Supplement of

Aerosol cloud interaction in the atmospheric chemistry model GRAPES_Meso5.1/CUACE and its impacts on mesoscale numerical weather prediction under haze pollution conditions in Jing-Jin-Ji in China

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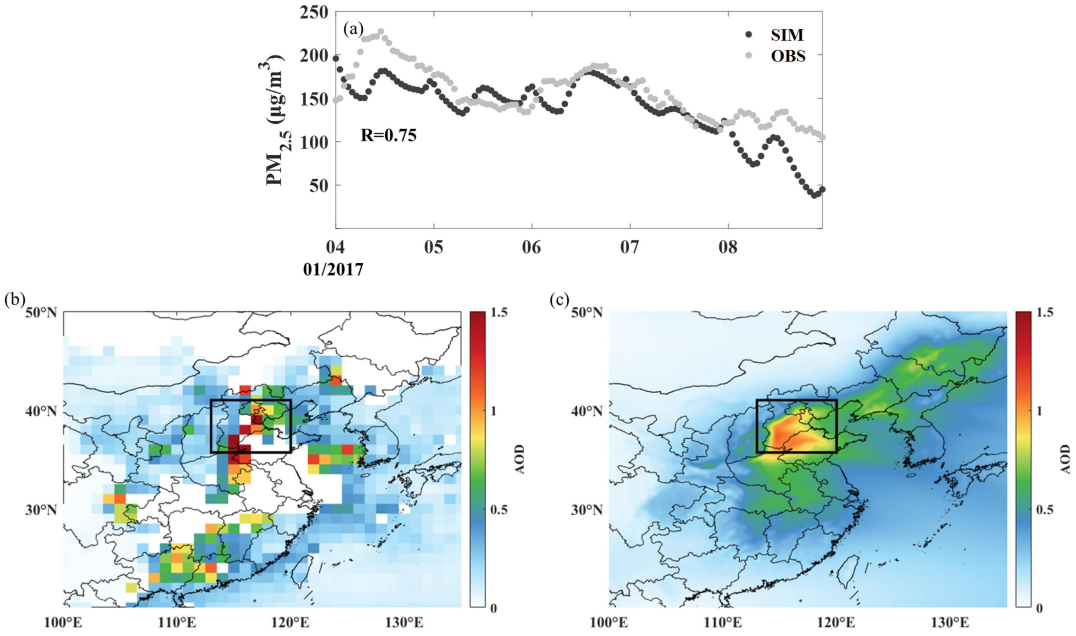

Figure S1: (a) The temporal variation of regional mean $PM_{2.5}$ mass concentration in Jing-Jin-Ji. (b) The spatial distribution of mean AOD from 4 to 8 January 2017. The black rectangle represents the location of Jing-Jin-Ji.

