



## **Effect of Periodic Eyewall Convection on the Intensification of Simulated Typhoon Hato (2017)**

Rong Fang (1), Shumin Chen (), Weibiao Li (), and Yusi Wu ()

(1) Sun Yat-Sen University, School of Atmospheric Sciences, Zhuhai, China (fangr5@mail2.sysu.edu.cn), (2) Guangdong Province Key Laboratory for Climate Change and Natural Disaster Studies, Guangzhou, China (fangr5@mail2.sysu.edu.cn)

Diabatic heating in the eyewall is important for the intensification of tropical cyclones (TCs). The convection associated with the intensification stage of Typhoon Hato (2017) was studied by the numerical simulation using the high-resolution Weather Research and Forecast Model. Results showed that there existed periodic oscillations with a period of 3–6 hours occurred correspond to the TC intensification. In each cycle, violent convections, which developed from the downshear side of the eyewall, moved upward and rotated counterclockwise with the whole TC system. Subsidences were mostly obvious in the upshear side on lower and middle layers due to the inflows, and right within the convection azimuthally above  $\sim 10$  km. In the favorable stage for TC intensification of each oscillation circle, vertical motions of all levels were well coordinated, which was favorable to transport large amount of water vapor concentrated within the lower levels to the middle and high levels to release energy for TC development. The compensating subsidence in high levels brought a potential temperature tendency of  $\sim 4$  K h<sup>-1</sup> to the TC eye, with a TC intensification rate of approximately  $-2$  hPa h<sup>-1</sup>. While in unfavorable stage the oscillation circle, the potential temperature in the eye was decreased, and TC intensity tended to be stable or even slightly weakened.