



Supplement of

Relative roles of aerosol size and hygroscopicity in modulating marine liquid-phase cloud responses under the winter monsoon

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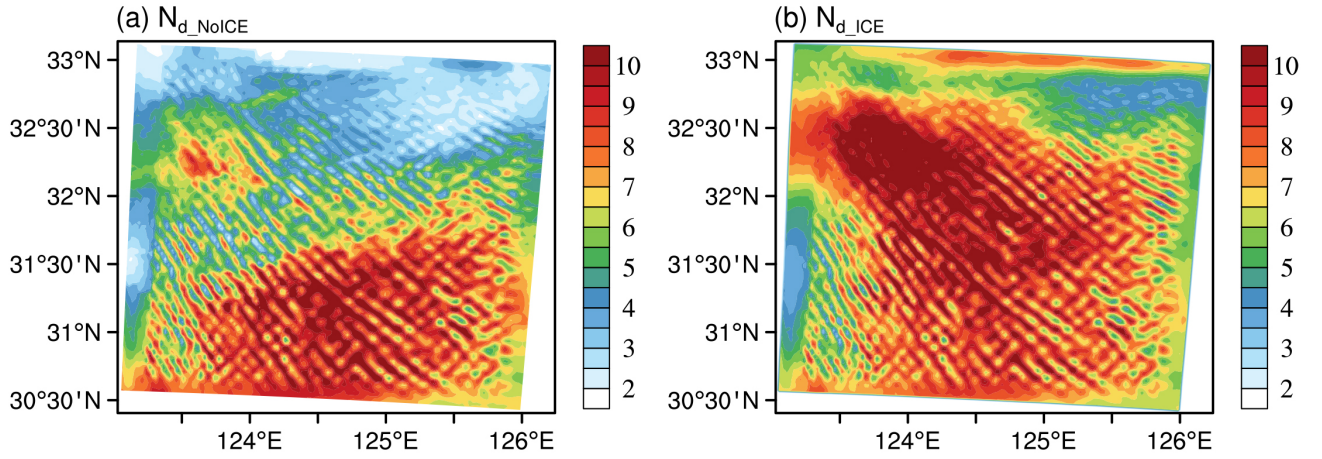


Figure S1. Spatial distribution (Control experiment) of column-mean N_d (in cm^{-3}) averaged over the simulation period without (a) and with (b) ice-phase and mixed-phase clouds.