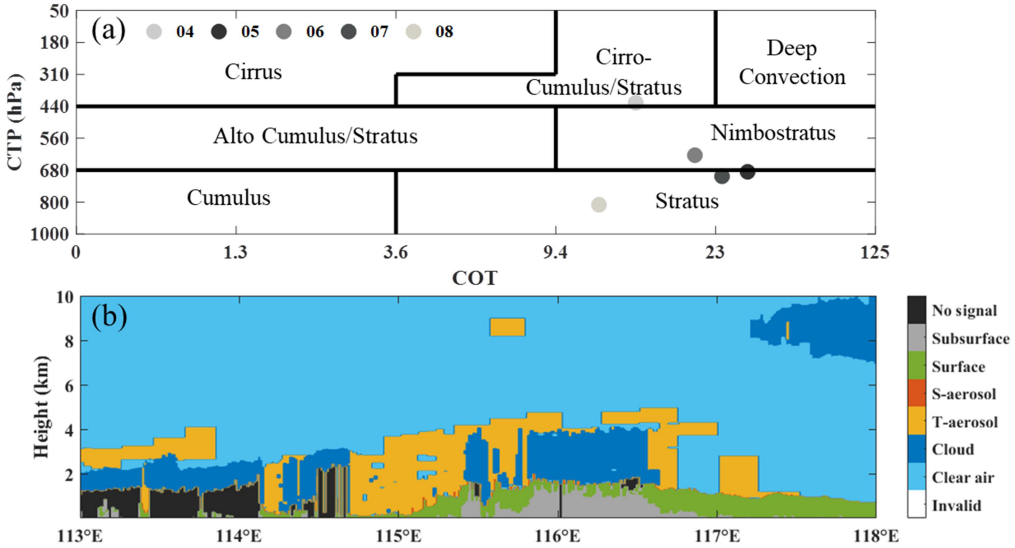

Figure S2: (a) Cloud types over Jing-Jin-Ji from 4 to 8 January 2017 based on ISCCP cloud classification algorithm. (b) The vertical distribution of aerosol and cloud layers described by VFM in Jing-Jin-Ji at 18:12 on 7 January 2017.

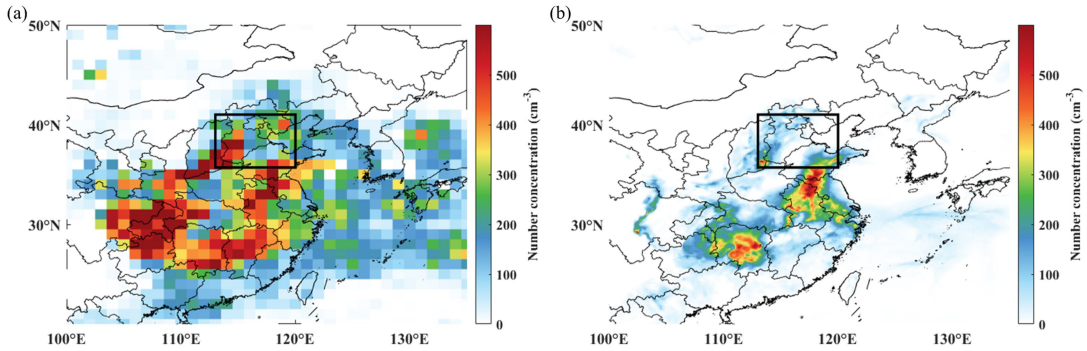

Figure S3: The spatial distribution of mean number concentration of cloud droplets on 7 January 2017. (a) The VIIRS. (b) The mean simulations between 950 and 850 hPa from E2 experiment.

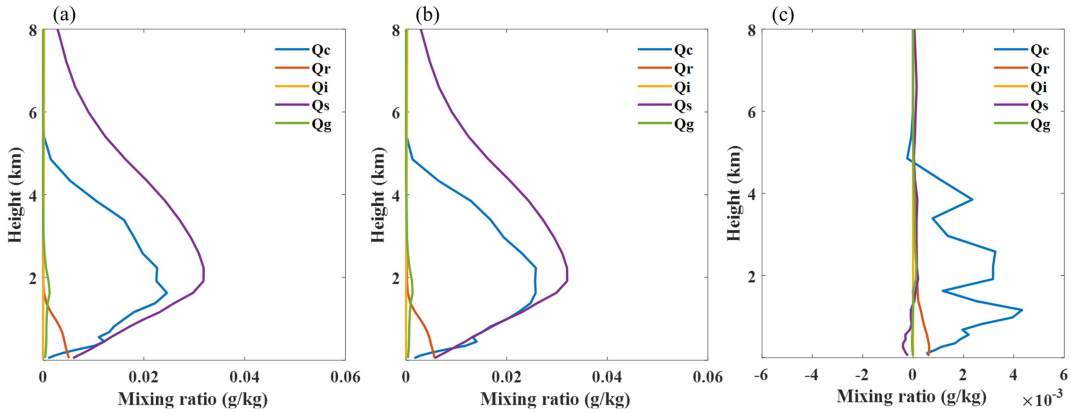

Figure S4: The vertical profile of regional mean hydrometeors mixing ratio (Qc, Qr, Qi, Qs, and Qg) in Jing-Jin-Ji on 7 January 2017. (a) The E1 experiment. (b) The E2 experiment. (c) The difference between the E2 and E1 experiment.

