Supplement of Atmos. Chem. Phys., 22, 12113–12151, 2022
https://doi.org/10.5194/acp-22-12113-2022-supplement


Atmospheric Chemistry and Physics
Open Access
EGU

*Supplement of*

# Cloud adjustments from large-scale smoke–circulation interactions strongly modulate the southeastern Atlantic stratocumulus-to-cumulus transition

**Michael S. Diamond et al.**

*Correspondence to:* Michael S. Diamond (michael.diamond@noaa.gov)

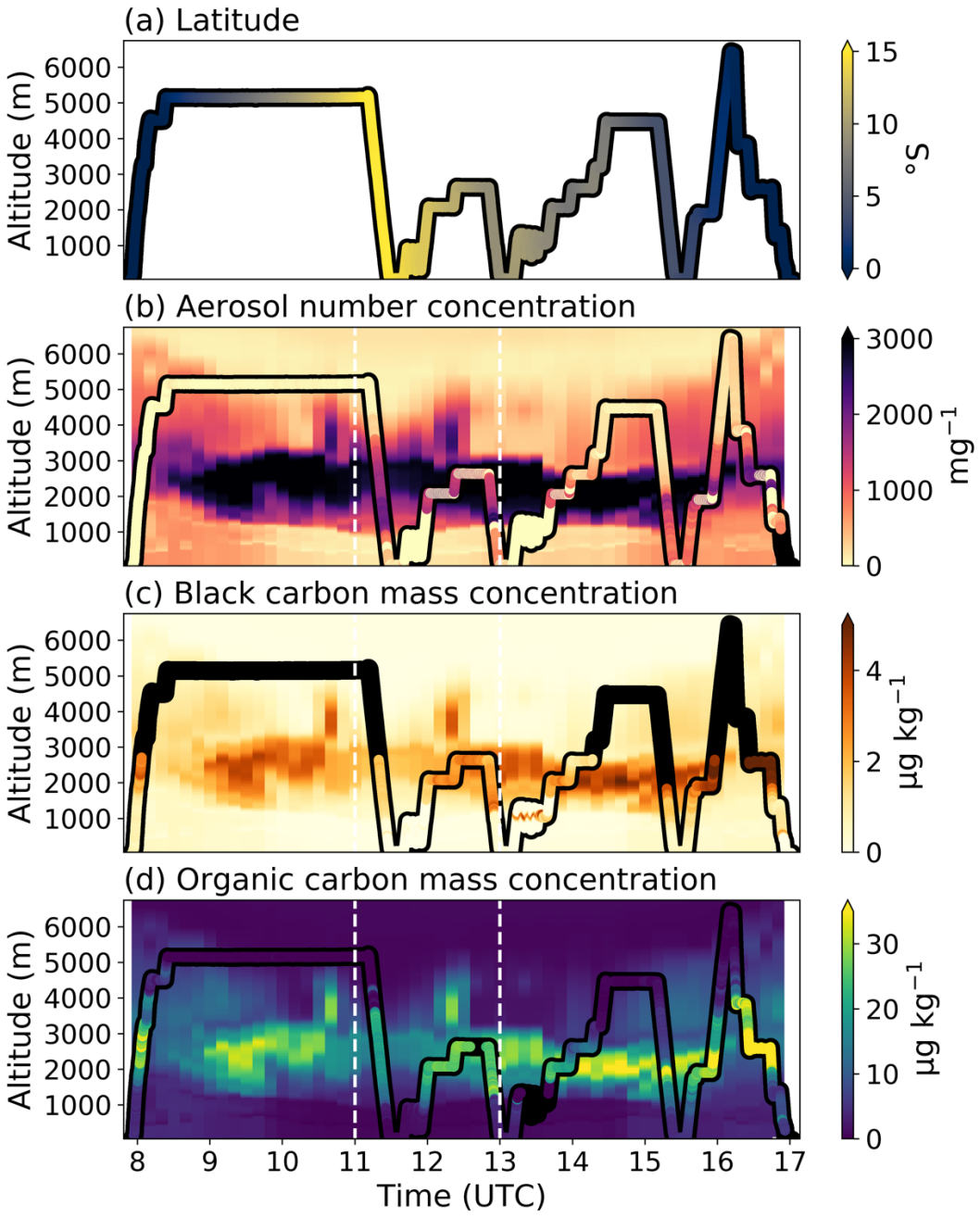


**Figure S1.** Comparison of P3 flight data with WRF-CAM5 FireOn curtains on 15 August 2017. (a) Latitude of the P3 over time. The longitude of the flight is 5° E for essentially the entire flight. For (b) $N_a$, (c) black carbon, and (d) organic carbon, scatter points represent P3 observations and the background shading is the WRF-CAM5 FireOn curtain (subset to the nearest P3 location and time) at all altitudes. The 1100-1300 UTC time period most relevant to the comparison, based on the HYSPLIT matches and P3 flight path (when the aircraft sampled around 2 km altitude), is demarcated by white dashed lines in (b-d). Black (unfilled) points represent missing P3 data.

