

Supplementary Materials:

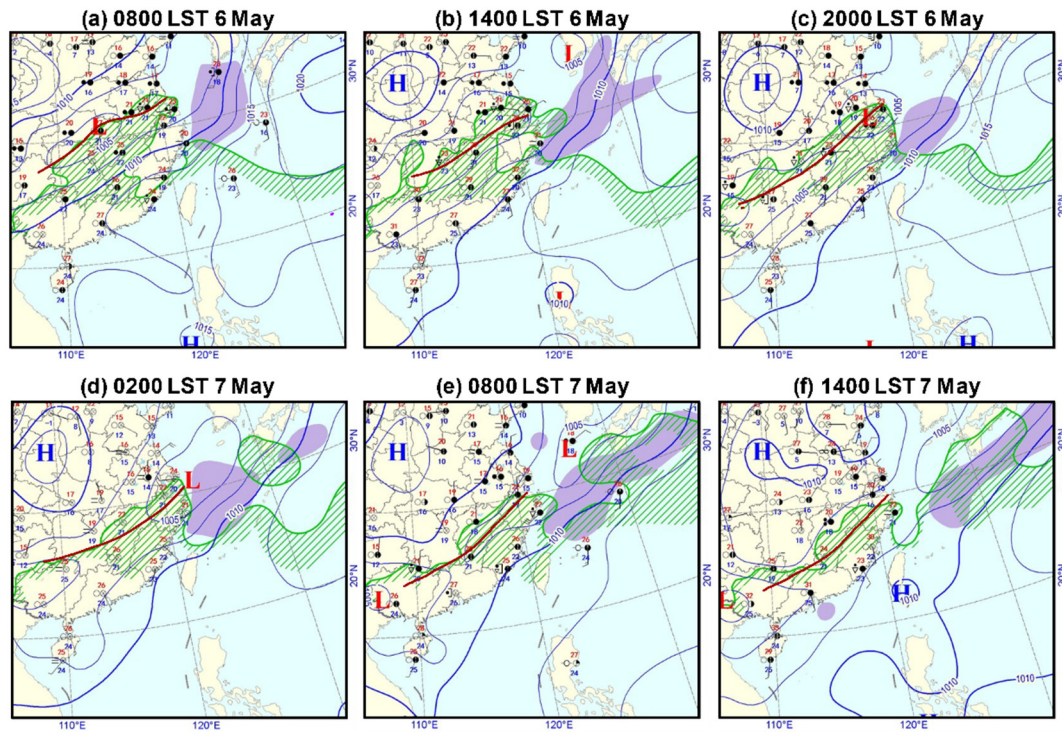


Figure S1. Surface weather maps (a–f) at 6-h interval between 0800 LST on 6 May 2018 and 1400 LST on 7 May 2018. The bold brown line denotes the analyzed location of surface synoptic front.

