

Do sudden stratospheric warmings boost convective activity in the tropics?

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Influence of stratospheric circulation changes related to sudden stratospheric warmings (SSW) on the tropical troposphere have been examined in many previous studies. However, due to small sample size of SSW and large internal variability in the tropical troposphere, influence of the SSW on the tropical troposphere is still uncertain. We examine impact of the stratospheric circulation changes related to SSW on the tropical troposphere using 5,000-year scale ensemble simulations with a 60 km horizontal resolution global atmospheric model MRI-AGCM3.2. Thousands of SSW-like circulation change events are extracted thanks to the large ensemble simulations. A composite analysis of the SSW-like events shows significant stratospheric upwelling and cooling in the tropics. Synchronized with the upwelling, statistically robust tropospheric signals such as raised temperature and enhanced convective activity including tropical cyclone are found. Although the mean tropospheric signals tend to be small in the view of S/N ratio (~ 0.1), relative probability of their extreme events significantly increases.

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