Under high-wind conditions of tropical cyclone, the effects of the sea spray may have on the transfer of energy between the ocean and the atmospheres. To examine the effects of sea spray on the typhoon structure and intensity, the sea spray flux parameterization schemes developed by Fairall were incorporated into the regional atmospheric Mesoscale Model version 3.7 of Pennsylvania State University-National Center for Atmospheric Research. Sensitivity tests were performed with varying the spray source function intensities and with and without dissipation heating.

The results indicate that the sea spray increases the direct sensible heat flux from the ocean, and more the spray amounts, more the direct sensible heat flux. Otherwise, the sea spray decreased a little the direct latent heat flux. With the sea spray itself sensible heat flux and latent heat flux, the total enthalpy flux were increased by 1% and 12% with moderate and larger spray amounts. Consistent with this, the intensity of the typhoon is moderately increased by 5% and 8% in the minimum sea level pressure.

The effect of spray on the near-surface temperature and moisture depends on the amount of spray and its location in the typhoon. Within the high-wind region of the typhoon, the lower atmosphere becomes cooler and moister due to the evaporation of sea spray. However, the dissipative heating offsets the cooling effect of sea spray, which make the lower atmosphere warm. The cooling or warming in the surface further modifies the boundary layer structure and the activity of convection.