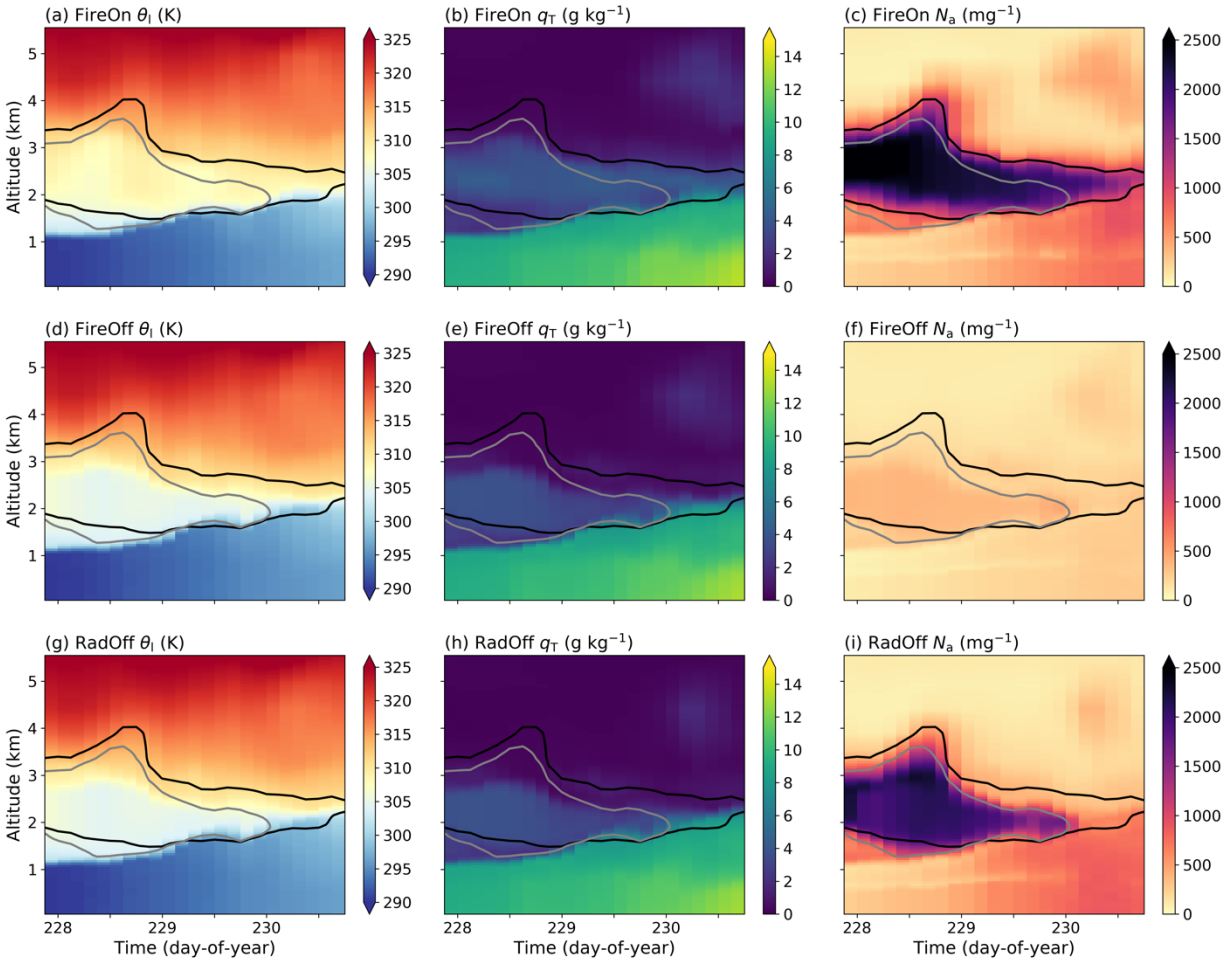


**Figure S2.** Lagrangian curtains of liquid water potential temperature, total water mixing ratio, and accumulation mode aerosol number concentration from 20:00 UTC on 15 August 2017 (doy 227) to 20:00 UTC on 18 August 2017 (doy 230). (a-c) show the FireOn case, (d-f) show the FireOff case, and (g-i) show the RadOff case. Black contours indicate FireOn Na of 1000 mg$^{-1}$ and grey contours indicate RadOff Na of 1000 mg$^{-1}$.

