



## **A study on typhoon genesis with ultra-high resolution atmospheric general circulation model**

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While prediction of a typhoon track is getting more accurate year by year, the mechanism of typhoon genesis may not have been understood very well, yet. Probably accurate predictions of typhoon genesis will be an essential component of the next-generation weather prediction and also integral part of dynamical studies on climate variations and changes

In our ultra-high resolution simulations of atmospheric general circulation with the 10-km mesh resolution, there are several typhoons generated during 10-60-day integration periods. Basically there are many disturbances with cyclonic vortices in the tropics near sea surface. However, some grow upward and become tropical cyclones but the others do not. We are conducting some case studies on these simulated tropical vortices and investigating into the mechanism and essential conditions for typhoon genesis.

A quick look at our result suggests that vertical shear of wind may be a main factor to stimulate typhoon genesis. As a vortex grows upward, lower vortex moves toward a certain direction, usually westward by beta-drift during the generation period. However, the direction is very difficult to understand due to surface drag and complex 3-D wind structures near the surface. In any cases, if vertical shear advects the upper vortex embryo toward where the developed lower vortex moves, the entire vortex system can keep its vertical structure and seems to develop into a tropical cyclone. In this presentation, more detailed analysis will be reported.