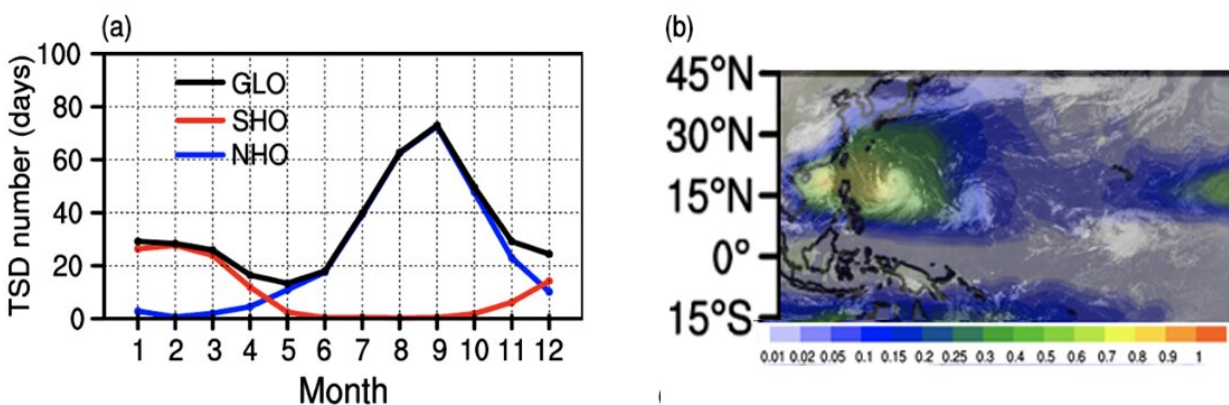


# Researchers connect climate features to the variability of global tropical storm days from 1965 to 2019

June 1 2021



TSD climatology. (a) Seasonal variation of TSD (days) averaged around the globe (black curve), Northern Hemisphere (blue curve), and Southern Hemisphere (red curve). (b) The spatial distribution of climatologically annual mean Tropical Storm Days (1965-2018) with a satellite image overlay taken 7 July 2015 by GOES West. From left to right: Tropical Cyclones Linfa, Chan-hom, Nangka, Ela, and another possible TC developing in the bottom right of the image. Credit: Plots by Bin Wang. GOES-West satellite image courtesy: NOAA.

Nearly two billion people live in a region where tropical cyclones (TC) are an annual threat. TCs are deadly and can cause billions of dollars in economic losses worldwide. During peak season in the Northern Hemisphere, typically July through October, about two TCs develop or

are ongoing every day. However, this and overall TC frequency vary substantially year-to-year.

To quantify this variability, scientists developed a metric called the tropical storm day (TSD). TSD is a collective measure of how frequently [tropical cyclones](#) develop, storm track, and cyclone lifespan, which reflects overall activity. Despite this advancement, researchers have not often studied tropical cyclone variability on a global scale.

Now, teams of meteorologists from Nanjing University of Information Science and Technology and the University of Hawaii are collaborating to find what drives the global TSD changes during a period between 1965-2018 and how to apply their findings to different timescales. They have published their results and discussion in *Advances in Atmospheric Sciences*.

Data shows that tropical storm days seem to vary in patterns that last 3-6 years, or interannually, with a 10-year (decadal) pattern that is also apparent. Through the decades analyzed in the study, collaborators did not find a significant trend in how frequently either an interannual or decadal pattern occurs. That said, researchers were able to link interannual and decadal leading modes to both the El Niño-Southern Oscillation (ENSO) and the Pacific Decadal Oscillation (PDO).

Tropical storm days have had a steady relationship with El Niño and La Niña from 1965 to 2018. Ties to the Pacific Decadal Oscillation appear weaker as time advances through the period, especially during the 1980s. Nonetheless, decadal variation in the Pacific is associated with [sea surface temperature](#) (SST) anomalies in the tropical eastern Pacific, while variation in the Atlantic and Indian Oceans is related to SST anomalies in the western Pacific.

"We find the tropical storm day and Pacific Decadal Oscillation

relationship breakdown in the 1980s is due to the decoupling of SST anomalies associated with the PDO-East and PDO-West." said Prof. Bin Wang, the corresponding author of the study and a senior scientist with University of Hawaii at Manoa. "The results here have a significant implication for seasonal to decadal predictions of global TSD."

**More information:** Yifei Dai et al, What Drives the Decadal Variability of Global Tropical Storm Days from 1965 to 2019?, *Advances in Atmospheric Sciences* (2021). [DOI: 10.1007/s00376-021-0354-1](https://doi.org/10.1007/s00376-021-0354-1)

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