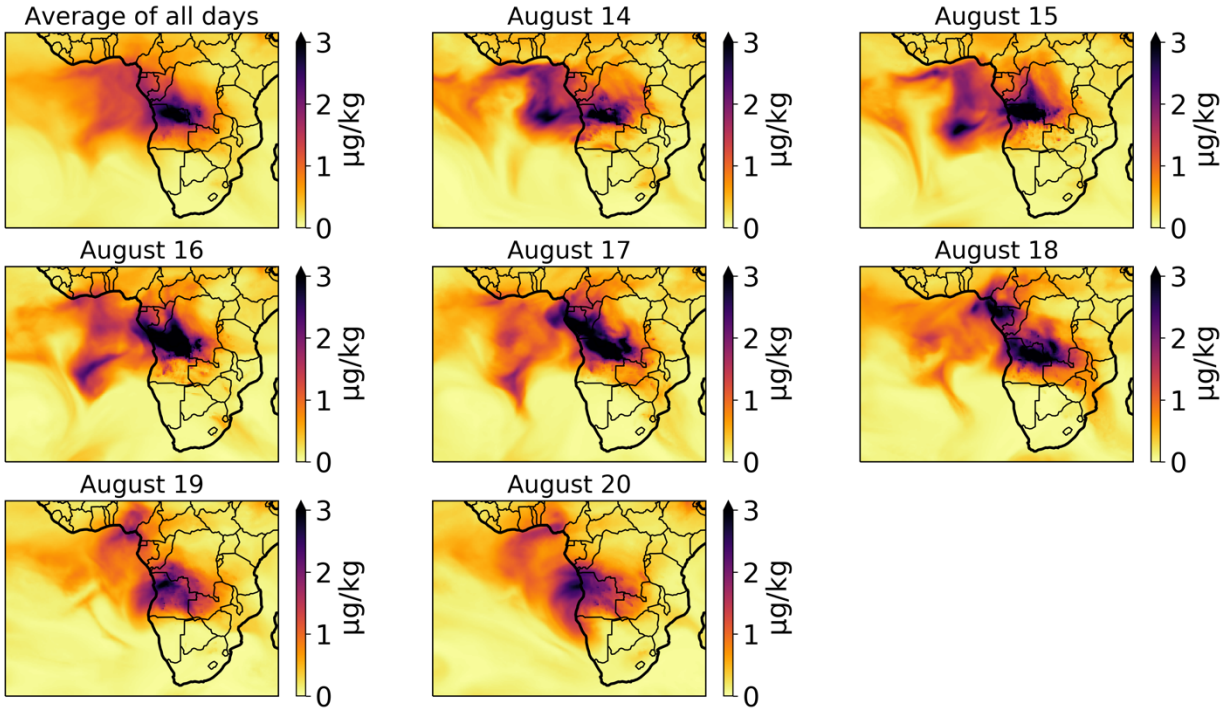


**Figure S3.** Smoke (black carbon mass concentration) evolution over time in WRF-CAM5 FireOn. Values are averaged between 2 and 5 km.

