

Influences of sea surface temperature on a heavy rainfall event over Shimane in late August 2013

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Shimane in western Japan suffered from heavy rainfall in late August 2013. This heavy precipitation is associated with a seasonal rain front and warm humid airflow over the Tsushima warm current. Although sea surface temperature (SST) distribution is considered to be important for the heavy precipitation, SST analysis data sets with high spatial resolution currently available have certain uncertainties because of differences in observations used and analysis procedures for the datasets. To investigate influences of SST on the heavy precipitation event and its sensitivity to SST datasets, we have conducted hindcast experiments with the weather research and forecasting (WRF) model with 3-km horizontal resolution with five different SST data as its lower-boundary condition. The experiments can reproduce heavy precipitation, though somewhat underestimated. The experiments have confirmed that the experiments with warmer SST data along the Tsushima current tend to reproduce the stronger precipitation. Since differences in evaporation and near-surface equivalent potential temperature are sensitive to the SST distribution, moisture supply, low-level stability and resulted precipitation can be modified by uncertainties in SST estimations. Therefore, the present study implies that quantitatively more accurate forecasts of heavy precipitations require more reliable SST distribution.

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