## Increased severe landfall typhoons in China since 2004

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**ABSTRACT**: Severe landfall typhoons (SLTYs) are defined as those with maximum sustained wind speed  $\geq$ 41.5 m s<sup>-1</sup> at landfalls, which strongly affect the coastal regions of China and cause grave losses of life and property. In this study, we analyze the SLTYs in China in peak summer (July-September) during the period 1973-2017, which are separated into three periods: period-I (1973-1987), period-II (1988-2003), and period-III (2004-2017). Results show that the SLTYs in China have abruptly increased since 2004, characterized by the count of about 65.9% (72.7%) of the SLTYs in China (South China) in period-III only. This phenomenon is partly attributed to the significantly-increased severe typhoon frequency and the longer duration of severe typhoon stage over the western North Pacific. The most potential factors can be summarized as follows. First, the abnormal easterly steering flow over the western North Pacific in period-III is beneficial for typhoons to march westward. Second, typhoons continue to strengthen before landfall in South China, which may be attributed to warming in the northern South China Sea and enhanced warm moist southerly monsoon flow. About 9.7% of typhoons with landfall in South China experienced a rapid intensification process in 24 h before landfalls in period-III. However, the percentage is only 1.6% and 3.1% for period-I and period-II, respectively. Third, intensified typhoons have been attracted to the warming land surface over South China since 2004, which is generally a result of air-land-sea interaction, and the conditions of air, land and sea are increasingly beneficial for SLTYs in China.

Keywords: Severe landfall typhoons (SLTYs), air-land-sea interaction