Supplement of Atmos. Chem. Phys., 21, 6199–6220, 2021
https://doi.org/10.5194/acp-21-6199-2021-supplement

Atmospheric Chemistry and Physics
Open Access
EGU

Supplement of

Potential impact of aerosols on convective clouds revealed by Himawari-8 observations over different terrain types in eastern China

Tianmeng Chen et al.

Correspondence to: Zhanqing Li (zhanqing@umd.edu) and Chuanfeng Zhao (czhao@bnu.edu.cn)

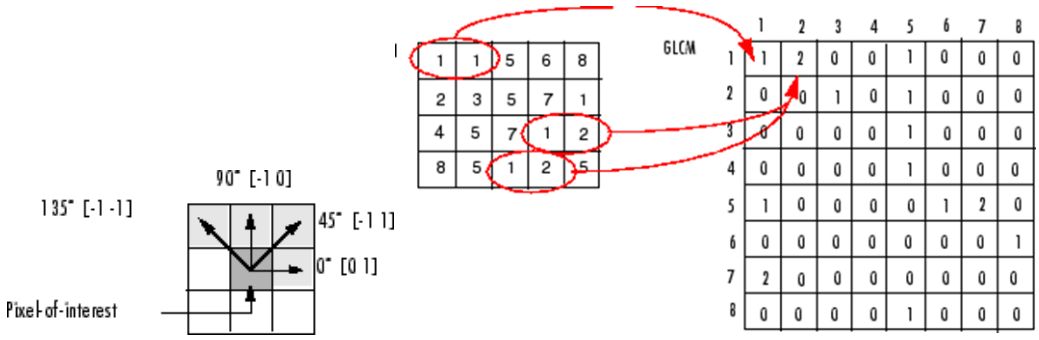

Figure S1. An example of the GLCM at d=1 and θ=0° (From Haralick, 1973). The GLCM is a matrix of counts of grey values, for pairs of pixels whose relative positions are defined by the polar coordinates (d, θ). GLCM assesses the relative frequency of the (i, j)th element, where i and j are the gray tones of two pixels separated by distance d in direction θ. The unit of d is a pixel, and θ always takes 0°, 45°, 90°, and 135°.

