

Variations in Tropical-Cyclone Activity and Storm-Surge Devastation since the 1950s in China

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ABSTRACT

Tropical-cyclone data and the statistics of tropical-storm casualties and damage since the 1950s were collected and analyzed. The results show that annual and decade-long variations are obvious in the annual number of tropical cyclones generated over the western North Pacific (including the South China Sea), those making landfall in mainland China, and those that induced disastrous storm surges. It is worthy noting that these variations are not always in phase. For example, an active year for more cyclones in the western North Pacific may have fewer landing in China, or vice versa. Also, the tropical cyclones that make landfall do not always cause storm-surge disasters. It sometimes happens that a year with more but weaker tropical cyclones making landfall has fewer storm-surge events than a year with fewer but more intense storms. In the long term, the tropical cyclone landfall probability has been gradually increasing since the mid 1960s. Over the past twenty years, major storm-surge disasters have occurred more frequently but there have been fewer overall tropical cyclones. This has been linked to El Niño Southern Oscillation (ENSO) phases, in that fewer but more intense tropical cyclones influence China in the El Niño year.

The intensity of disastrous storm-surges is obviously site-specific, strongly related to the intensity and tracks of tropical cyclones reaching land, local tidal ranges and tidal phase, the standard of coastal region infrastructure and public education regarding of flood dangers. Since global warming can be expected to increase tropical cyclone intensity and storm surges, some countermeasures should be strictly carried out, including perfecting the tropical cyclone and storm-surge warning services, elevating the standards of coastal infrastructures, and improving public awareness of disaster defense.