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Insights of warm-cloud biases in Community Atmospheric Model 5 and 6 from the single-column modeling framework and Aerosol and Cloud Experiments in the Eastern North Atlantic (ACE-ENA) observations

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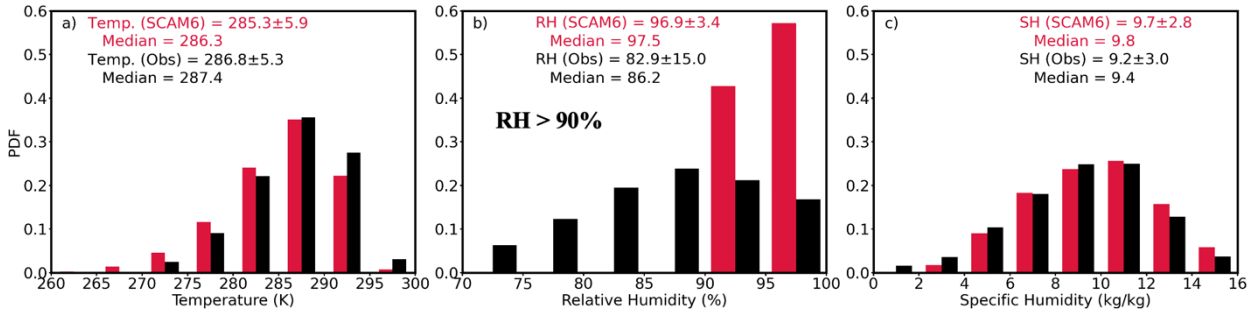

Figure S1. The same with Fig. 1c-d but for the grids with RH larger than 90%.

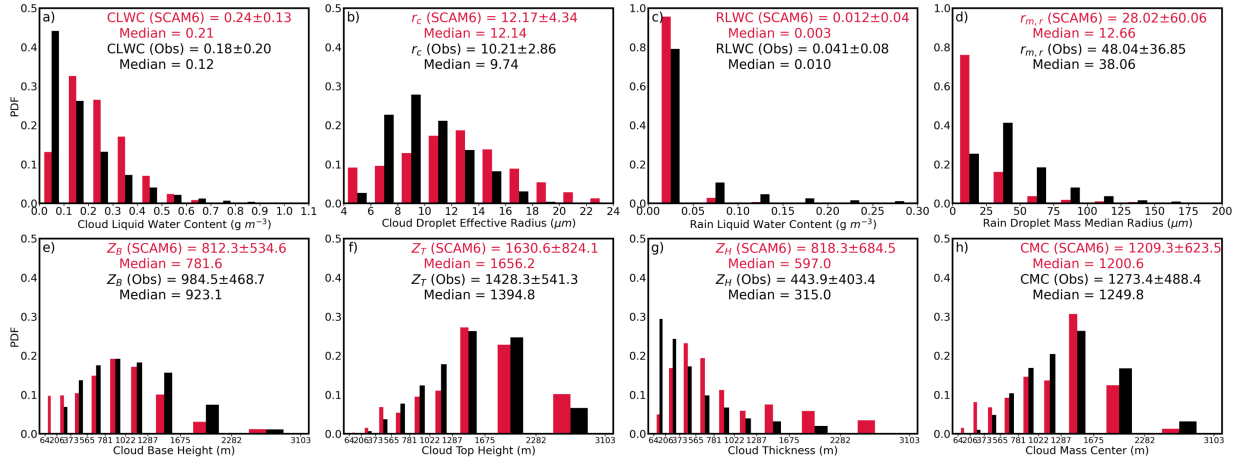

Figure S2. The same with Fig. 3 but the samples are selected based on the criteria of consecutive cloud layers lasting more than 2 hours with the cloud top heights less than 3 km, in order to strickly focus on the signals of stratus and stratocumulus clouds.

