Mesoscale numerical simulations of T-PARC/TCS08 typhoons with assimilation of satellite and airborne observations: Predictability study

Zhaoxia Pu, Department of Atmospheric Sciences, University of Utah, Salt Lake City, UT
Lei Zhang, Department of Atmospheric Sciences, University of Utah, Salt Lake City, UT
Qingyun Zhao, Naval Research Laboratory, Monterey, CA

ABSTRACT

Mesoscale numerical simulations are performed to simulate four major typhoons (e.g., Typhoons Sinlaku, Jangmi, Nuri and Hagupit) during the T-PARC/TCS08 field campaign with assimilation of satellite and airborne observations. Our objectives are to examine the impact of data assimilation on the predictability of tropical cyclones and also to understand the role of mesoscale environmental conditions in tropical cyclone formation and rapid intensification.

First of all, we examine the impact of several types of satellite and airborne observations (e.g., AIRS, QuikSCAT satellite, aircraft dropsonde and Doppler lidar wind data) on the predictability of tropical cyclone structure and intensity changes. Sensitivity of the predictability of tropical cyclones to various environmental variables, such as temperature, moisture and wind fields is investigated. Dynamic and thermodynamic processes that influence the tropical cyclone formation and intensification are also diagnosed.

In addition, progress is made in assimilating airborne radar data into mesoscale numerical models in order to examine their impact on the predictability of the formation and rapid intensification of tropical cyclones.

Most recent results, progress and future plan will be presented and discussed.