Supplement of Atmos. Chem. Phys., 26, 15895–15913, 2026
https://doi.org/10.5194/acp-26-15895-2026-supplement
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Atmospheric Chemistry and Physics
Open Access
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Supplement of

Sensitivity of marine cloud brightening over the Great Barrier Reef to spatial variability in aerosol forcing: a case study using a convection-permitting model

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Supplementary

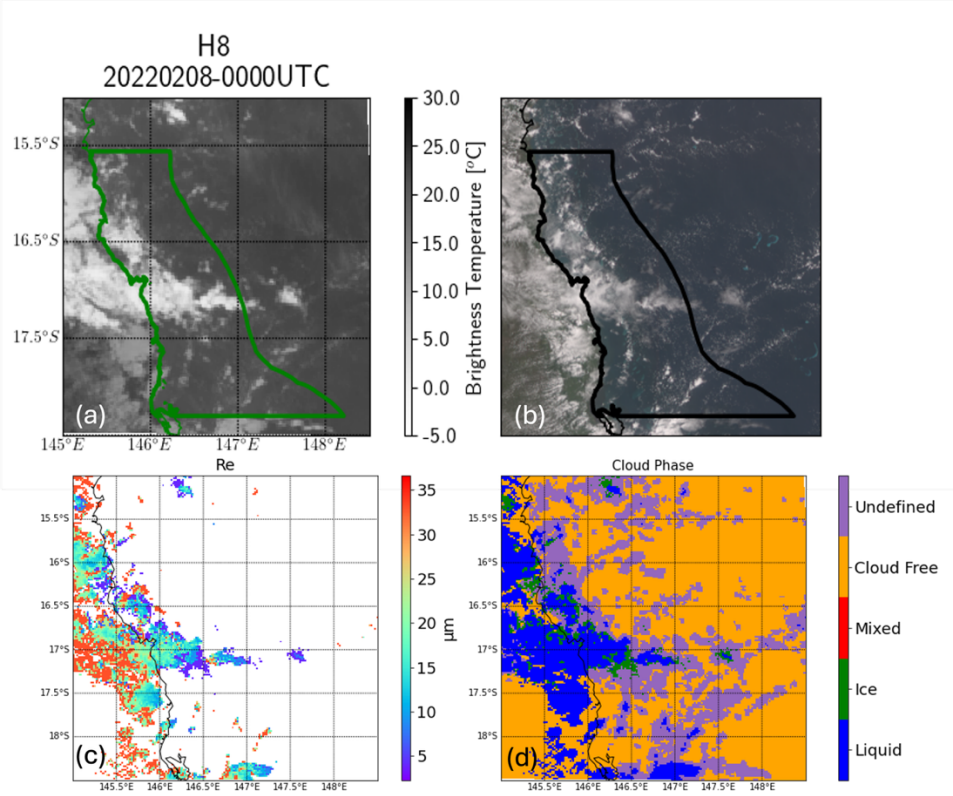


Figure S1: (a) Brightness temperatures of band 13 (10.4 μm) derived from Himawari-8 satellite observations on 08 of Feb 2022 at 0000 UTC. Green lines outline the domain of Carins region. (b) True color image from Himawari-8 satellite observations on 07 of Feb 2022 at 0000 UTC. (c-d) Cloud top effective radius and cloud phase retrievals from Himawari-8 on 07 of Feb 2022 at 0000 UTC.