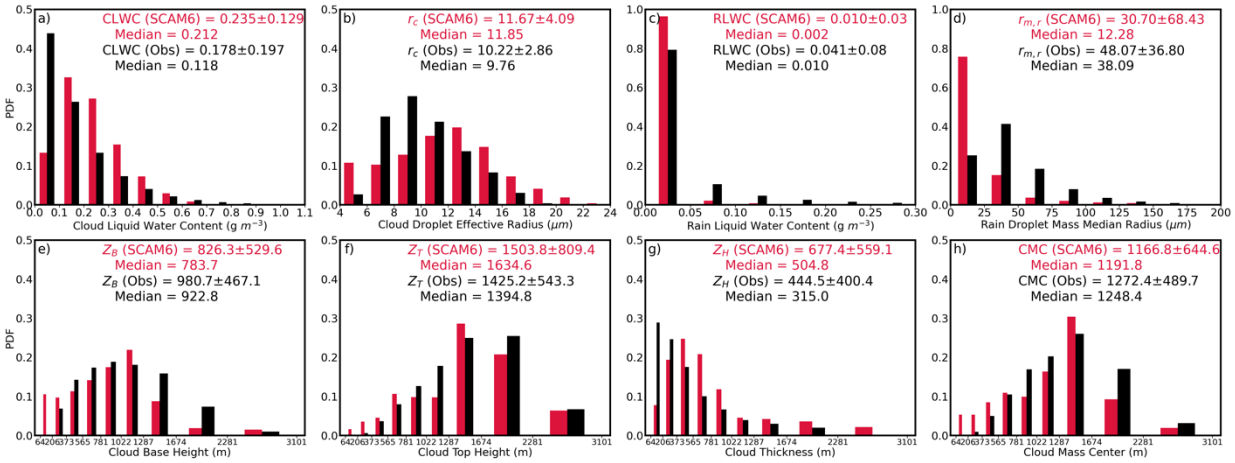

Figure S3. The same with Fig. 3 but for the sensitivity experiment in which all moisture related variables (both state variables and tendency terms) are scaled down by a factor of 0.85 in the large-scale forcing dataset to remedy the biases in the forcing.

