



## **Characteristics of Tropical Cyclone Extreme Rainstorm and Its Preliminary Causes over the Hainan Island**

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### **ABSTRACT**

From the viewpoint of tropical cyclone (TC) process maximum daily rainfall (TPMDR), characteristics of TC extreme rainstorms (TCERs) over the Hainan Island from 1969 to 2014 are analyzed using station daily precipitation data, Shanghai Typhoon Institute TC best track data and NCEP/NCAR reanalysis data. Frequencies of TPMDR  $\geq 50\text{mm}$ ,  $\geq 100\text{mm}$ , and  $\geq 250\text{mm}$  show significant decreasing trend ( $-0.7$  times(10yr) $^{-1}$ ), weak decreasing trend ( $-0.2$  times(10yr) $^{-1}$ ), and weak increasing trend ( $0.1$  times(10yr) $^{-1}$ ), respectively. TPMDRs of the three different levels are all frequent during July to October, with peak frequencies occurring mainly in September and August. For regional distribution, TPMDRs show an active center over western Hainan especially at the Changjiang station in frequency and intensity. Meanwhile, the TCs which cause extreme rainstorm over western Hainan display a main movement direction of northwestward tracks.

Causes diagnoses of extreme rainstorm over western Hainan show that, the main factors include topography, TC movement speed, TC structure which deals with TC track and TC intensity, and the intensity of the South China Sea Summer Monsoon.

### **Key words:**

tropical cyclones, TC extreme rainstorm, characteristics, causes, the Hainan Island