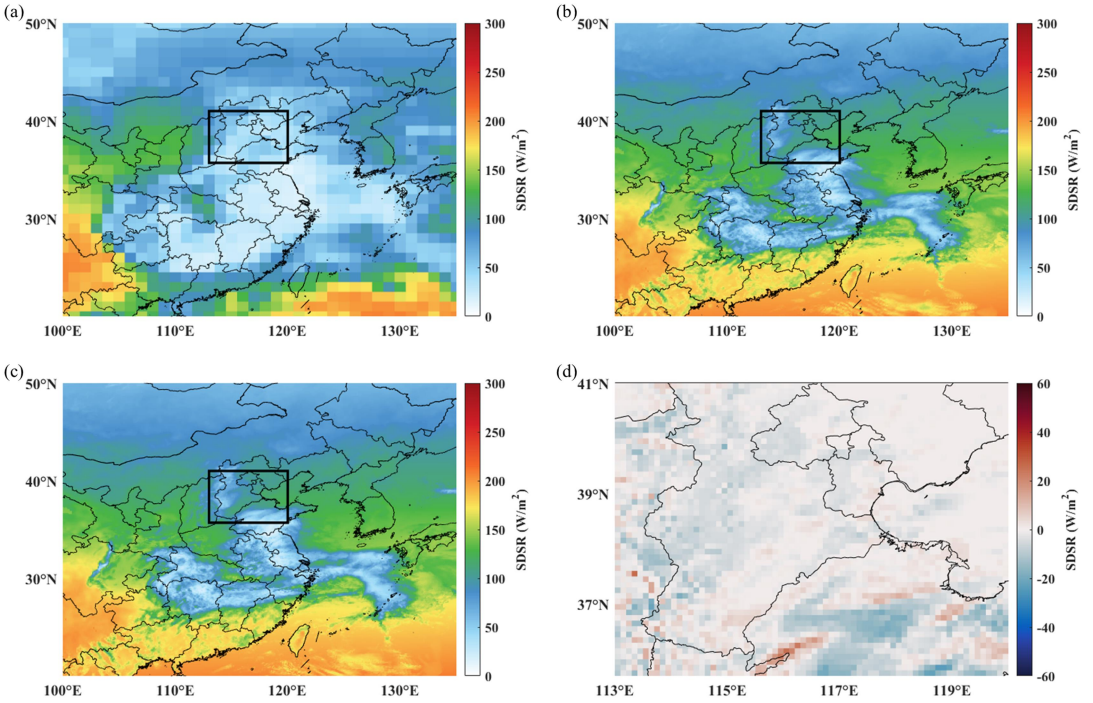

Figure S5: The spatial distribution of mean SDSR on 7 January 2017. (a) The VIIRS. (b) The E1 experiment. (c) The E2 experiment. (d) The difference between the E2 and E1 experiment in Jing-Jin-Ji.

