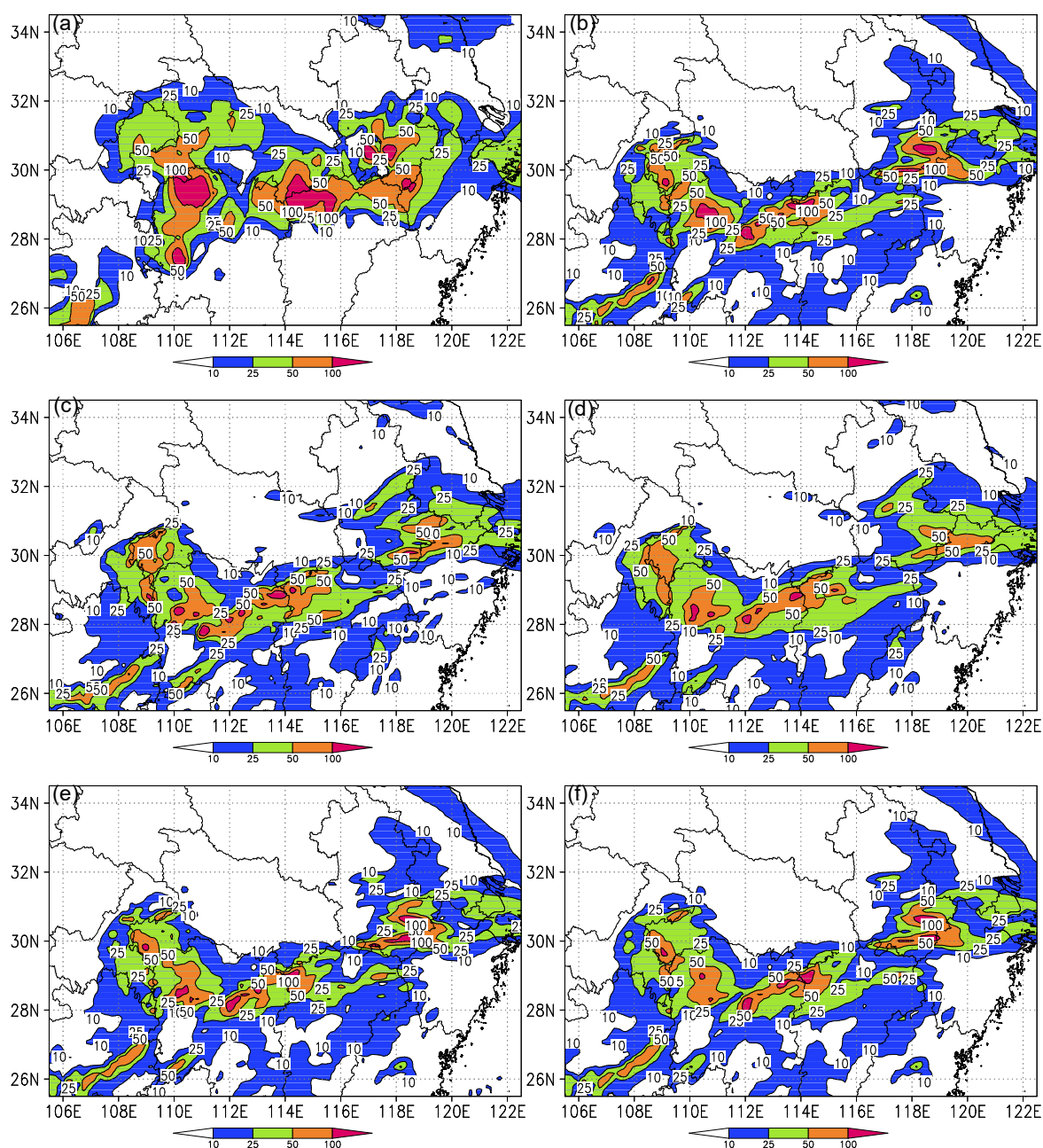**Supplementary Materials:** Supplementary Figures

Figure S1. Spatial distribution of the 24 h accumulated precipitation (unit: mm): (a) observation; (b) control test; (c) Test ATM12; (d) ATM subset average; (e) Test LSM2; and (f) LSM subset average.