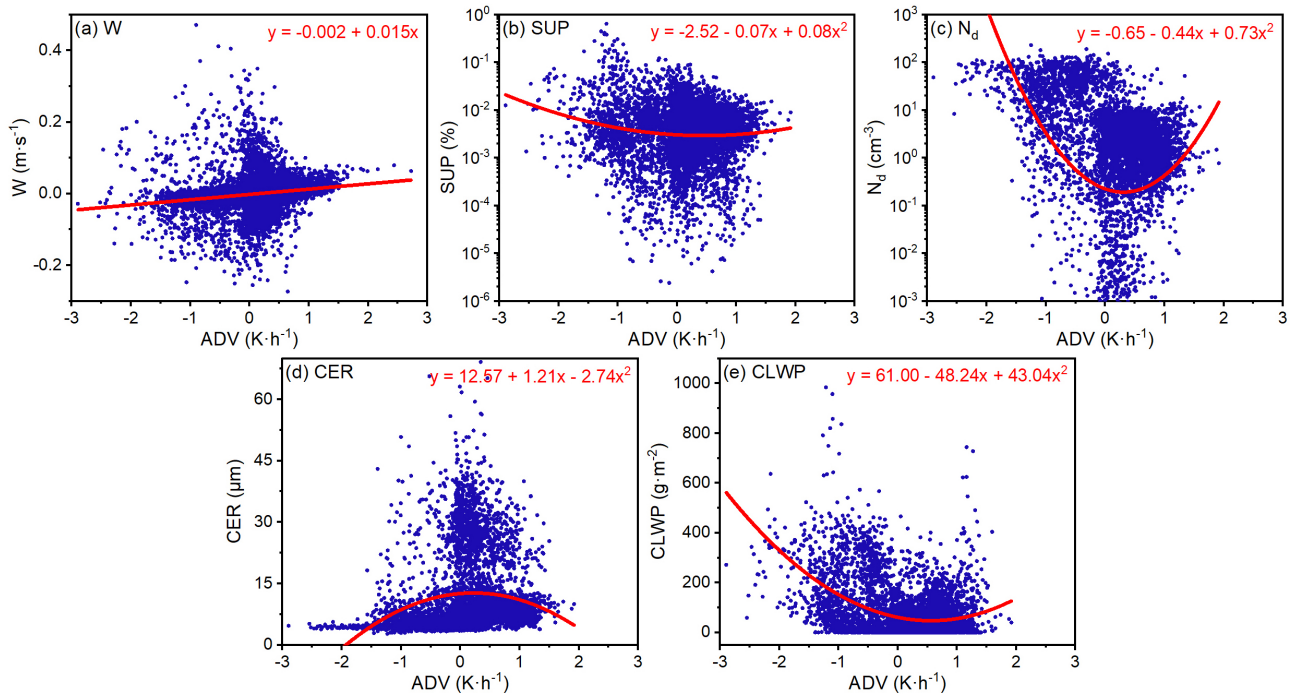


Figure S2. Variations of vertically weighted average vertical wind speed (a) and supersaturation (b) from near the surface up to 1300 m, column average N_d (c), as well as CER (d) and CLWP (e) with vertically weighted average ADV from near the surface up to 1300 m (blue dots in the figure, sampled at intervals of 10 horizontal grids due to excessive total sample sizes of all the grid cells at all the time points) and the fitted curves (red lines in the figure, the optimal fitting solution among the linear and polynomial fits was selected as the fitted curve for each variable).