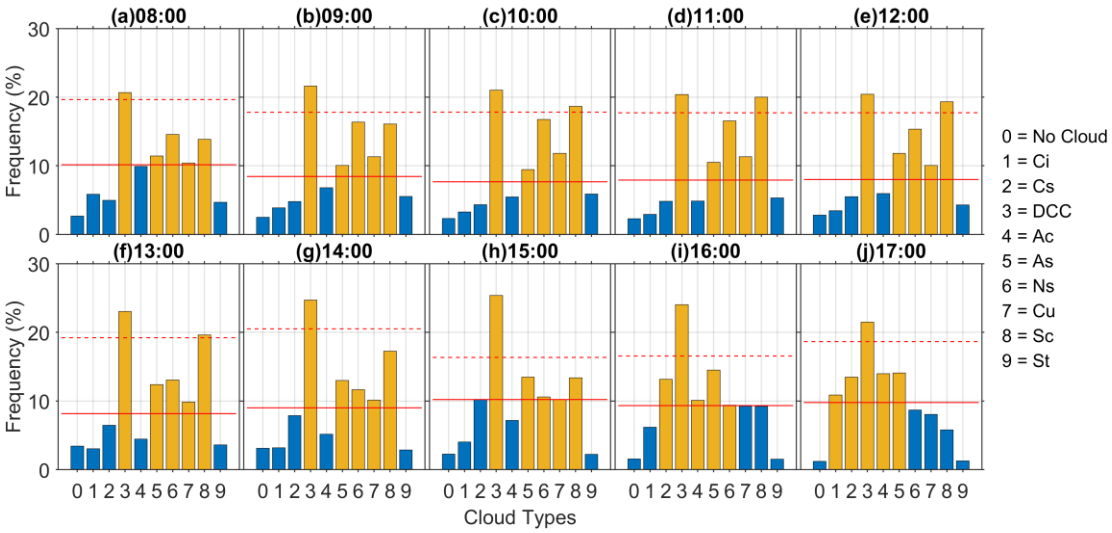

Figure S2. Frequencies of cloud types corresponding to the identified convective cloud with TCT-CID method in the warm seasons (May to September) of 2016 and 2017. Cloud type numbers represent 1 = cirrus (Ci), 2 = stratocirrus (Cs), 3 = deep convective cloud (DCC), 4 = altocumulus (Ac), 5 = altostratus (As), 6 = nimbostratus (Ns), 7 = cumulus (Cu), 8 = stratocumulus (Sc), 9 = stratus (St). Red solid and dashed line represent the median and 2σ of frequency distribution, respectively. Orange bars are cloud types with frequencies pass the median value.

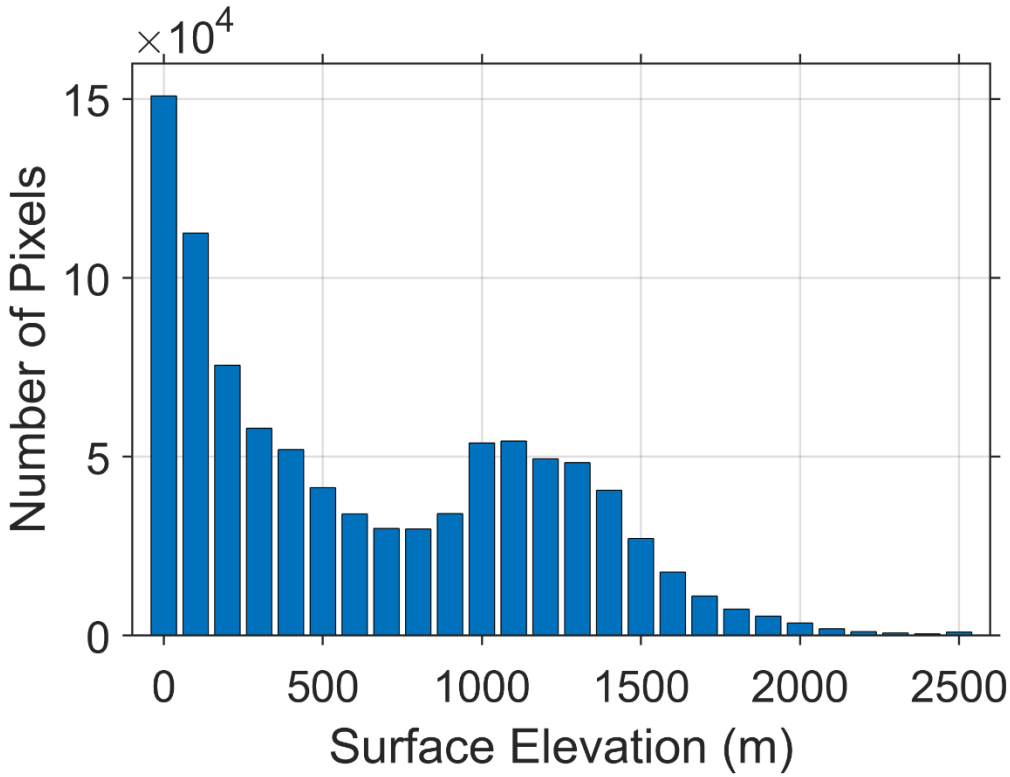

Figure S3. Surface elevation distribution over the region of interest (ROI).