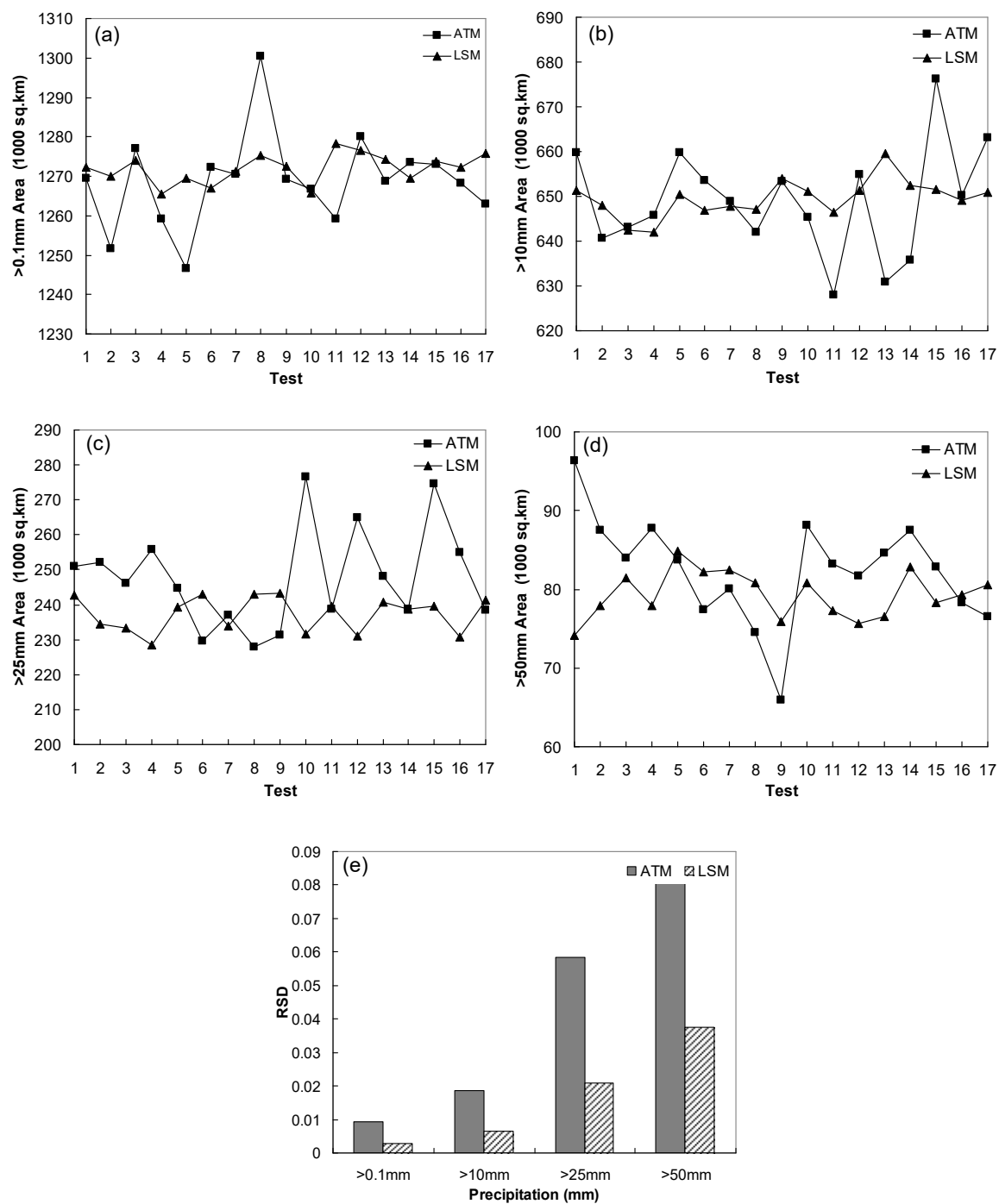
Figure S2. The total precipitation area (unit: 10^3 km^2) and its relative difference (unit: %) in standard deviation for various precipitation intensities: (a) area of >0.1mm precipitation; (b) area of >10mm precipitation; (c) area of >25mm precipitation; (d) area of >50mm precipitation; and (e) relative difference in standard deviation (RSD).
