Responses of rainfall characteristics to the land surface conditions over the wet Asian monsoon region

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This study estimated the sensitivity of rainfall characteristics to land-surface conditions over Southeast Asia, which has a wet land surface during the rainy season. To obtain the regional difference in sensitivity and simulate basic cloud-precipitation systems, we used a high-resolution regional climate model. The sensitivity of rainfall amount to an increase in soil moisture was dependent on the location. This implies that the response of rainfall characteristics to soil moisture is not simple, suggesting that changes in rainfall characteristics are not solely determined by evapotranspiration. In addition, the sensitivity of rainfall characteristics displayed remarkable regional characteristics. The coupling of an increase in water vapor in the planetary boundary layer and a decrease of sensible heat flux can explain the response. The increase in water vapor in the planetary boundary layer was associated with a reduction of the development of deep convections and an increase of boundary layer clouds.

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