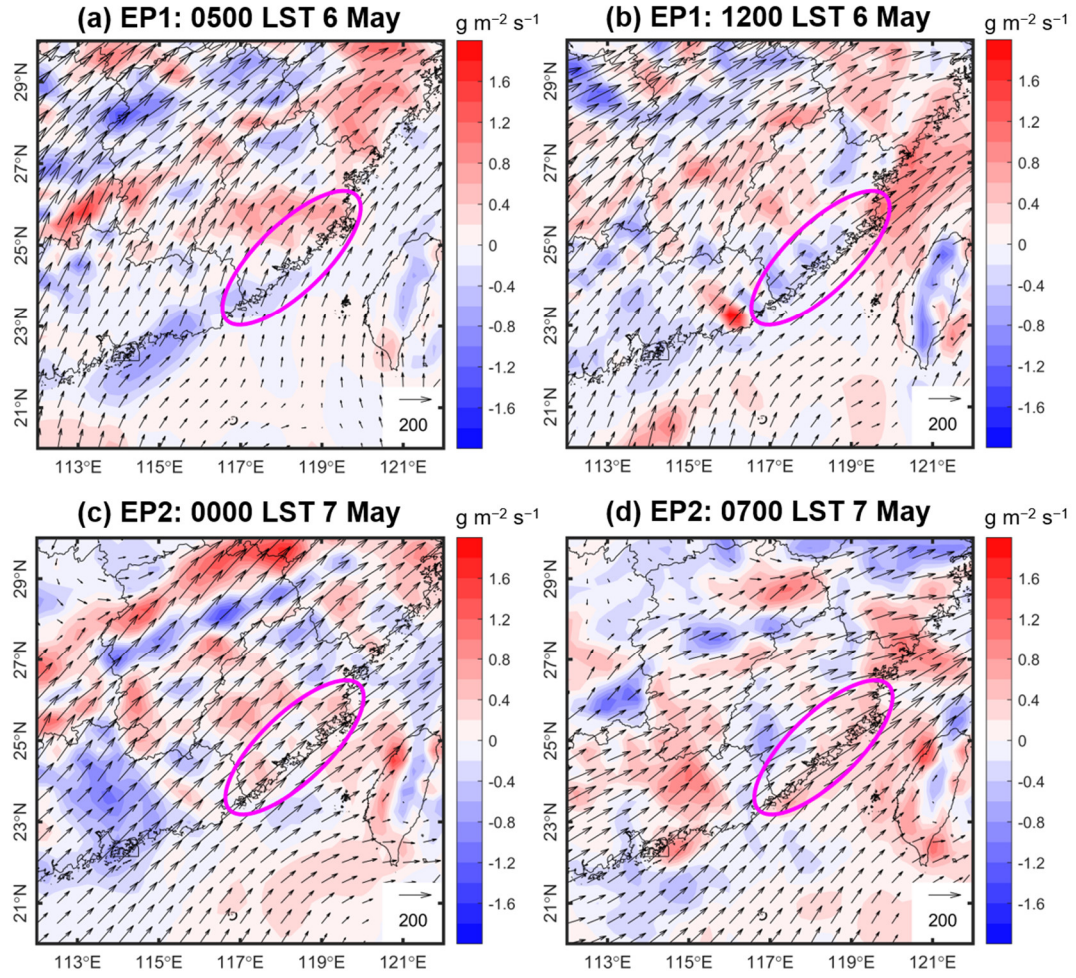


Figure S2. Distribution of vertically integrated moisture flux convergence from 900 to 500 hPa (shaded; unit: $\text{g m}^{-2} \text{s}^{-1}$) and moisture flux at 850 hPa (arrows; unit: $\text{g kg}^{-1} \text{m s}^{-1}$) using ERA5 dataset at (a) 0500 and (b) 1200 LST 6 May 2018 for EP1 and at (c) 0000 and (d) 0700 LST 7 May 2018 for EP2. The magenta circle denotes the focused area in the present study.

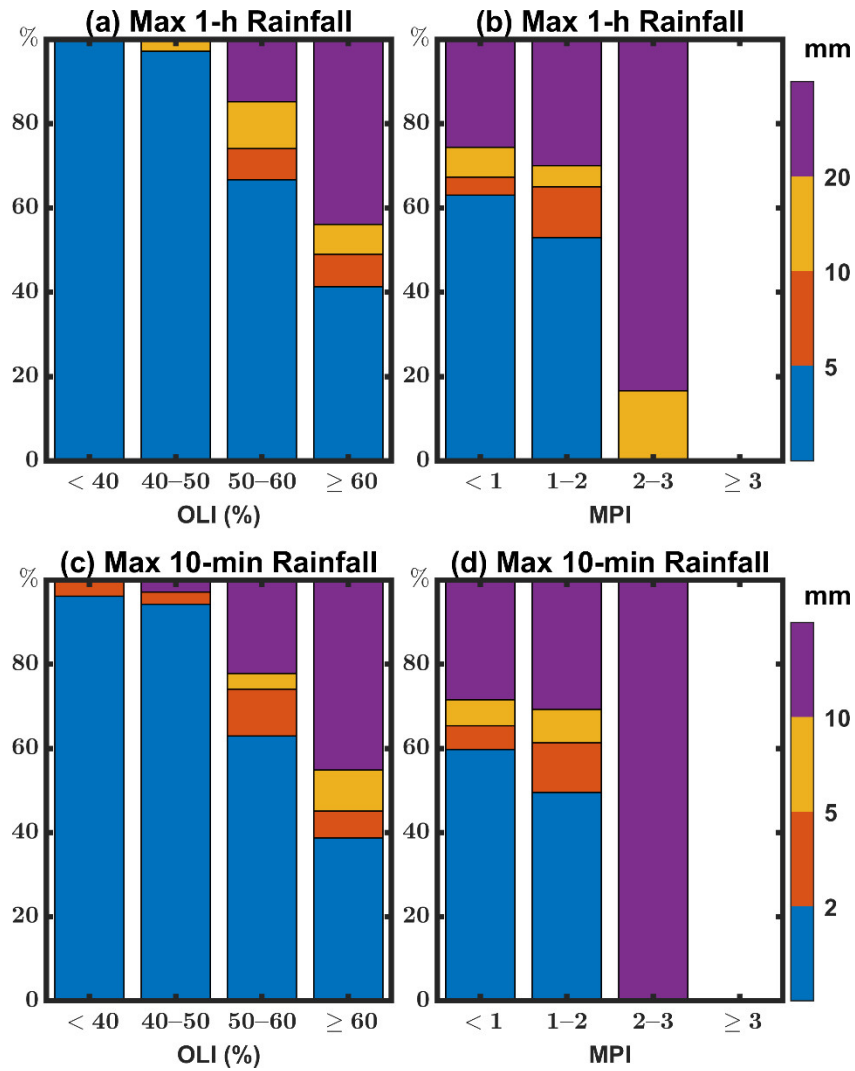


Figure S3. Distributions of the (a, b) maximum rainfall amount and (c, d) 10-min rainfall in the next hour produced by the 319 MCS samples over southern China on 3–4 May 2018, as a function of (a, c) OLI and (b, d) MPI. The maximum rainfall amount (10-min rainfall) in the next hour is calculated as the average of the top five hourly rainfalls (10-min rainfalls) belonging to an MCS sample. The ≥ 3 MPI subset in (b, d) is empty since there is no MCS sample with MPI greater than or equal to 3.