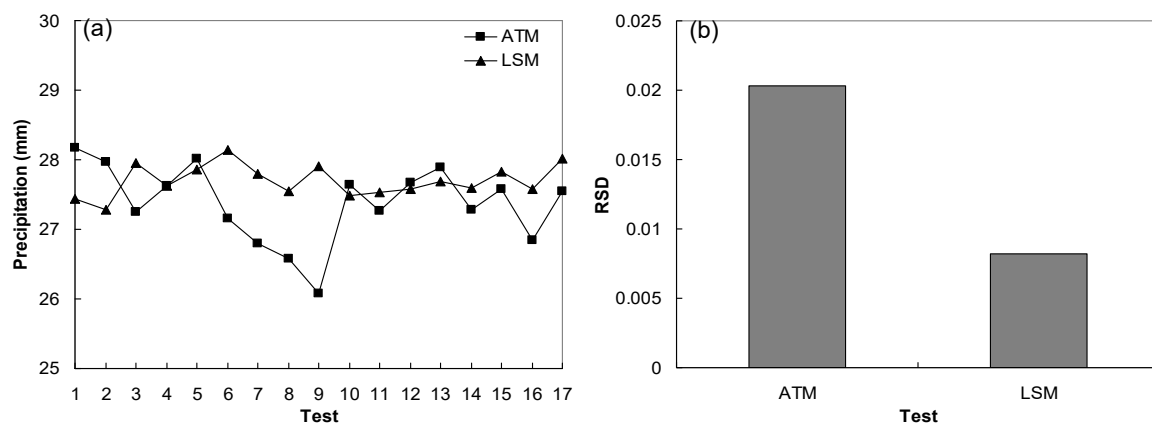
Figure S3. As Figure S2, but (a) for the average value of the precipitation area (Domain D2; Figure 1) and (b) for its relative difference (unit: %) in standard deviation.
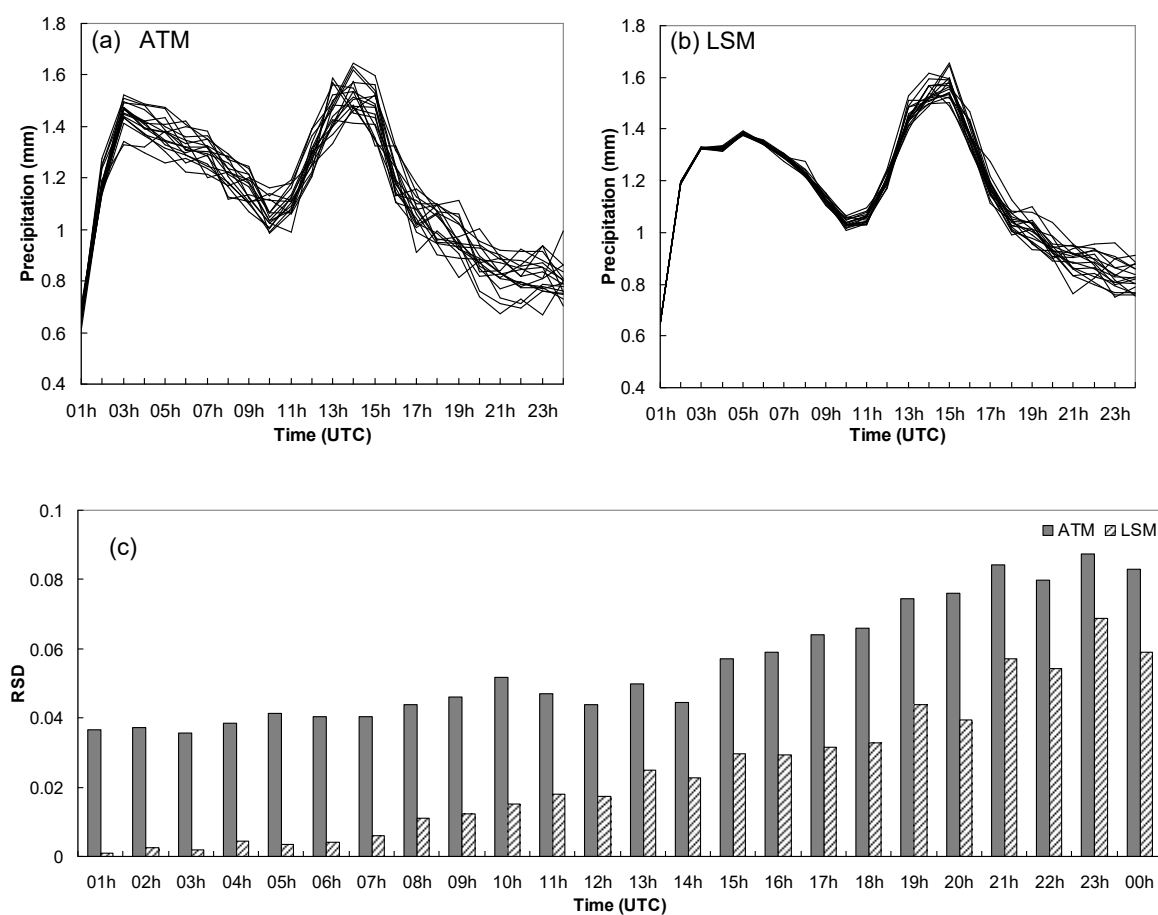

Figure S4. Time series of Domain D2-averaged hourly precipitation (a: ATM subset; b: LSM subset) and its relative difference (unit: %) in standard deviation.
