North Pacific. The present MPAS model has a spatial resolution of 60 km with the refinement (15km) region spanning approximately 55 degrees of latitude and 110 degrees of longitude over the North Pacific. The present regional model is configured to 5-km resolution for the western North Pacific and coupled with WRF atmospheric model and ROMS oceanic model. Preliminary results revealed that the MPAS model have good performances in simulating the track and intensity of typhoons and the regional WRF-ROMS coupled model contributed to improving the intensity prediction through the air-sea coupling process. Future research will focus on developing a fully coupled atmosphere-ocean model for both global and regional regions for the improved typhoon prediction.

Key words: Typhoon prediction, Variable resolution, Global model, Air-sea interaction

References

Skamarock, W. C., and Coauthors, 2012: *Mon. Wea. Rev.*, **140**, 3090-3105.

Warner, J. C., and Coauthors, 2010: *Ocean Modeling*, **35**, 230-244.

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