

1



Seasonal Variations in Fire Conditions Drive Aerosol Optical Properties over the Southeast Atlantic

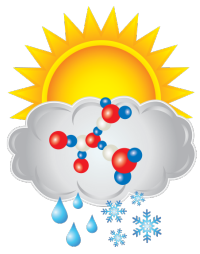
Haochi Che, Michal Segal-Rozenhaimer,
Lu Zhang, Caroline Dang, Paquita Zuidema,
Arthur J. Sedlacek III, Xiaoye Zhang, Connor Flynn

Tel Aviv University
NASA Ames Research Center
Oak Ridge Associated Universities
University of Miami
Brookhaven National Laboratory
Chinese Academy of Meteorological Sciences
University of Oklahoma

4



- Burning condition drive the seasonal variation of aerosol optical properties in the marine boundary layer.
- Clouds affect the physical, chemical and optical properties of BB aerosols during their westward transport.



ASR Introduction, Background, and Motivation

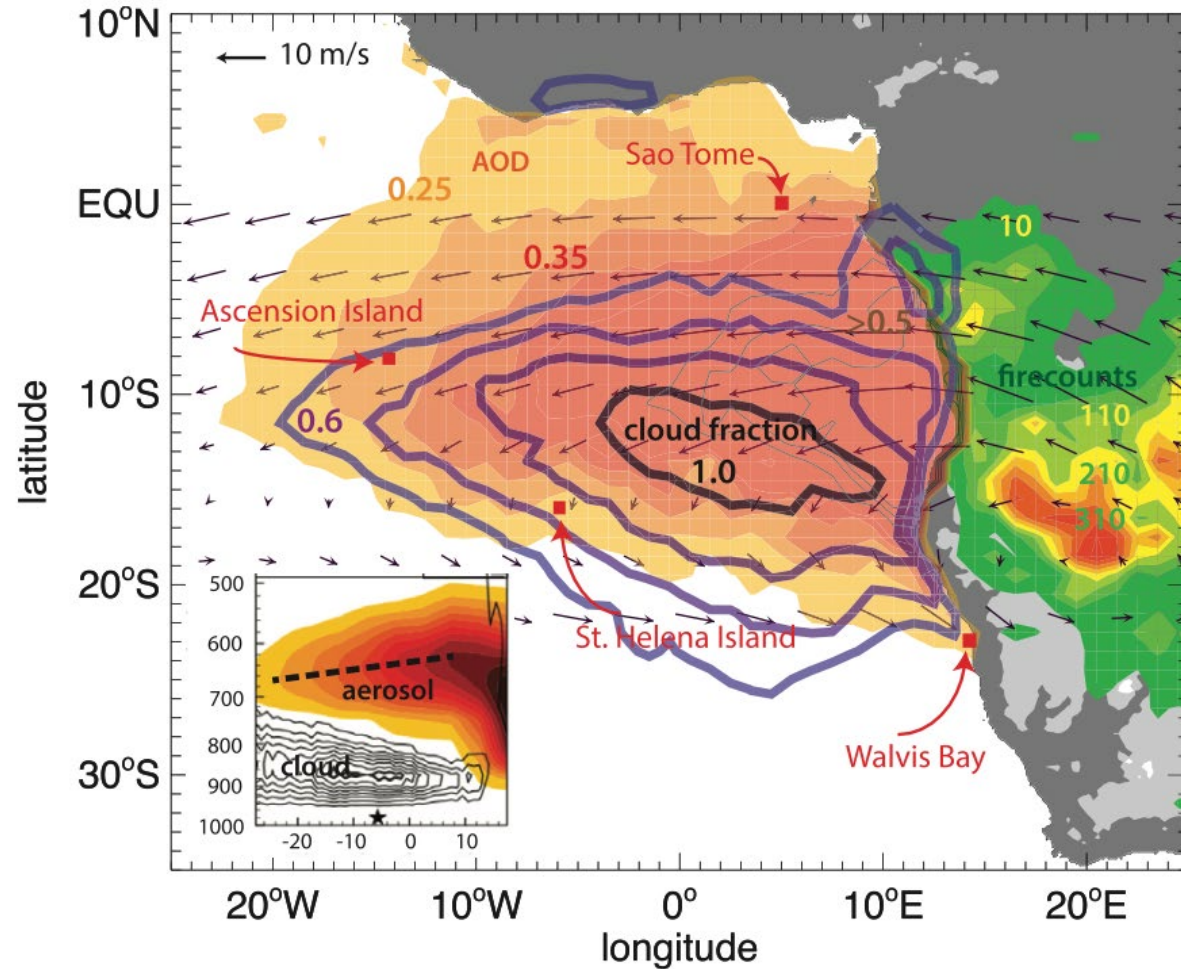
Atmospheric
System Research

1

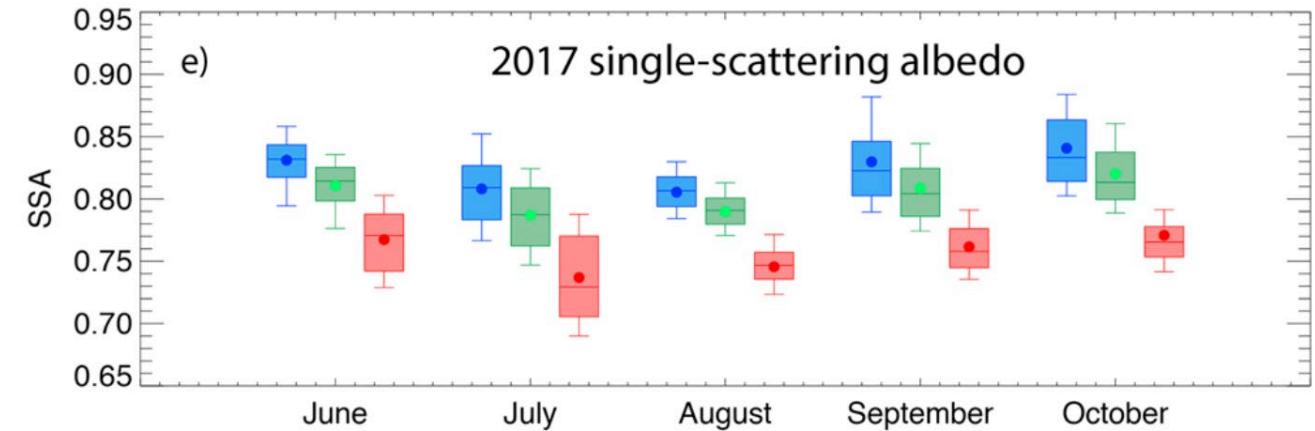
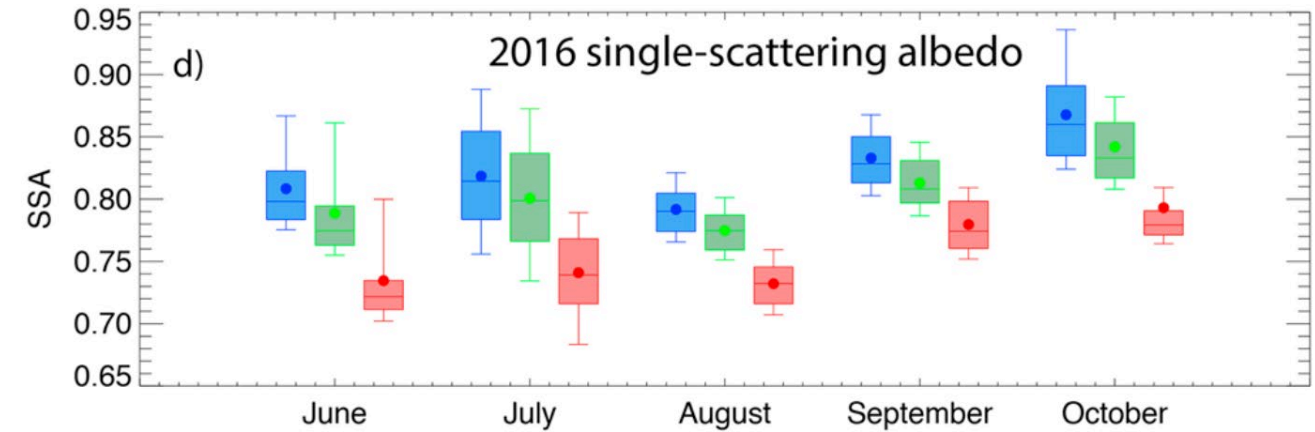
2

3

4

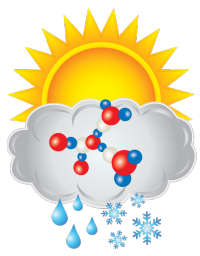


Westward transport of BBA.
Zuidema et al., 2016 (BAMS)



Seasonal variation of aerosol properties in the
marine boundary layer, from LASIC campaign.