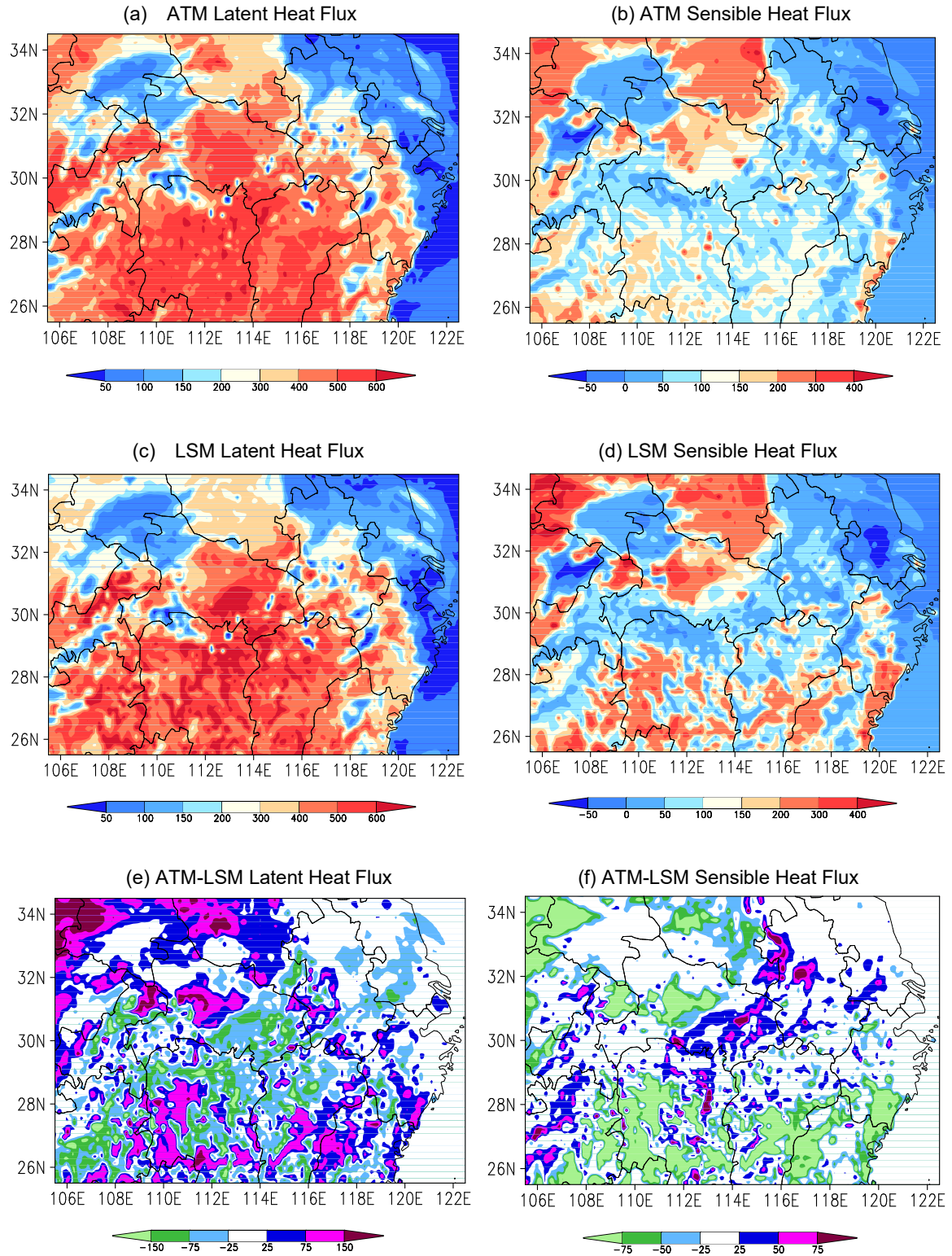
Figure S5. Latent (left) and sensible (right) heat fluxes simulated for 06:00 h on 31 May 2007 by the ATM and LSM subsets (unit: W m⁻²), where (a)-(d) denote the ATM latent, ATM sensible, LSM latent, and LSM sensible heat fluxes, respectively, and (e)-(f) represent the ATM minus LSM latent and sensible heat fluxes, respectively.