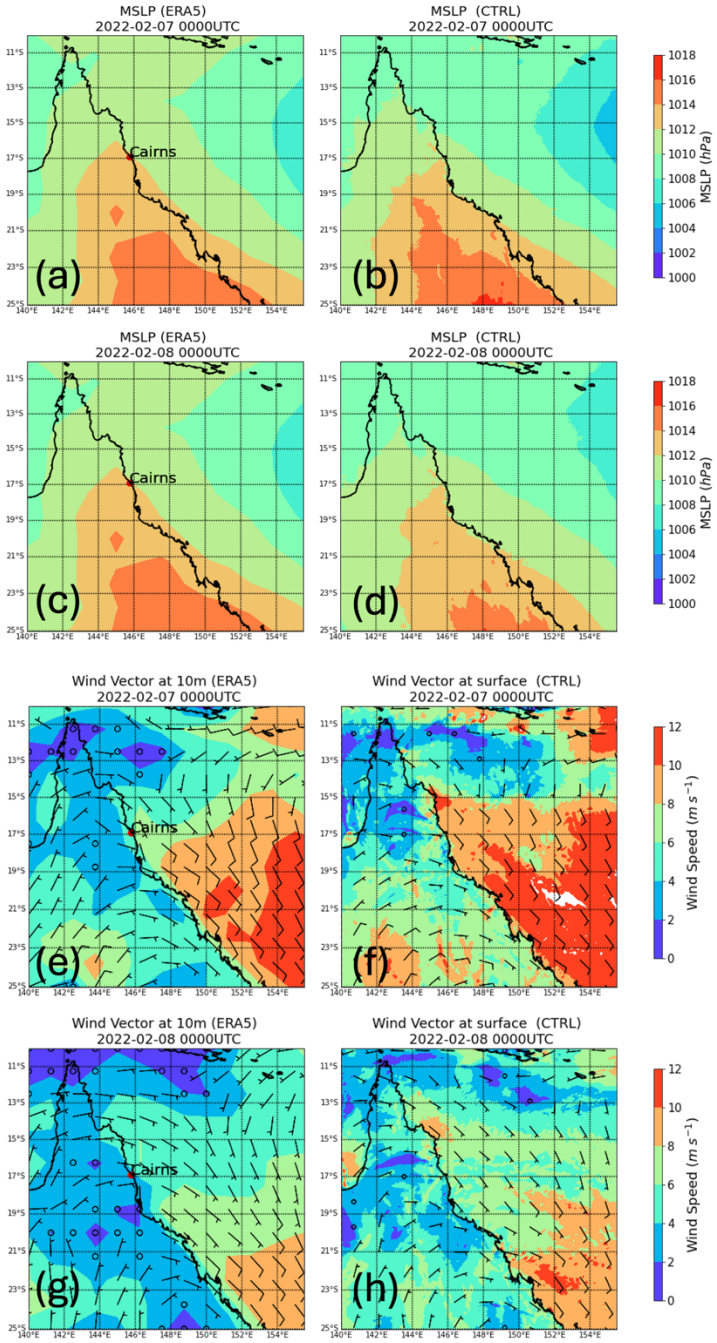


Figure S2: (a-d) Wind vector distribution at surface from ERA5 and WRF at 0000UTC 07 Feb and 08 Feb 2022. (e-h) MSLP from ERA5 and WRF at 0000UTC 07 Feb and 08 Feb 2022.