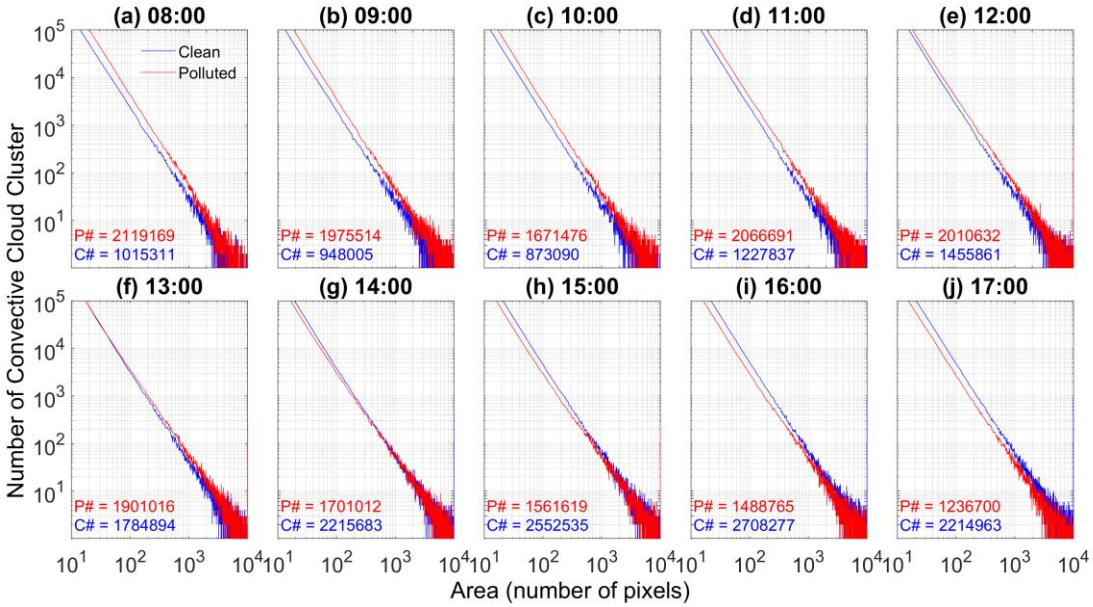

Figure S4. Number of convective cloud clusters with respect to convective cloud area (the bin size is 10 pixels) in polluted (red) and clean (blue) environments during daytime in May-September, 2016-2017. P# and C# marked at the bottom of each panel are the total number of convective cloud clusters identified by the TCT-CID method in polluted and clean environments, respectively. The time marked above each figure is the local time.