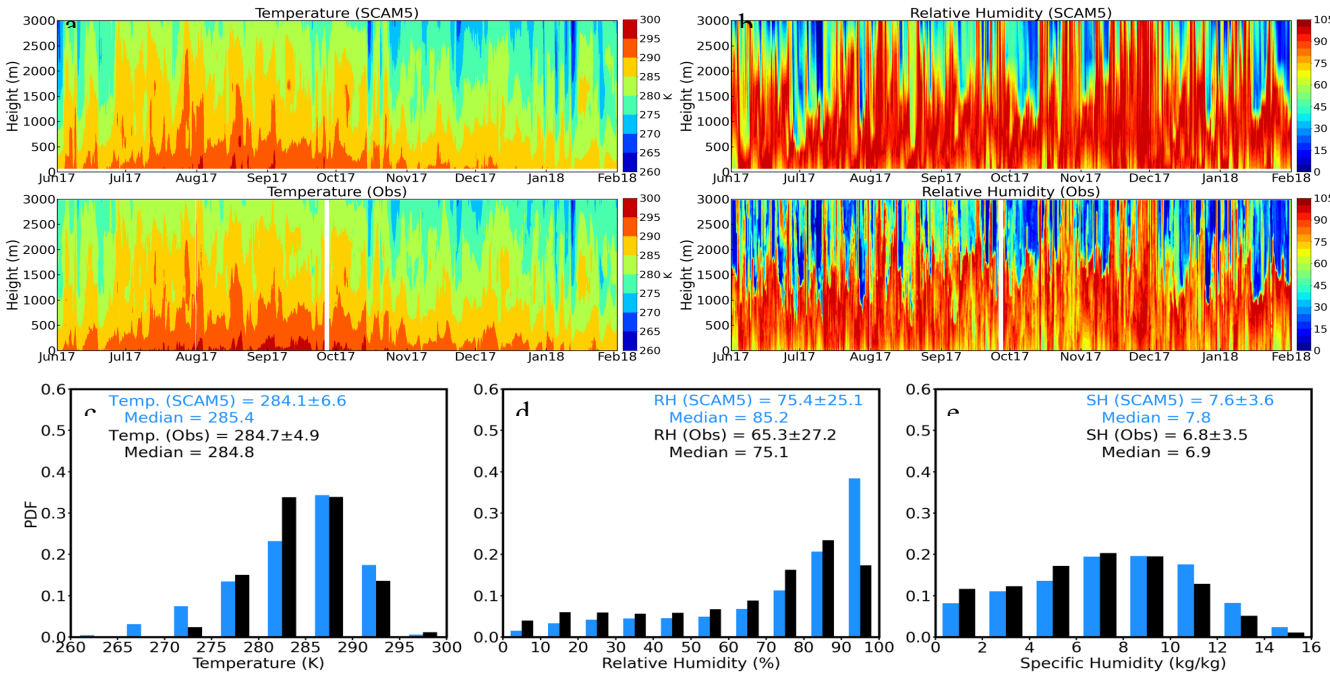

Figure S4. The same with Fig. 1 but for SCAM5.

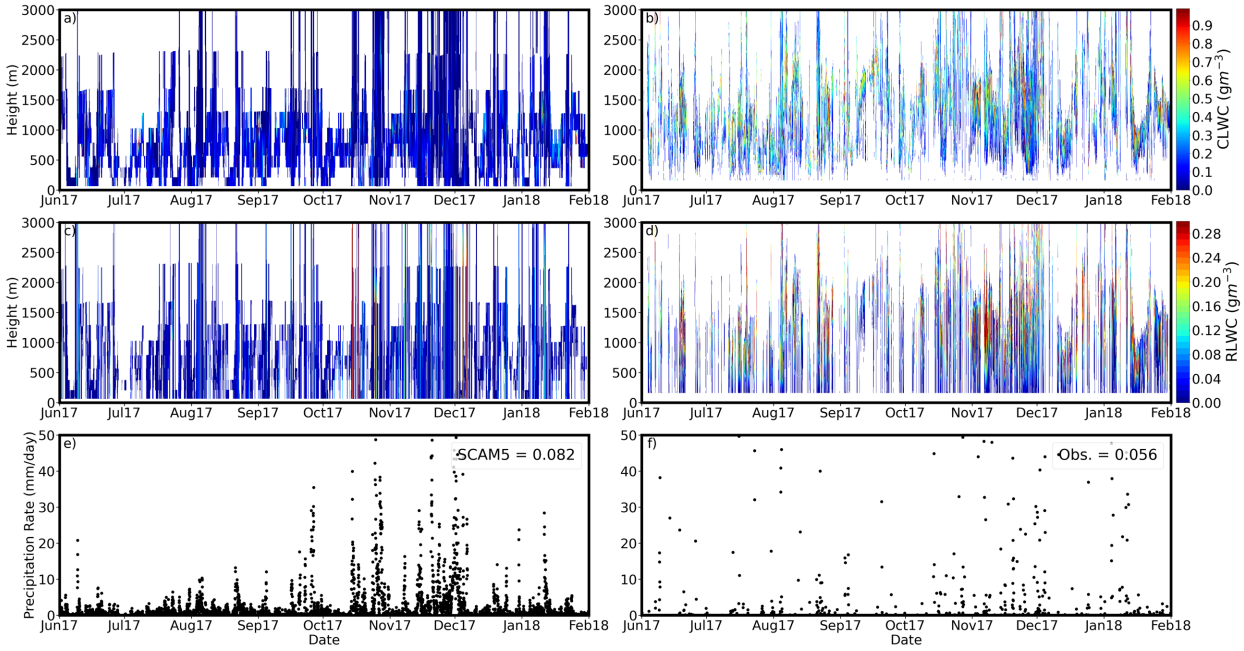

Figure S5. The same with Fig. 2 but for SCAM5.

