



The Impact of Environmental Vorticity on Intensification of Tropical Cyclones over the Northwestern Pacific

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

(1) Sun Yet-sen University, Zhuhai, China (wuys@mail2.sysu.edu.cn), (2) Guangdong Province Key Laboratory for Climate Change and Nature Disaster Studies, China

The forecasting ability of tropical cyclones' (TCs') intensity has barely improved in the recent years, and it's generally believed that the influencing factors of TCs' intensity are environmental circulation, internal structure and underlying surface. In this study, the intensification period of 181 TCs occurred in July to October during 2003–2017 were analyzed. The stepwise multiple regression was applied to analyze the environmental effects including the vertical wind shear, the 850 hPa vorticity, the 250 hPa divergence, the water vapor content within the layer between 850hPa and 200hPa, the sea surface temperature, and the convective available potential energy on TCs' intensity. Results can be concluded as the following two: 1) Approximately 71% of the TCs were significantly influenced by the environmental factors mentioned above, with the mean minimum center pressure 14.43 hPa less than the TCs that is not influenced by environment factors. This indicates that the environmental factors probably strengthened TCs. 2) Approximately 51% of the TCs that affected by environmental factors were mainly affected by the 850 hPa environmental vorticity, which is controlled by the cooperation of Coriolis force and 850 hPa convergence, and the intensities of them were relatively stronger.