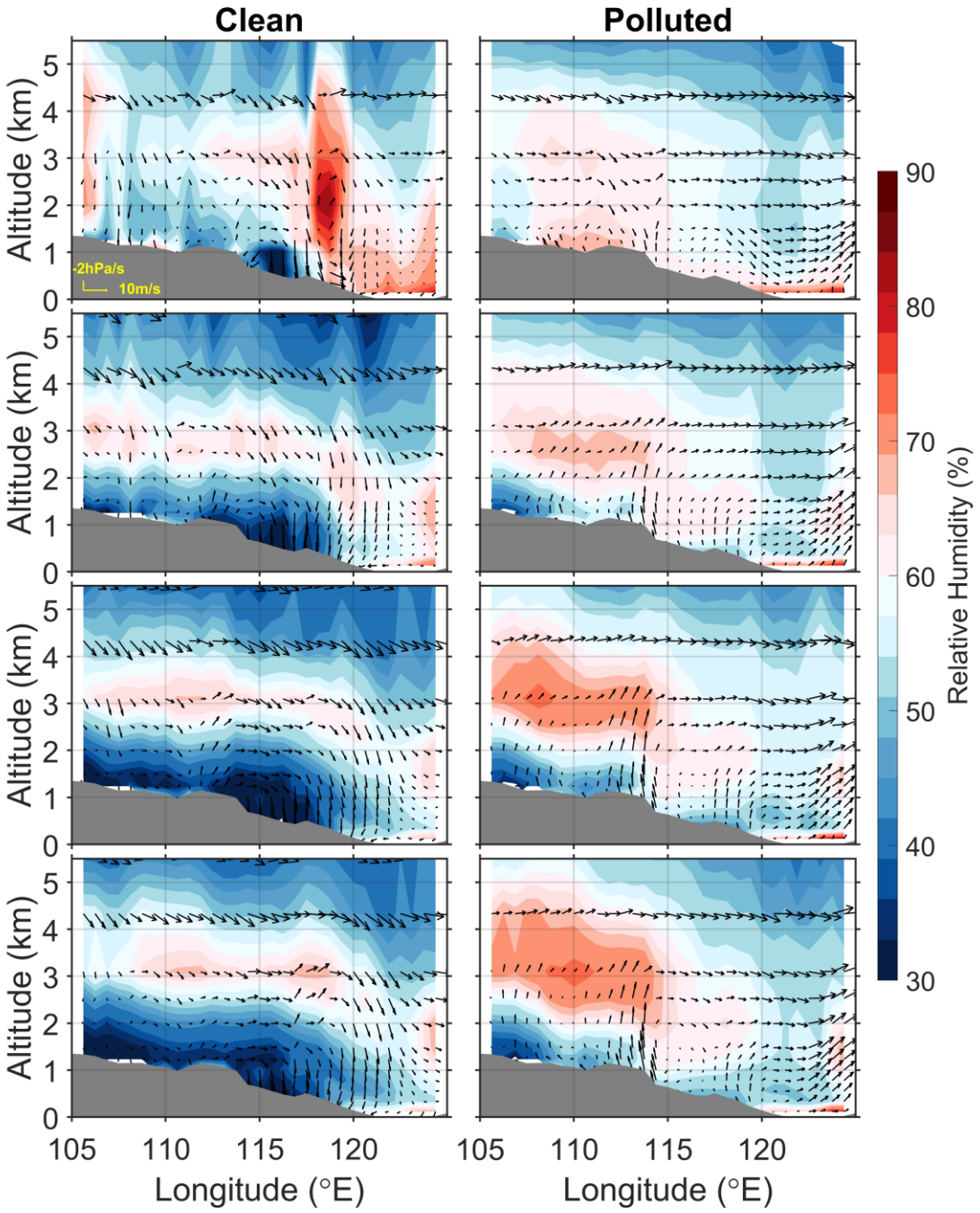

Figure S5. May-September (2016 and 2017) longitude-altitude cross-sections of mean relative humidity (color-shaded) and mean zonal-vertical wind (vectors) over the continent for clean (left panel) and polluted (right panel) conditions at (a, b) 08:00 LT, (c, d) 11:00 LT, (e, f) 14:00 LT and (g, h) 17:00 LT over 35-45°N within ROI. Vectors are composed by eastern wind u and vertical velocity ω scaled with -100. Gray shaded parts are the zonal mean terrain heights of 35-45°N within ROI.

