

Sensitivity of Extreme Rainfall in Taiwan to SST over the South China Sea through Modulation of Marine Boundary Layer Jet

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Abstract

Water vapor transport from the South China Sea (SCS) by the marine boundary layer jet (MBLJ) can be an important moisture source for heavy rainfall events in Taiwan during the mei-yu season. However, the variability of MBLJ due to the sea surface temperature (SST) changes and its impact on extreme rainfall events in Taiwan has not been well understood. This study aims to better understand this problem by conducting numerical experiments varying the SST over the SCS.

Results show that increasing the SST over the SCS leads to stronger vertical mixing in the boundary layer and weakened MBLJ. With the weaker MBLJ, the mei-yu front can push further south, which shifted the heavy rainfall over Taiwan southward for a hundred kilometers. The opposite effect is observed when the SST is decreased over the SCS but with a relatively smaller impact.

Key word: Marine boundary layer jet, Mei-yu front, Air-sea interaction