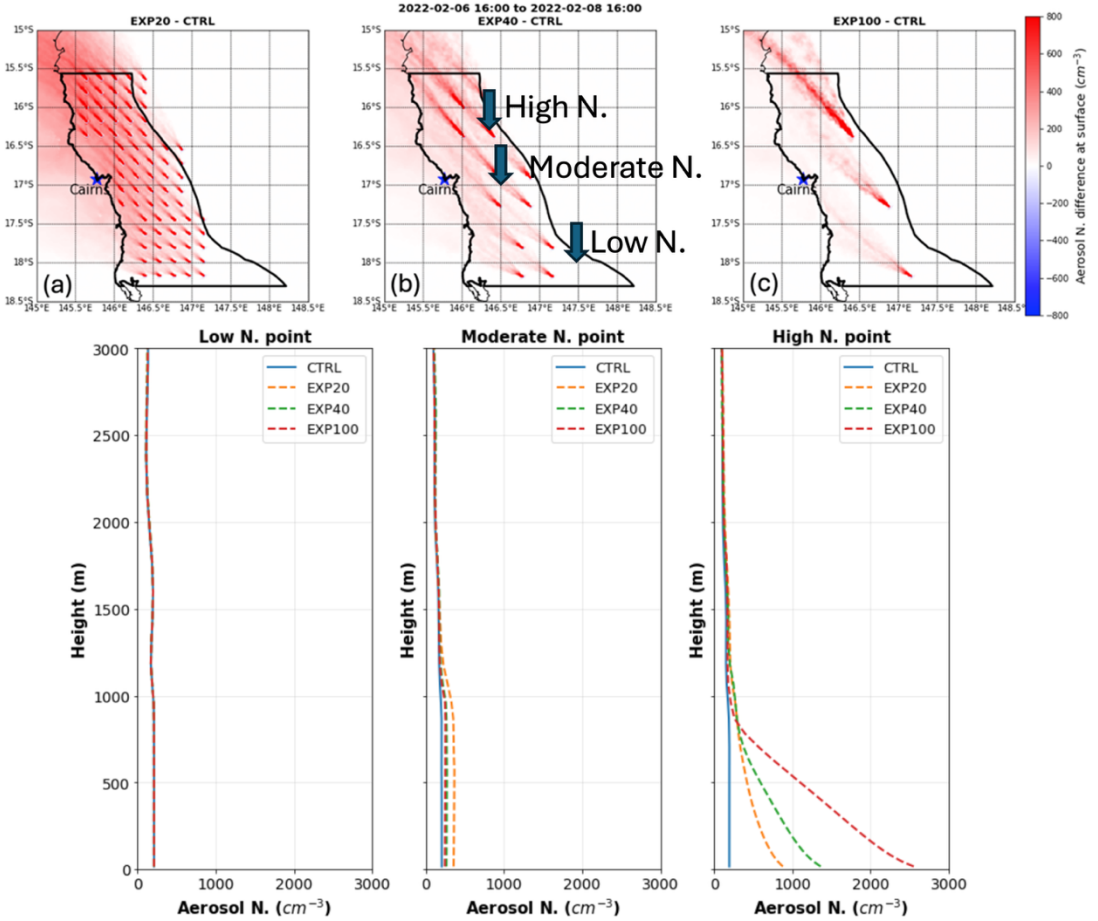


Figure S3: Aerosol number concentration profiles for columns with low, moderate, and high concentrations. The time period of this analysis is from 1600UTC 06 Feb 2022 to 1600UTC 08 Feb 2022.

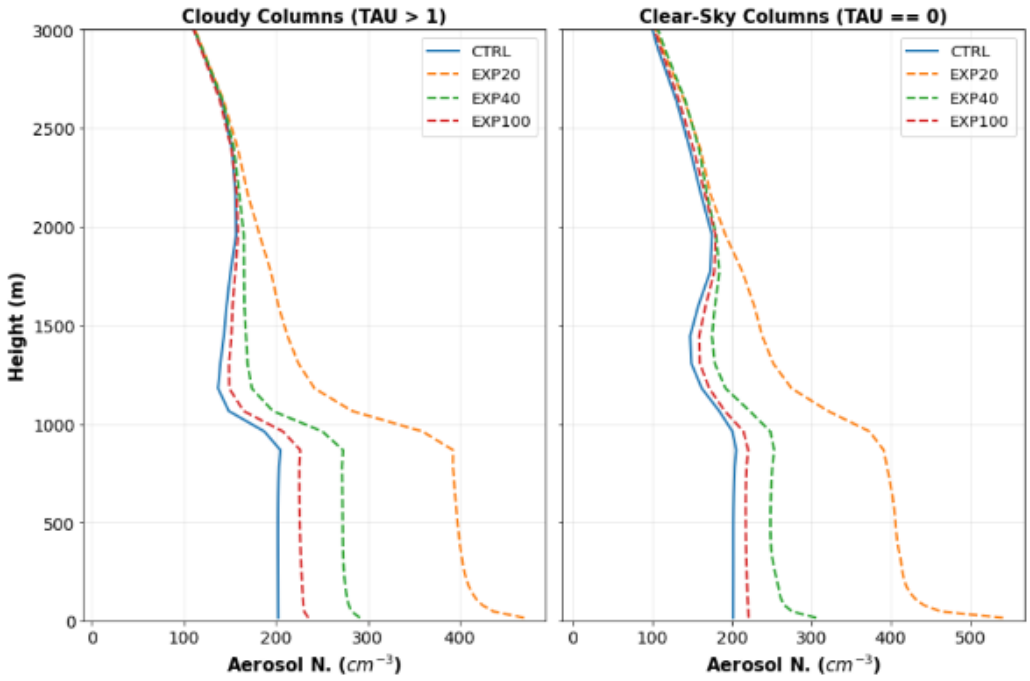


Figure S4: Domain-averaged vertical profiles of aerosol number concentration for cloudy and clear-sky columns. Cloudy columns are defined as those with optical depth (TAU) > 1, while clear-sky columns are defined as those with TAU = 0.

