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Evaluation of the relationship between daily extreme precipitation and temperature over Eastern China

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In this work, the relationship between daily extreme precipitation and temperature is investigated by using rain gauge precipitation data and corresponding the Integrated Global Radiosonde Archive over eastern China during 1998-2012. Eventually, 14 stations are selected to explore the relationship in eastern China (MEC) and southeastern China (SEC). The result shows that daily extreme precipitation intensity increases approximately 7% when near surface temperature increases 1 °C in MEC and SEC, which generally follows Clausius–Clapeyron (CC) rate (CC rate describes the increasing rate of water vapor with temperature). Moreover, the regression slopes for the logarithmic daily extreme precipitation intensity and near surface temperature range from 3% °C⁻¹ to 9% °C⁻¹ at the selected stations in MEC and SEC. However, extreme precipitation intensity decreases with near surface temperature when the temperature is higher than 25 °C. That is, the increase of extreme precipitation with near surface temperature performances single peak structure in MEC and SEC. The variation of extreme precipitation and near surface dew point temperature shows the similar pattern in MEC and SEC (The transition dew point temperature is also about 25 °C). Therefore, **it could be deduced that extreme precipitation intensity does not always increase with climate warming in MEC and SEC.** In addition, precipitable water, which corresponds to extreme precipitation event, increases with near surface temperature at CC rate. **It is found that the increase rate of precipitable water with temperature is closer to CC rate than that of extreme precipitation.**