Zuidema et al., 2018 (GRL)



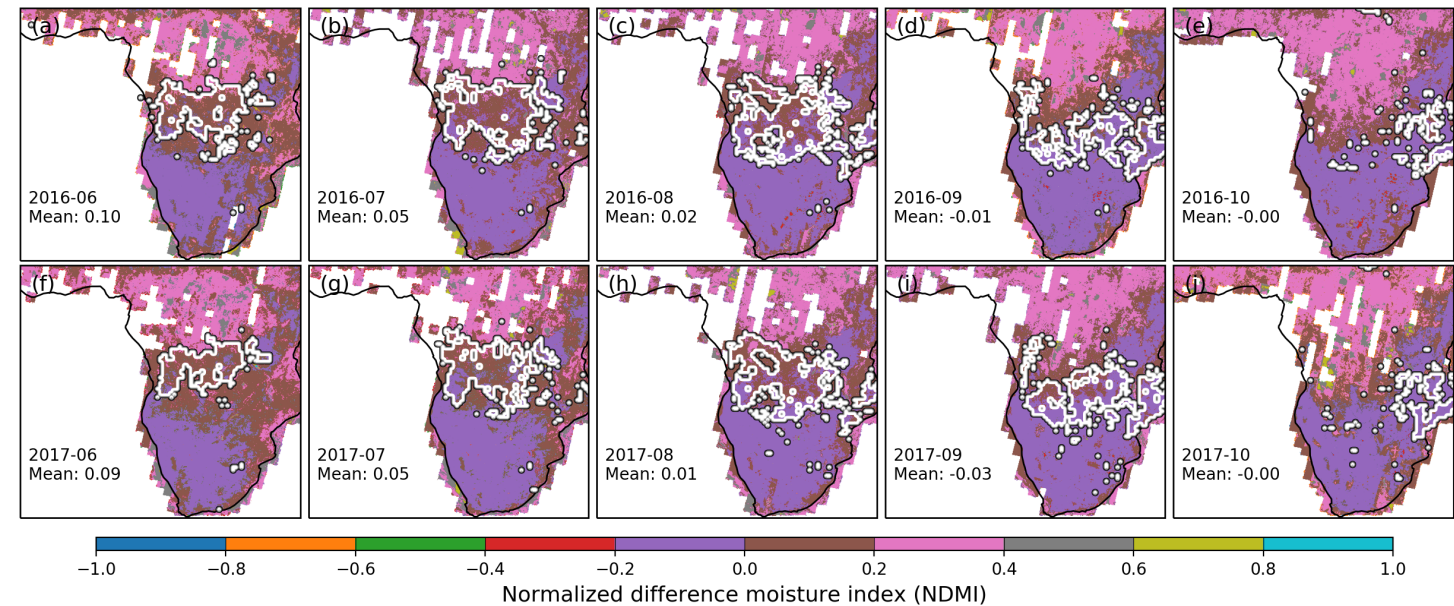
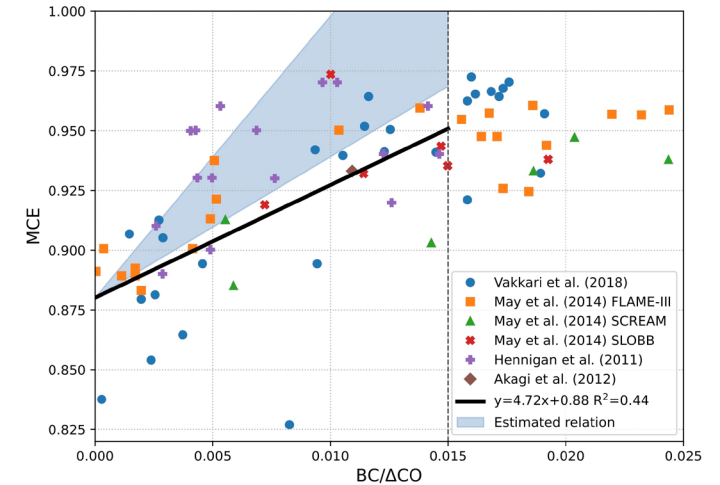
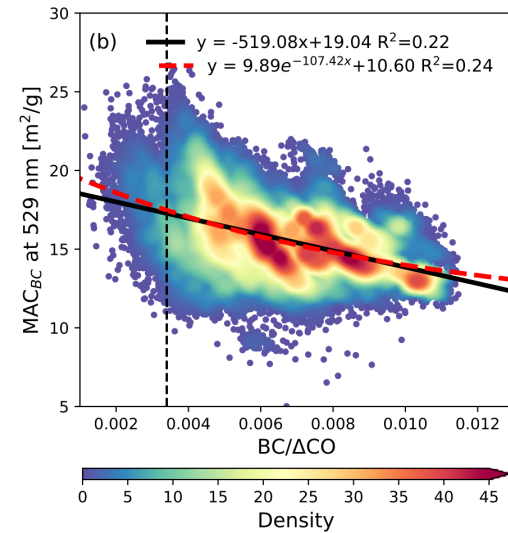