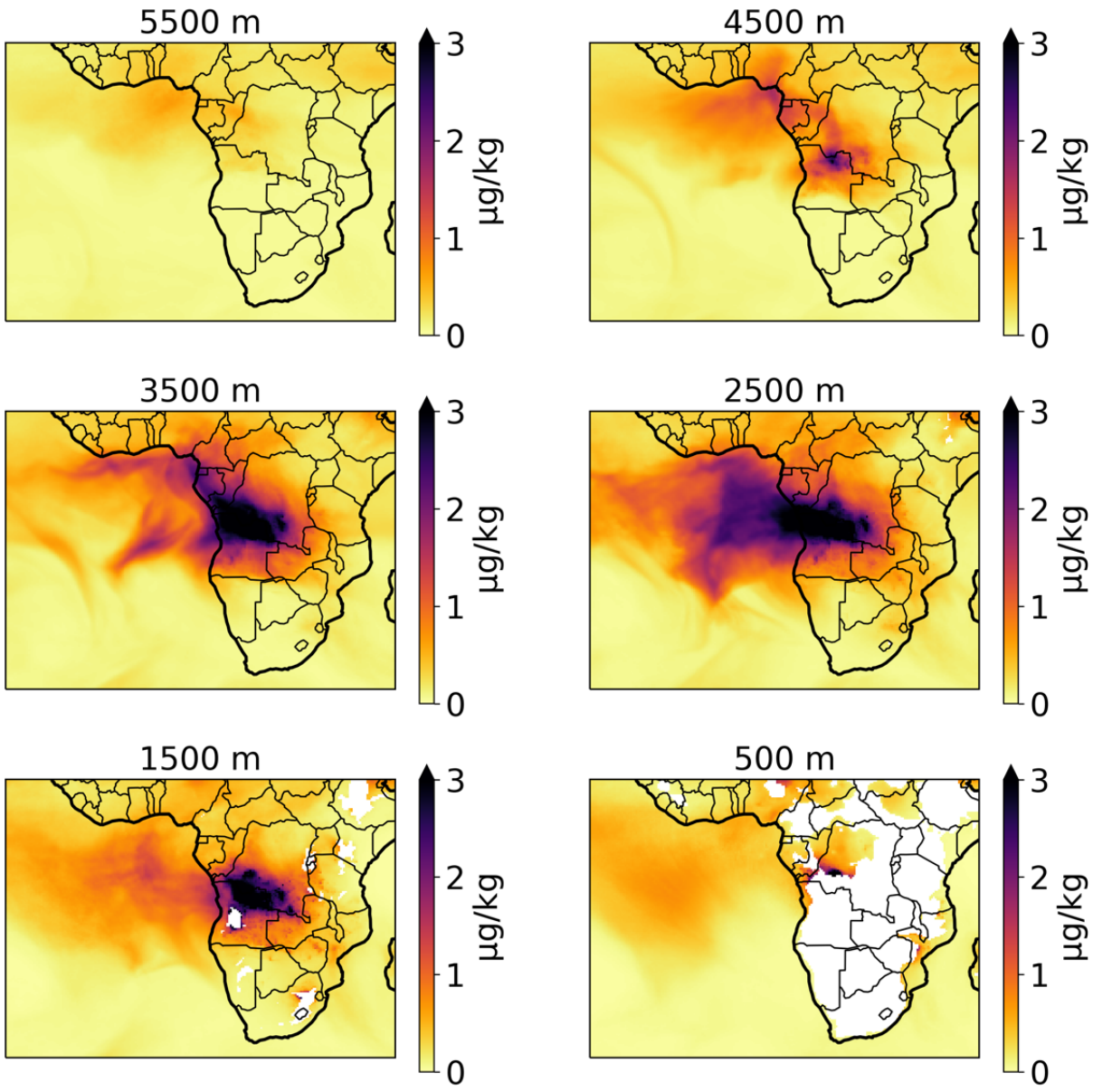


**Figure S4.** Smoke (black carbon mass concentration) vertical structure in WRF-CAM5 FireOn. Values are averaged over all simulated time periods.

