

Observed rainfall asymmetry of tropical cyclone in the process of making landfall in Guangdong, South China

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This study investigates the rainfall asymmetry of tropical cyclones (TCs) in the process of making landfall in Guangdong (GD), South China, on the basis of satellite-based and reanalysis precipitation data. We mainly focus on TC rainfall asymmetry, its main influencing factor, and its change in the process of landfall, and the difference between different ENSO phases. The results reveal that vertical wind shear (VWS) is the dominant influencing factor of TC rainfall asymmetry in GD. The rainfall maximum is located in downshear left of VWS. The TC rainfall asymmetry has little change in the process of making landfall, though the rain rate decreases. Both the phase and amplitude of TC rainfall asymmetry have no significant change from 24 hours prior to landfall to 12 hours after landfall. The rainfall maximum steadily lies in downshear left. The amplitude of rainfall asymmetry is about 50%, suggesting that the asymmetric rainfall is about half of the axisymmetric rainfall. There is no obvious difference in TC rainfall asymmetry between El Niño, La Niña, and neutral years.

Keywords: Tropical cyclone, Rainfall asymmetry, TRMM, Vertical wind shear