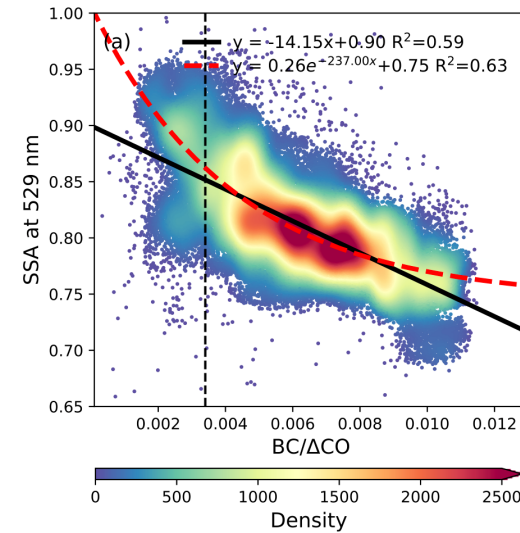
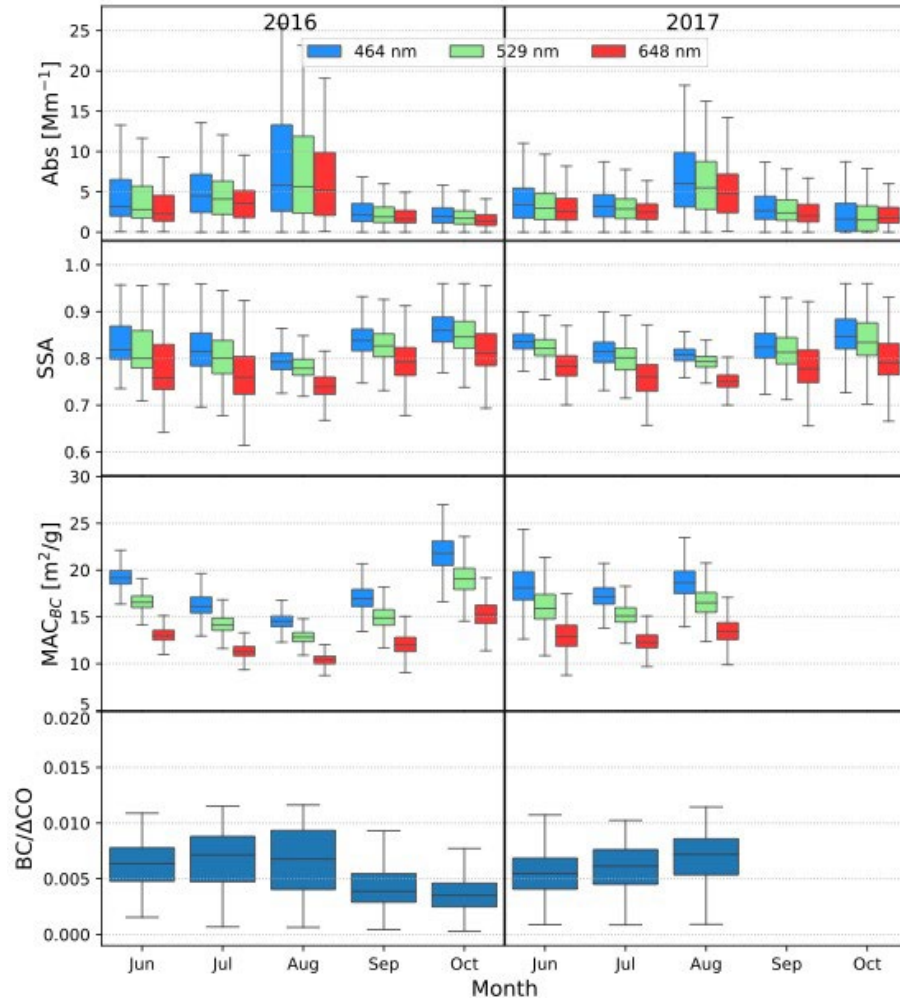
Aerosol optical properties and BC/ Δ CO