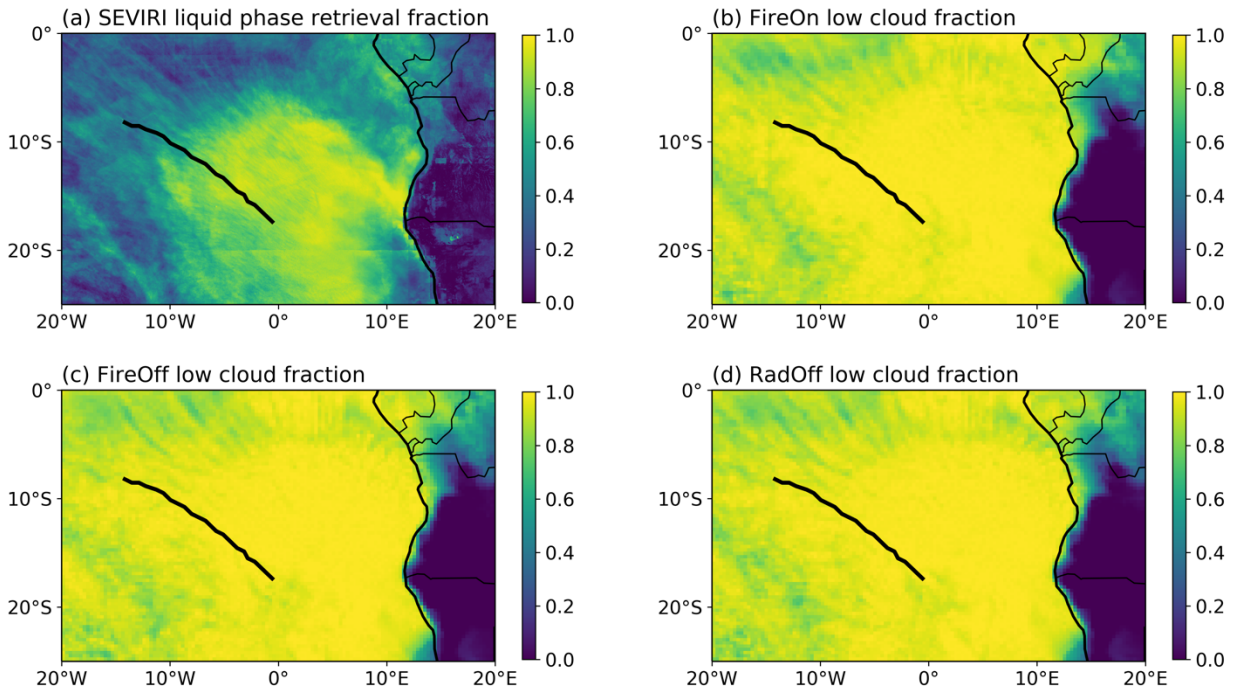


**Figure S5.** Low cloud fraction averaged over 15-18 August 2017 for (a) SEVIRI (defined as the occurrence of successful liquid cloud phase) and the WRF-CAM5 (b) FireOn, (c) FireOff, and (d) RadOff cases. Location of the Lagrangian trajectory is indicated in black for reference.

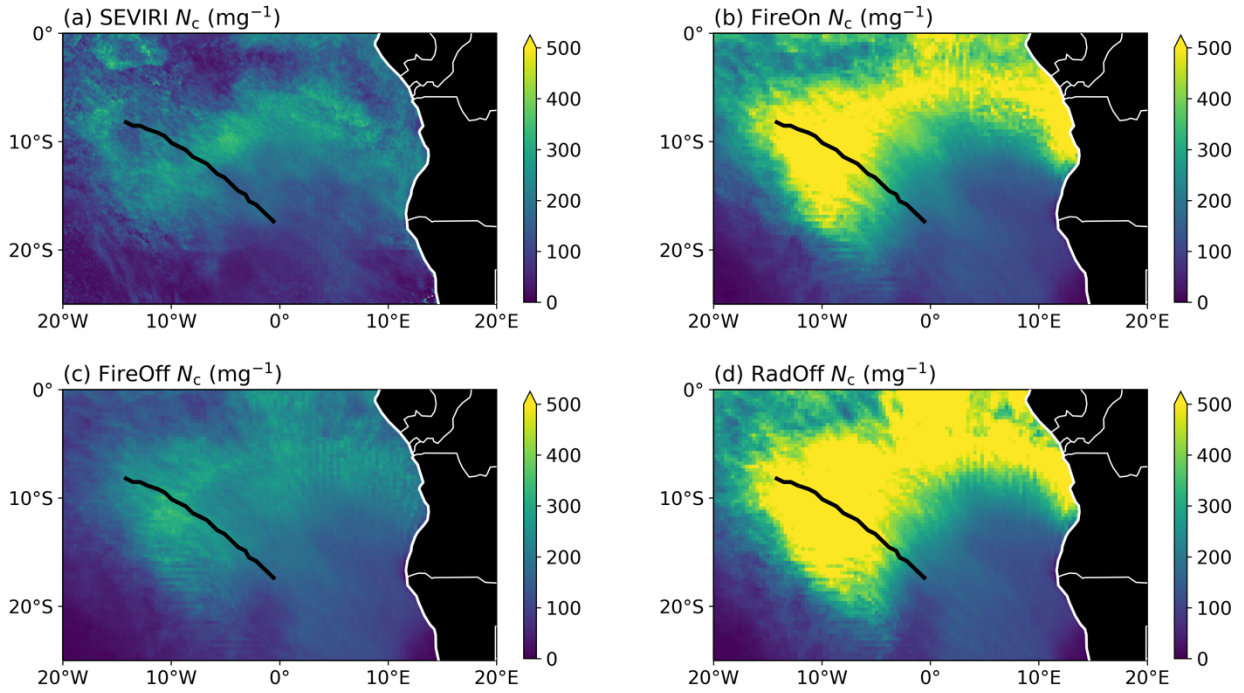


**Figure S6.** Cloud droplet number concentration averaged over 15-18 August 2017 for (a) SEVIRI and the WRF-CAM5 (b) FireOn, (c) FireOff, and (d) RadOff cases. SEVIRI values are averaged over times between 08:00 and 16:00 UTC only. Location of the Lagrangian trajectory is indicated in black for reference.