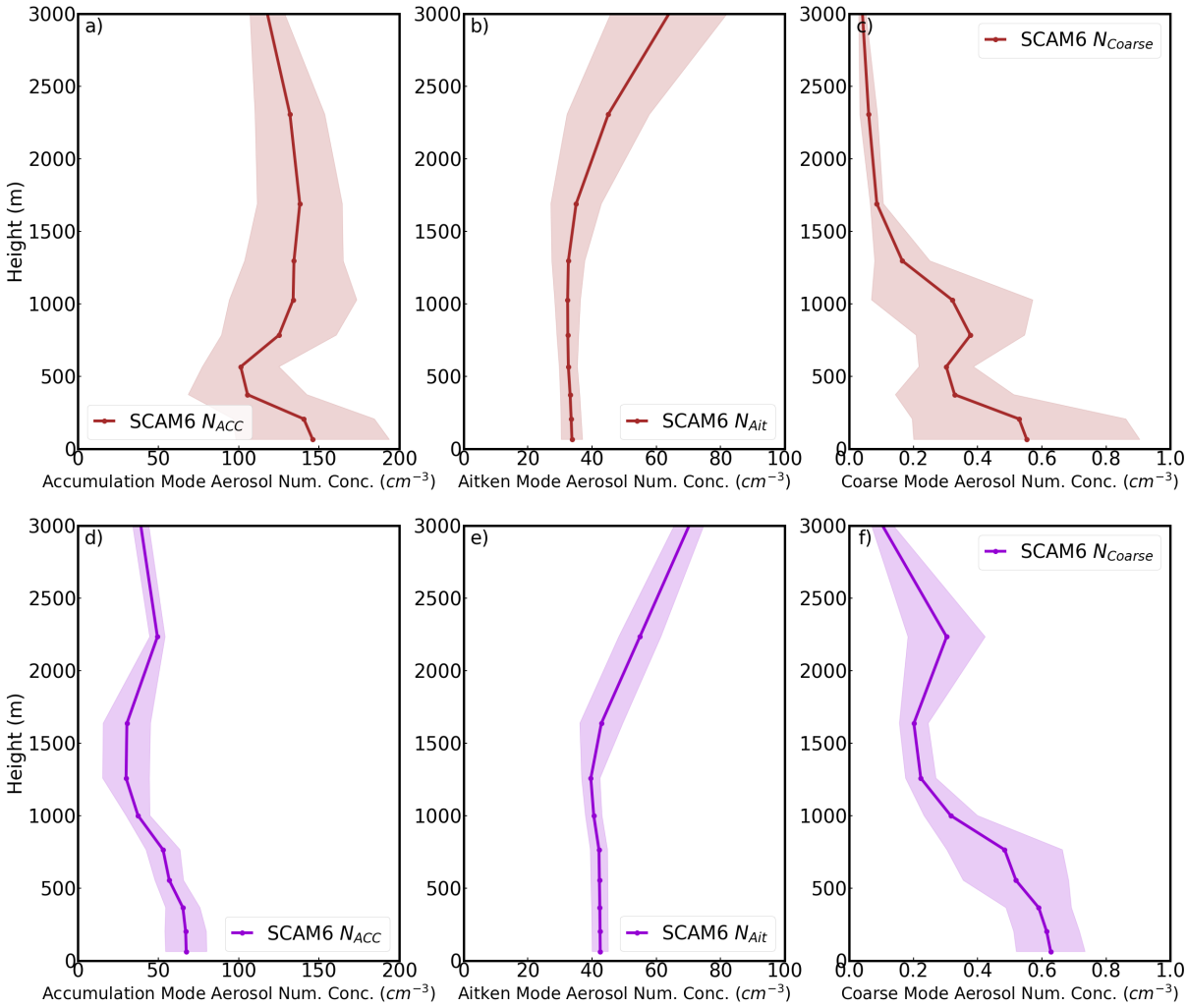

Figure S6. Vertical profiles of SCAM6 simulated aerosol number concentrations of Aitken mode (a, d); Accumulation mode (b, e); Coarse mode (c, f), during the Summer (brown) and Winter (purple) ACE-ENA IOPs.