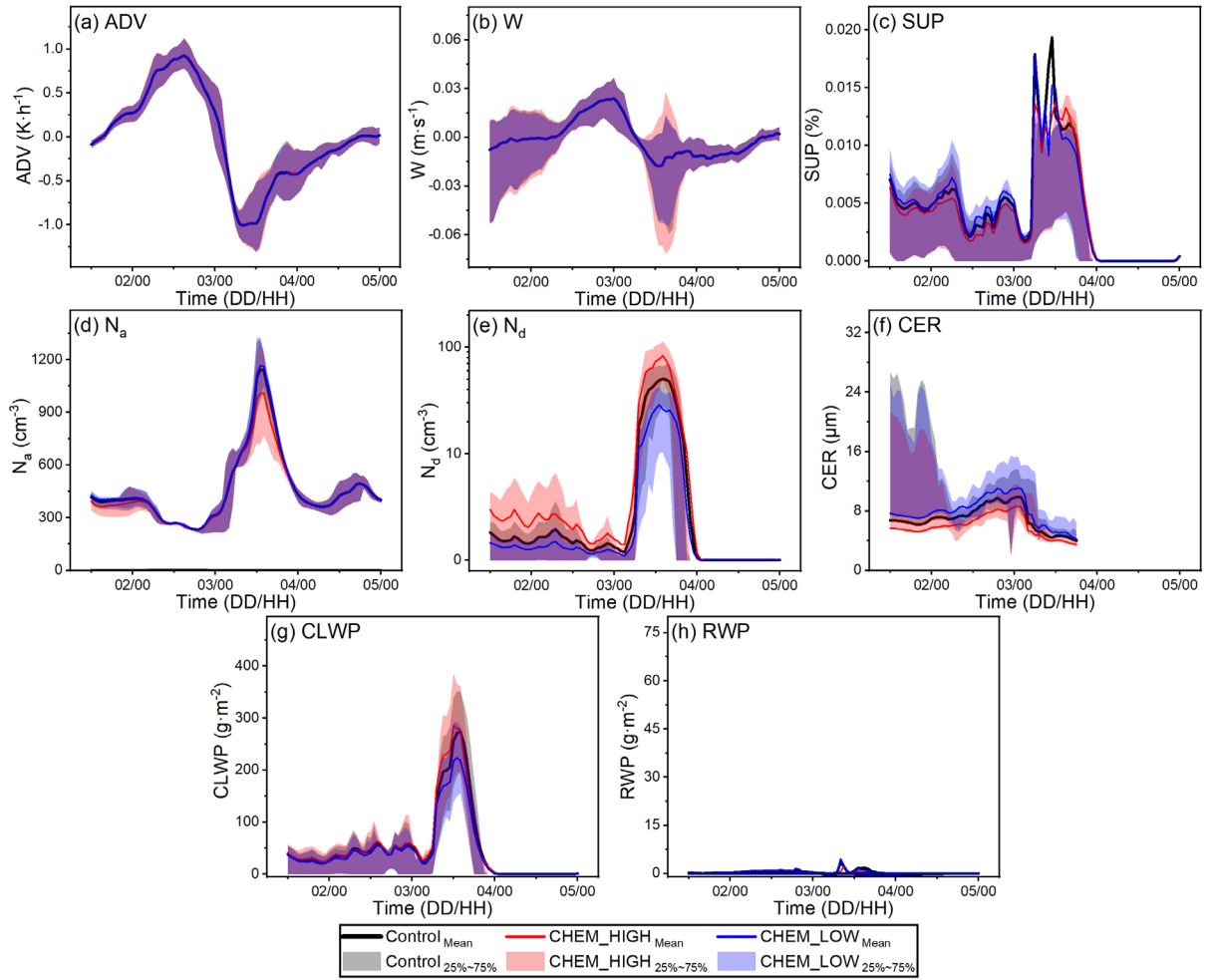


Figure S3. Same as Fig. 2, but red and blue lines and shaded areas represent the results of CHEM_HIGH and CHEM_LOW experiments, respectively.

Table S1. Statistical information of meteorological fields for each experiment, and correlations and deviations of other experiments relative to the Control experiment*.

		Control	SIZE_LARGE	SIZE_SMALL	CHEM_HIGH	CHEM_LOW
<i>H</i>	Mean (m)	3803.0	3802.3	3803.1	3803.0	3803.0
	MAX (m)	18544.6	18544.5	18544.6	18544.7	18544.7
	MIN (m)	38.8	38.8	38.8	38.8	38.8
	r	-	1.0	1.0	1.0	1.0
	NMD (%)	-	-0.02	0.00	0.00	0.00
<i>T</i>	Mean (K)	265.2	265.1	265.2	265.2	265.2
	MAX (K)	293.6	293.6	293.6	293.6	293.6
	MIN (K)	195.7	195.7	195.7	195.7	195.7
	r	-	1.0	1.0	1.0	1.0
	NMD (%)	-	-0.05	0.01	0.00	0.00
<i>T-T_d</i>	Mean (K)	12.7	12.6	12.7	12.7	12.7
	MAX (K)	84.8	84.8	84.8	84.8	84.8
	MIN (K)	-1.1	-1.1	-1.2	-1.1	-1.1
	r	-	1.0	1.0	1.0	1.0
	NMD (%)	-	-0.92	0.13	0.03	0.03
<i>u</i>	Mean (m s ⁻¹)	20.4	20.4	20.4	20.4	20.4
	MAX (m s ⁻¹)	99.1	99.1	99.1	99.1	99.1
	MIN (m s ⁻¹)	-8.4	-8.4	-8.4	-8.4	-8.4
	r	-	1.0	1.0	1.0	1.0
	NMD (%)	-	-0.01	0.00	0.00	0.00
<i>v</i>	Mean (m s ⁻¹)	3.8	3.8	3.8	3.8	3.8
	MAX (m s ⁻¹)	40.4	40.3	40.4	40.4	40.4
	MIN (m s ⁻¹)	-15.9	-16.5	-16.0	-16.4	-15.6
	r	-	1.0	1.0	1.0	1.0
	NMD (%)	-	-0.07	0.01	0.01	0.01

* All statistics in the table are calculated over all time steps and across all vertical and horizontal grid points. *H*, *T*, *T-T_d*, *u*, and *v* denote height, temperature, dewpoint depression, zonal wind, and meridional wind, respectively. The r and NMD represent the correlation and normalized mean difference of each sensitivity experiment relative to the Control experiment, calculated by reshaping the four-dimensional arrays (time, vertical, longitude, and latitude) of each variable into one-dimensional arrays in the same order. All r values pass the 99% significance test.