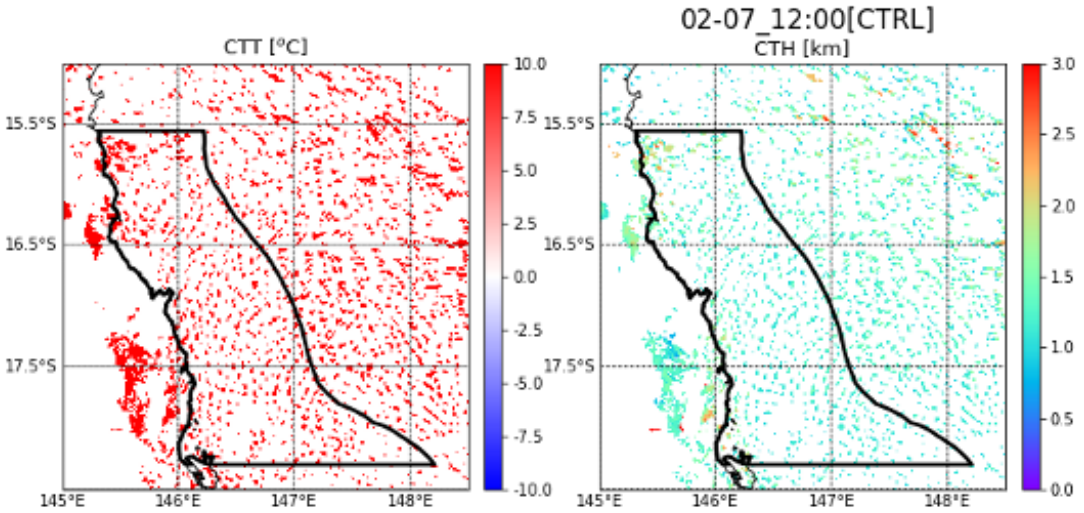


Figure S5: Simulated cloud top temperature and cloud top height field over the Carins Region at 12UTC 07 Feb.

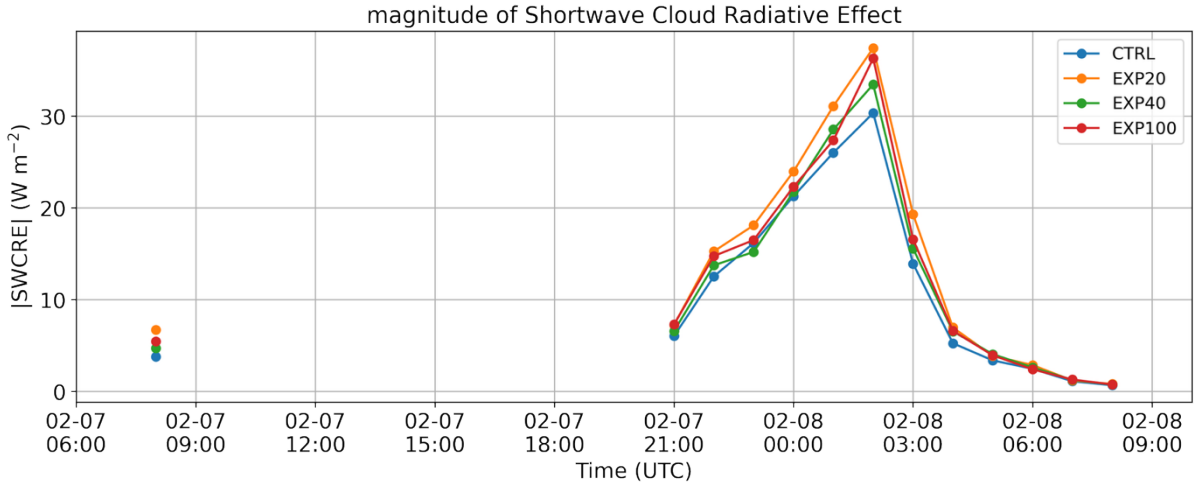


Figure S6: Time series of domain-averaged magnitude of shortwave cloud radiative effect over the Carins Region.