1

2

3

4



- Clear monthly variation of aerosol optical properties, corresponding well with BC/ Δ CO.
- The increase in BC/ Δ CO from June to August is likely caused by burning becoming more flaming, which may correspond to reduction in the water content of fuels.
- The decrease in BC/ Δ CO in September and October may be caused by the lower proportion of flaming conditions, and the increase in precipitation in the BB transport pathway.

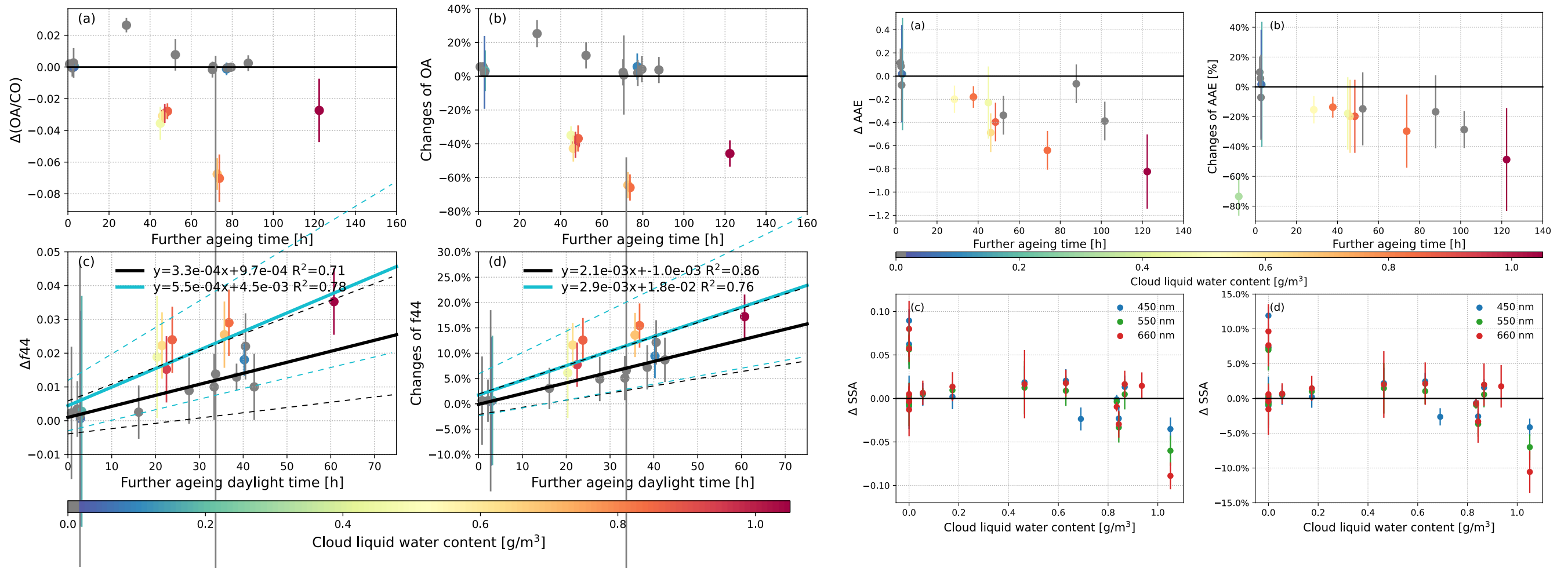
Transport and aging of BB aerosols

1

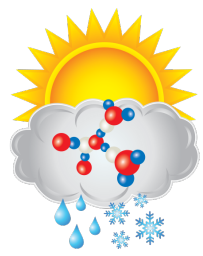
2

3

4



- Cloud processing contributes to the decrease in OA.
- Stronger aqueous-phase oxidation of OA.
- Reduction of absorption Ångström exponent (AAE) with aging.
- Decrease in Single Scattering Albedo (SSA) with cloud processing.



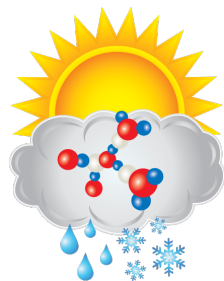
ASR Acknowledgements

Atmospheric
System Research

This research has been funded by the Department of Energy (DOE) Atmospheric System Research (ASR) grant DE-SC0020084, supporting Michal Segal-Rozenhaimer and Haochi Che. We thank scientists from the DOE supported ARM-AMF LASIC campaign for providing observation data.

We also thanks all scientists from NASA ORACLES and NERC CLARIFY team for providing aircraft observation data.

Thank you!



ASR
Atmospheric
System Research

U.S. DEPARTMENT OF
ENERGY



NERC
SCIENCE OF THE
ENVIRONMENT