

The Island Scale Tornadoes Formation Mechanism Study and Simulation

Chih-Ying Chen¹, Chuan-Yao Lin¹

(1)Research Center for Environmental Changes, Academia Sinica

When a particular weather event occurs, various social activities and possibilities exceed the historical average level. Natural disasters (including eco-hydroclimate, drought, surge, rainstorm), for human safety, destroy economic losses, are being staged everywhere. Generally, waterspouts can be easily observed in Taiwan compared to tornadoes on the land. Also, the tornadoes on the ground usually cause more disasters and losses. Previous research is mainly analytically focused on tornado events by using observations (Ex: radar data) but somehow ended up due to the limitation of analytical data and usually only focused on analyzing the environment condition base on those datasets. We selected three cases from Taiwan and Hawaii to conduct the numerical experiments here. This study uses an ultra-high resolution (~ 40m) numerical model to analyze and understand the formation mechanism of these tornadoes on tropical islands. The model results show the interaction between the topography, land-sea breeze, and convections have a significant relationship.

Keywords: Large-Eddy Simulation , Tornado, Land-sea breeze