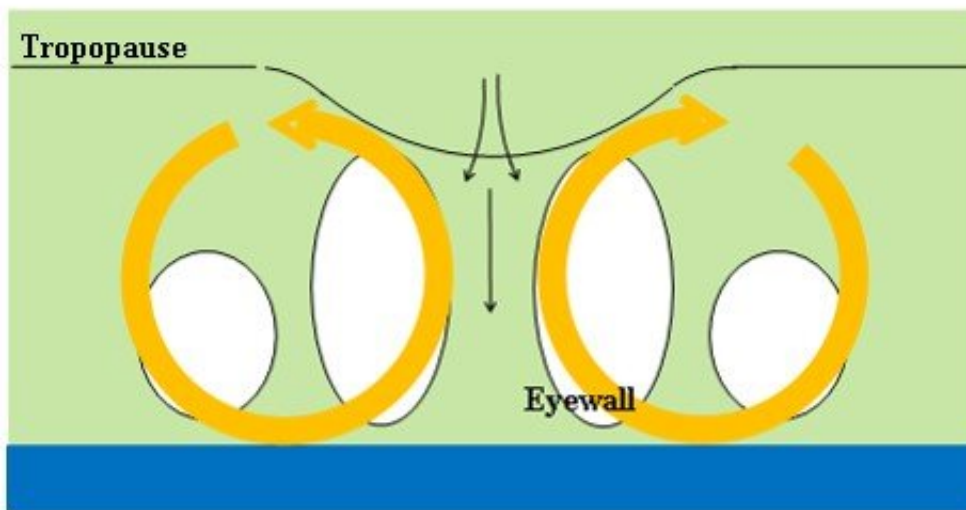


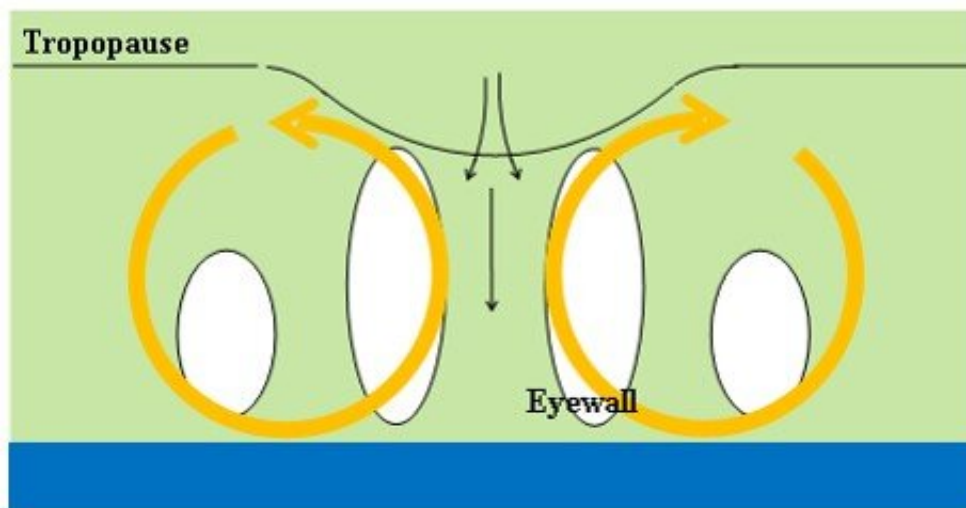
Inhibiting the energy transmission impact of dust aerosols on eastern Pacific tropical cyclones

March 25 2021

(a) Normal energy transmission in a TC



(b) With negative effect of dust on cloud water



Schematic of the negative effect of dust aerosols on the energy transmission of TC. Credit: Zhenxi Zhang

The thermodynamic state of the tropical atmosphere plays an important role in the development of tropical cyclone (TC) intensity. A TC imports thermodynamic energy from ocean-air heat and moisture fluxes and exports heat aloft at the much colder upper troposphere, through a radially and vertically directed overturning circulation in a TC. The work done through this cycle drives the TC's winds.

A negative response of cloud water in the lower troposphere to [dust](#) aerosol optical depth (AOD) has recently been reported in *Atmospheric and Oceanic Science Letters* by Dr. Zhenxi Zhang from the Inner Mongolia University of Technology, Hohhot, China, by analyzing MERRA-2 reanalysis data and GCM simulations from CMIP6.

"The explanation of this response could be that dust aerosols absorb [solar radiation](#), promoting the evaporation of clouds. In principle, this aerosol-driven vaporization modification could affect the enthalpy of the air surrounding a tropical cyclone," explains Dr. Zhang.

According to Zhang's study, a negative association between eastern Pacific TC intensity in offshore regions and dust AOD for the years 1980-2019 was also found. "The changes in TC [intensity](#) related to dust AOD conditions should be a consequence of the anomalous enthalpy of the air surrounding a TC caused by the negative effect of dust on cloud water," concludes Zhang.

More information: Zhenxi Zhang et al, Influence of dust aerosols on eastern Pacific tropical cyclone intensity, *Atmospheric and Oceanic Science Letters* (2021). [DOI: 10.1016/j.aosl.2020.100028](https://doi.org/10.1016/j.aosl.2020.100028)

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