

## Impact of dropsonde data assimilation on typhoon prediction over the sea around the Korean peninsula

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Accurate prediction of typhoon track and intensity is essential for disaster mitigation. This study investigates the effectiveness of assimilating airborne observations into numerical weather prediction models to improve typhoon prediction over the seas surrounding the Korean Peninsula. Ocean heat fluxes, which are crucial for typhoon development and maintenance, are strongly influenced by vertical profiles of meteorological variables. However, the lack of observations over the ocean limits the accuracy of numerical models. Airborne observations, such as those collected by the NIMS Atmospheric Research Aircraft (NARA), can provide high-quality data to address this observation gap.

To assess the impact of dropsonde data assimilation, we conducted a series of numerical experiments using the WRF-ARW model with a 3DVar data assimilation system. We compared forecasts initialized with and without assimilated dropsonde data from the NARA. Six experiments were conducted, three with the dropsonde data assimilation at three different initial conditions(UM GDPS, ECMWF ERA5, KIM) and three without dropsonde data assimilation at three different initial conditions.

**Key words:** aircraft, dropsonde, typhoon, 3DVar data assimilation

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