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Title: Numerical Simulation of Typhoon Winner (1997) and the Analysis of Microphysics Structure in Eye Wall

Abstract: Typhoon is a violent atmospheric vortex characterized by multiscale interaction, the typical horizontal extension is several hundred to a thousand kilometers, whereas the latent heat release from moist convective cloud and energy transfer from ocean surface with the scale of only tens of kilometers is responsible for its formation and maintenance. Multiscale simulation is the most effective methods in the investigation of track, intensity, inner-core structure of typhoon/hurricane(Liu et al.,1997). In this paper, the numerical simulation of typhoon Winner(1997), happen over Pacific Ocean, is conducted with a triply-nested nonhydrostatic model MM5 before and after its landfall stage. The grid space for three domain is 45, 15, and 5km , respectively, and all of three domains are fixed since we focused on the landfall period of Winner. The 60hrs integration of the model is initialized at 06GMT, August 17, 1997, about 30hours before the landfall of Winner, and a bogus typhoon is induced at that time. The selection of physical process is similar with that of Xiao and Zou(2000) in their simulation study of Hurricane Fran(1996). The track errors between simulated and observed typhoon centers at 6hr interval show that the maximum and the minimum track error is 95.6km and 9.2km, respectively, and the mean error is 54.5km.The simulated microphysics content in eye wall shows that the maximum rain water is in the middle-lower troposphere below 600hPa, and the vertical extension of rain water in outer spiral cloud band is as taller as in eye wall. The graupel is mainly in the upper level of eye wall and the content is the maximum of all microphysics quantities. Cloud water in eye wall extents from lower troposphere to the tropopause, while the ice is over the bottom of stratosphere, which distributes uniformity relatively. The pattern of microphysics content in the eye wall of typhoon over Pacific Ocean is somewhat different from that over Atlantic Ocean and the extension and relative uniformity distribution of ice may contribute mainly to the cirrus mantle.

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