

Impact of Dropwindsonde Data on Forecasting Tropical Cyclones Approaching the East Asian Regions

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Accurate forecasting for tropical cyclones is impeded by the lack of proper observations in and around tropical cyclones, especially over the ocean. Major improvement in observations over the data-sparse area for tropical cyclones has been made through dropwindsondes, satellites, and aircrafts loading other instruments. Observational data obtained from various observing systems through a series of field campaigns have been extremely useful to study structure and development of tropical cyclones. In addition, appropriate assimilation of such unconventional and high-resolution data can bring about significant improvement in numerical forecasts of tropical cyclones by increasing the accuracy of initial uncertainties. In this study, both simulated and real dropwindsonde data are used to investigate the impact of such data on forecasting tropical cyclones approaching the East Asian regions. We employ a 3D mesoscale model and approaches such as the observing-systems simulation experiments (OSSEs) and the observing system experiments (OSEs). Our results demonstrate that assimilation of dropwindsonde data generally improves track forecasts of typhoons. Especially it is essential to have such in-situ observations for accurate track forecasts while typhoons are located over the ocean, sufficiently far from making landfall. Therefore, to improve forecasts of tropical cyclones approaching the East Asian region, it is indispensable to have collaborations among scientists/governments of the east Asian countries.