

Intensification of landfalling typhoons over the northwest Pacific since the late 1970s

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Intensity changes in landfalling typhoons are of great concern to East and Southeast Asian countries. Regional changes in typhoon intensity, however, are poorly known owing to inconsistencies among different data sets. Here, we apply cluster analysis to bias-corrected data and show that, over the past 37 years, typhoons that strike East and Southeast Asia have intensified by 12–15%, with the proportion of storms of categories 4 and 5 having doubled or even tripled. In contrast, typhoons that stay over the open ocean have experienced only modest changes. These regional changes are consistent between operational data sets. To identify the physical mechanisms, we decompose intensity changes into contributions from intensification rate and intensification duration. We find that the increased intensity of landfalling typhoons is due to strengthened intensification rates, which in turn are tied to locally enhanced ocean surface warming on the rim of East and Southeast Asia. The projected ocean surface warming pattern under increasing greenhouse gas forcing suggests that typhoons striking eastern mainland China, Taiwan, Korea and Japan will intensify further. Given disproportionate damages by intense typhoons, this represents a heightened threat to people and properties in the region.

Keywords: Typhoons, Intensity change, Climate variability and change