

Extreme water vapor increase as a function of surface temperatures around Japan

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Extreme heavy precipitation is a key phenomenon that impacts on human society and natural environments, which demands our understanding on its behavior under warming climate. Recently, many efforts have been paid for investigating observed extreme precipitation in association with water vapor holdings, which increases with surface air temperature. However, a relationship between atmospheric moisture content and surface air temperature is poorly understood due to the lack of reliable the moisture products for statistical analysis. In this study, we investigate the relationship between atmospheric moisture content and surface air temperature around Japan by using precipitable water vapor (PWV) dataset derived from Global Positioning System satellites that offers high spatial and temporal resolution measurement. We will show the significant PWV increment with surface temperature beyond the Clausius-Clapeyron rate, and the effect of upper air temperature on PWV that can consistently explain the reason for super-CC rate.

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