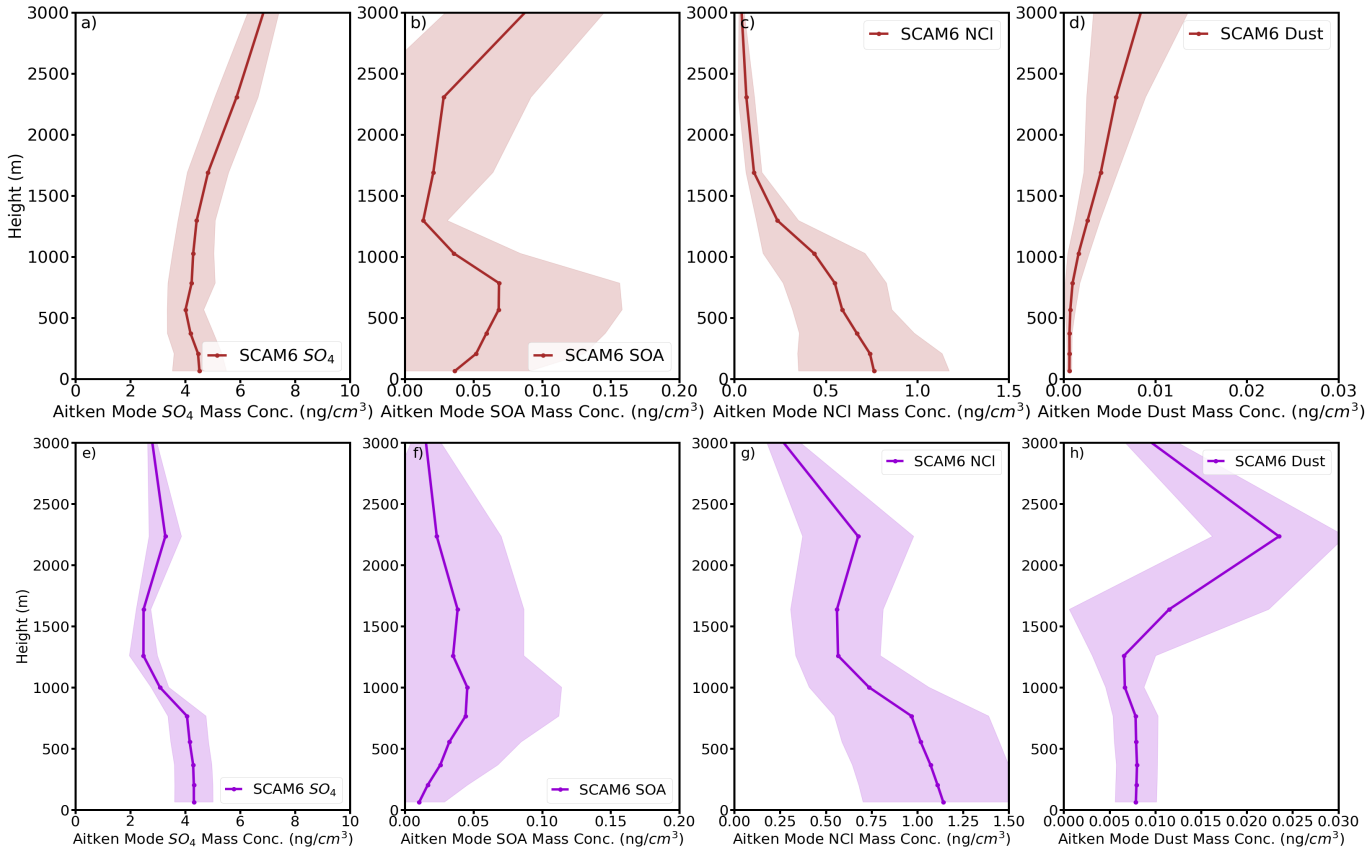

Figure S7. Vertical profiles of SCAM6 simulated Aitken mode aerosol chemical component mass concentrations of sulfate (a, e); SOA (b, f); NCl (c, g); Dust (d, h), during the Summer (brown) and Winter (purple) ACE-ENA IOPs.

Table S1. Date, starting and ending hours of the aircraft research flight selection during the ACE-ENA

Research Flight Date	Starting Hour (UTC)	Ending Hour (UTC)
20170626	9.65	11.60
20170628	9.65	12.20
20170630	9.80	11.60
20170703	11.00	14.20
20170704	9.00	10.60
20170706	8.90	11.60
20170711	10.60	13.70
20170712	9.50	12.60
20170713	9.30	11.90
20170715	12.50	14.20
20170718	9.10	11.90
20170720	8.90	10.90
20180119	12.80	15.55
20180124	13.50	14.70
20180125	11.50	13.85
20180129	10.00	13.00
20180130	10.00	13.50