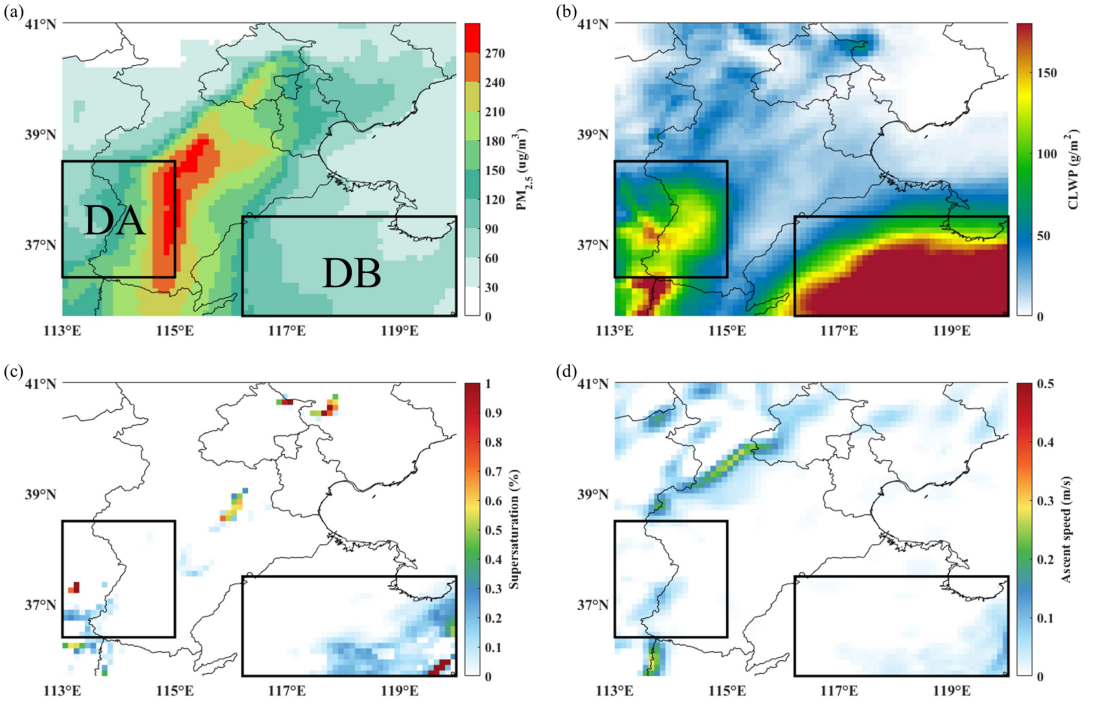

Figure S6: The spatial distribution of $PM_{2.5}$ mass concentration, CLWP, supersaturation (900 hPa), and ascent speed (900 hPa). (a) and (b) mean simulations on 7 January 2017. (c) and (d) simulations at 18:00 on 7 January 2017. The black rectangles are the locations of DA and DB.

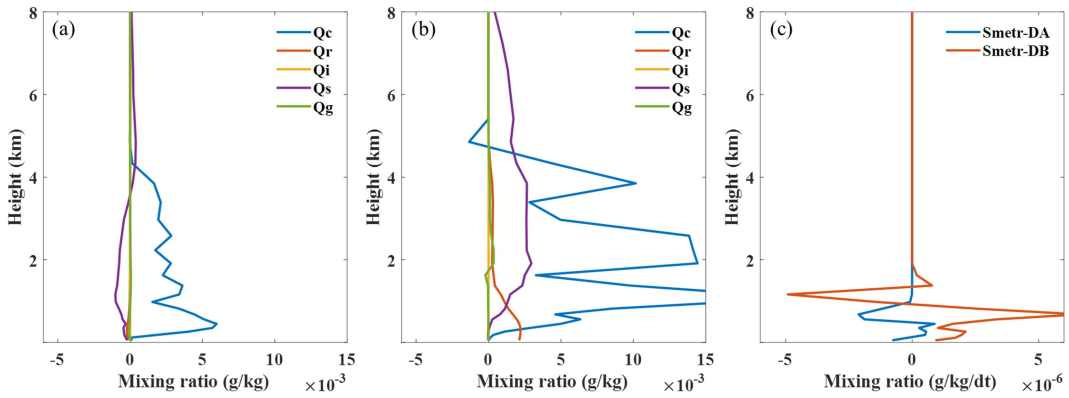

Figure S7: (a) The difference of mean hydrometeors mixing ratio between the E2 and E1 experiment on 7 January 2017 in the DA. (b) The same as (a) but for the DB. (c) The difference of melting of the snow to form rain in the DA and DB, respectively. The dt is 100s.