

Binary Tropical Cyclones in a Three-Dimensional Idealized Framework

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In the real atmosphere, the interaction of binary tropical cyclones (TCs), generally referred to as the *Fujiwara effect*, can cause large uncertainties of TC forecasts, particularly on the track. These binary TCs could have much complex interaction depending on the environment, TC size, or separation distance. For a better understanding of the binary TCs, we have carried out several numerical simulations with the structure adjustable balanced vortex in the three-dimensional idealized framework. As consistent with many previous studies, the simulated binary TCs show a high-dependency on separation distances. From the potential vorticity (PV) tendency, the results show many interesting features. First of all, the maximum-positive PV anomaly (advection+diabatic heating) area is typically consistent with the subsequent TC movement. This maximum-positive PV area may be useful to diagnose the subsequent movement of binary TCs. Second, the vertical wind shear induced by binary TCs, e.g., TC's outflow, can cause asymmetry of the diabatic heating profile. Perhaps, this asymmetric diabatic heating could be regarded as a “*three-dimensional Fujiwhara effect*”.