ABSTRACT

The Philippine archipelago is highly exposed to tropical cyclones (TCs) and their associated hazards, which have already caused disasters of numerous casualties and extensive economic damages. Improving the accuracy of TC forecasts from Numerical Weather Prediction (NWP) models has been an increasingly important endeavor. One such NWP system is the Weather Research and Forecasting (WRF) model, used for both academic research and operational purposes, and is the functioning NWP model of DOST-PAGASA.

The warm oceans are essential in the formation and intensification of tropical cyclones. Wind stress on the upper ocean can also affect the TC intensification process because of mixing and entrainment of cooler water from below into the upper oceanic mixed-layer (OML). However, the WRF model does not have an implicit representation of ocean feedback in default; integrating critical ocean-atmospheric processes is beneficial to TC forecast accuracy. The goal of this study is to determine the sensitivity of WRF models of Tropical Cyclones that affected the Philippines to different SST input data and ocean model options in WRF. This will be done by performing experimental runs of selected TCs with varying SST and OML initialization and update options in WRF. Then, the various model outputs' skill in simulating the TC track, intensity, and rainfall will be assessed through comparison with best track and observation data using appropriate verification statistics. Finally, effects of SST update and ocean model integration to the critical dynamic factors that steer TCs in the western North Pacific will be examined.