Transport of suspended sea spray droplets intensifying tropical cyclones

*伊藤 耕介[1]
*Kosuke Ito[1]

1. 琉球大学
1. University of the Ryukyus

A conventional bulk model for the surface layer assumes that the evaporation, in which liquid water turn into water vapor, depends on the local surface humidity and wind speed. In reality, sea spray droplets can stay for a few minutes to evaporate under the violent wind condition beneath tropical cyclones (TCs), and travel several kilometers toward the center of a TC. Although this transport has been neglected so far in numerical models, it can be one of the missing processes that intensify the vortex because the intensity of the TC relies on the inward accumulation of water vapor primarily. Here, a set of ensemble simulations with a simple atmosphere-ocean coupled model for intense TCs are conducted to verify this hypothesis with (i) no sea spray (NoSS), (ii) sea spray evaporating locally (SS_NoTrans), and (iii) sea spray having the duration of flight (SS_Trans). On average, steady-state TCs in SS_Trans are more intense than those in NoSS and SS_NoTrans. The difference between SS_NoTrans and SS_Trans is 25 hPa and 12 m/s and statistically significant. As expected, this intensification is consistent with the inward accumulation of water vapor that brings the inward transport of absolute angular momentum.

キーワード：台風、波しぶき
Keywords: Tropical cyclone, Sea spray droplets