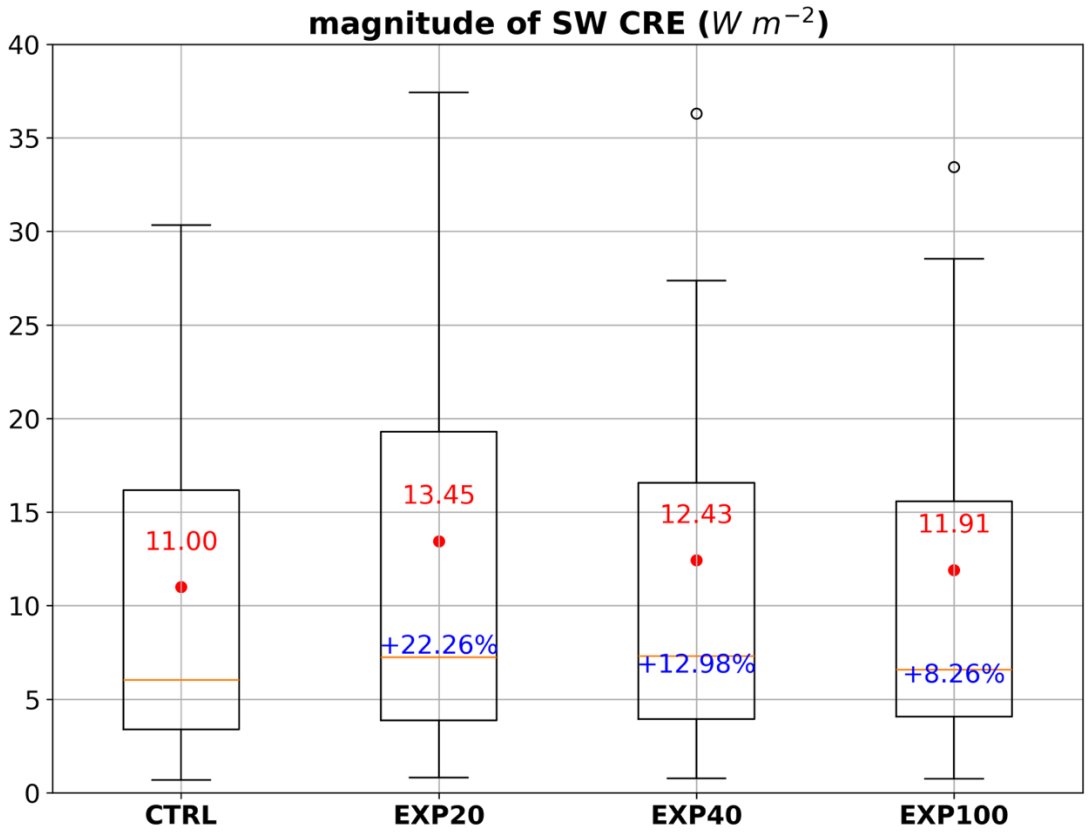


Figure S7: Boxplots of magnitude of SW CRE over the Cairns Region from CTRL and sensitivity experiments. Statistics are calculated for the period from 08:00 UTC on 7 Feb to 08:00 UTC on 8 Feb 2022.

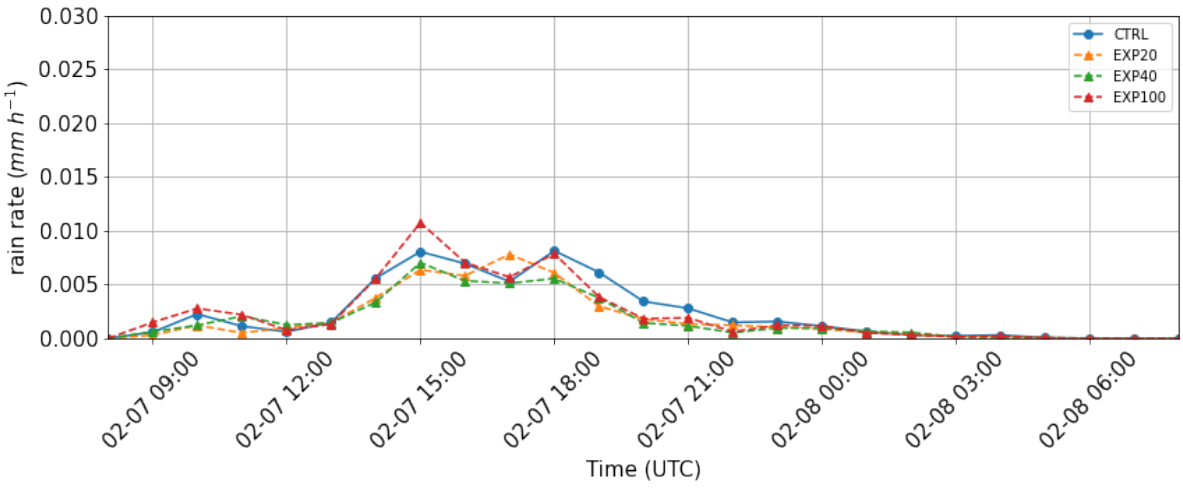


Figure S8: Simulated surface rain rate over the Cairns Region.