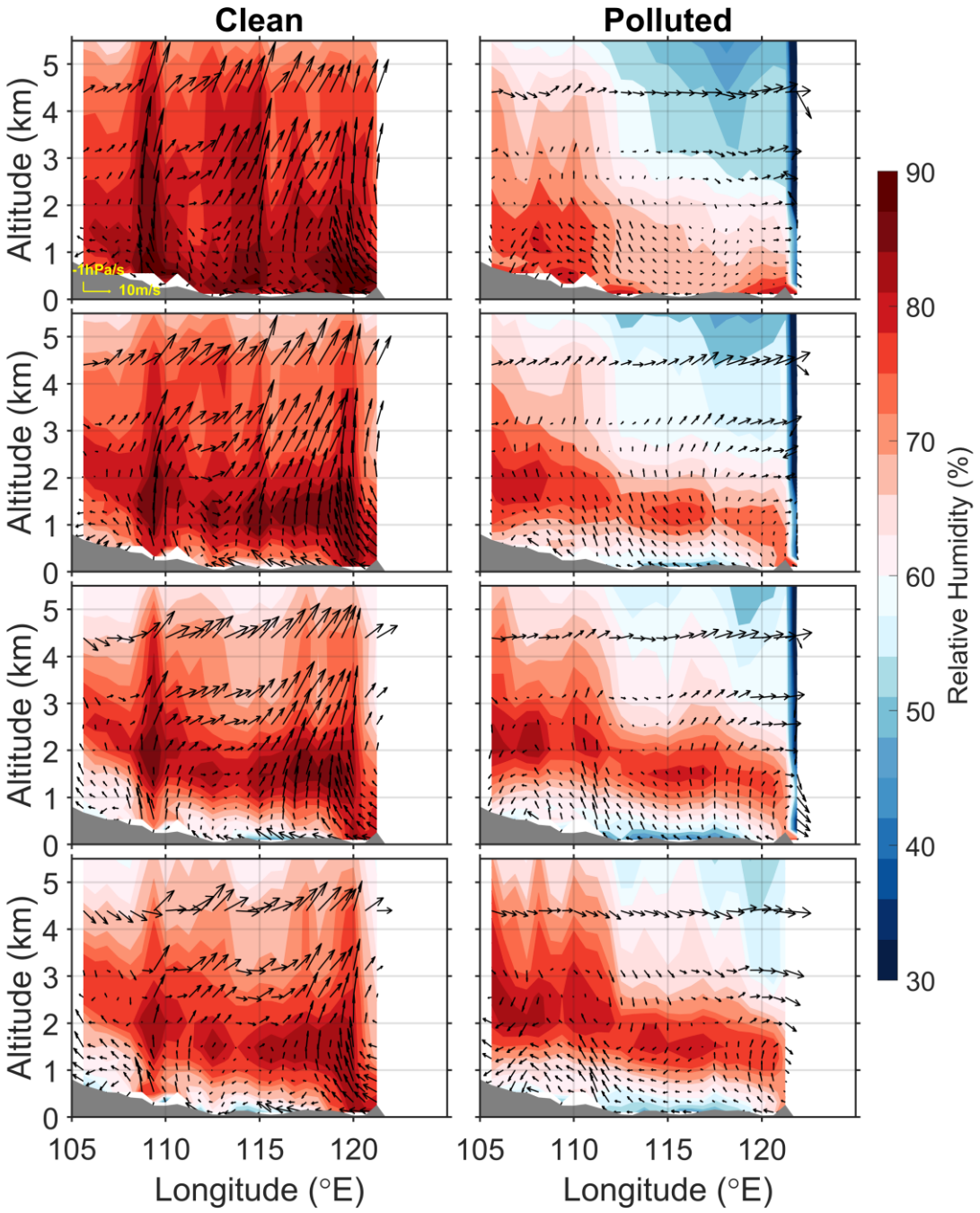

Figure S6. Same as Figure S4, but for cases over 25-35°N.

Table S1. Sample numbers in each subfigure in Figure 13

Variables	8:00	11:00	14:00	17:00
CAPE	61617183	80540597	98437416	93367514
θ	75680546	99346479	123881586	122078779
ω800	13006299	20543919	28460363	30182659
ω900	47481022	62754222	71330358	60125048
RH800	15497893	23035081	34405883	38837607
RH900	55144631	69801328	81217875	72647409
q	75676313	99390321	125010900	122913304

Table S2. Sample numbers in each subfigure in Figure 14

Variables	0m-500m	500m-1000m	1000m-1500m	1500m-2000m
CAPE	173567407	77428738	63863401	19103164
θ	216541215	93471060	85769179	25205936
ω800	0	0	71186445	21006795
ω900	183775417	57915233	0	0
RH800	0	0	86534373	25242091
RH900	212838948	65972295	0	0
q	216544497	93508434	86664779	26273128