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Incorporating Satellite Observations of Precipitation Spatio-Temporal Variability into Coupled Land-atmosphere Models

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Precipitation exhibits significant spatial variability at scales much smaller than the typical size of climate model grid cell. Neglecting such sub-grid variability in climate models causes unrealistic representation of land-atmosphere flux exchanges. We try to tackle this issue by incorporating global satellite-based rain rate observations into the representation of canopy hydrological process in a coupled land-atmosphere model. The canopy hydrological process is treated differently within two different types of areas: rain-covered areas and non-rain areas. As such, the subgrid variability of canopy water storage is accounted for, which forms a new canopy hydrology scheme. This scheme is used to investigate the impact of the sub-grid variability of rainfall and consequent that of canopy water storage on water cycle through interaction between land surface and atmosphere. Preliminary results from this study will be presented indicating significant impact of precipitation sub-grid variability on the simulations of hydrologic parameters.