



Aircraft and Model Evaluation of TEMPO Aerosol Layer Height

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Program Lead, Atmospheric Composition Modeling

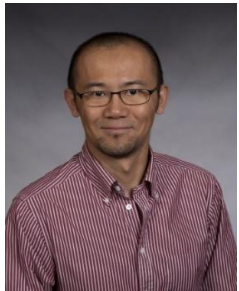
CEOS Atmospheric Composition Virtual Constellation
(June 3, 2026)



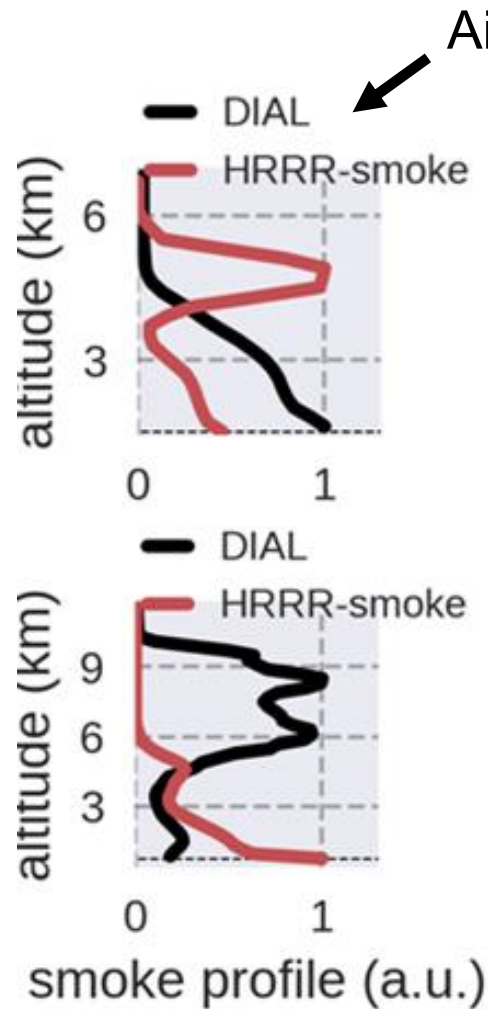
Plume Injection Height Critical for Predicting Smoke Transport



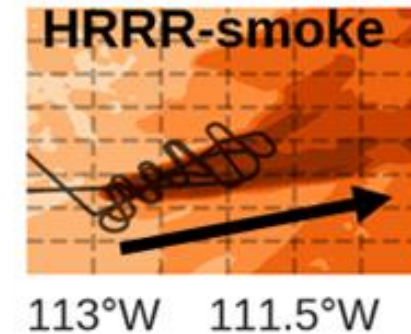
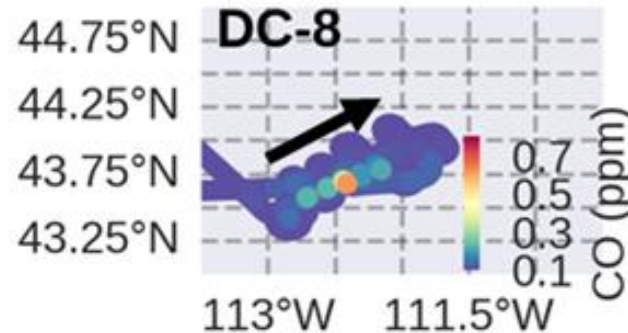
Trammell
Lyu



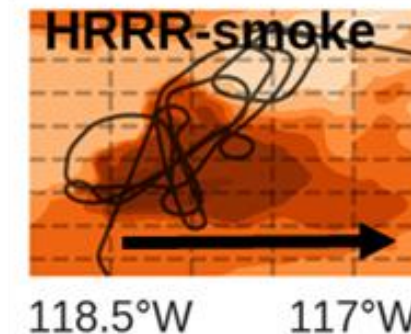
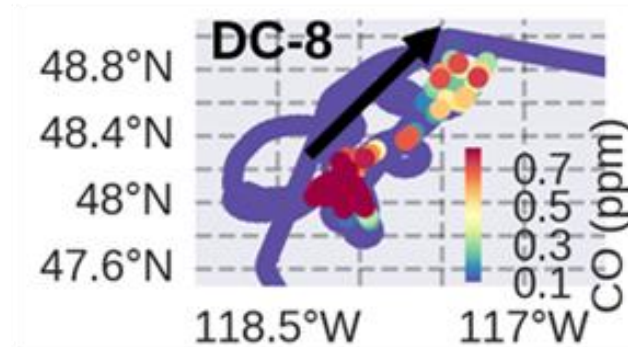
Siyuan
Wang



Airborne lidar



Sheep
(Jul 24, 2019)



Williams Flats
(Aug 8, 2019)

NASA DIAL: Johnathan Hair, Taylor Shingler, Marta Fenn

Support from
NOAA Climate Program Office

Research Objectives

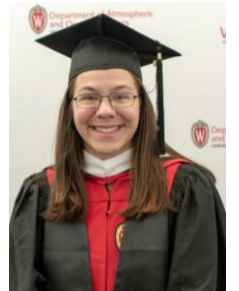
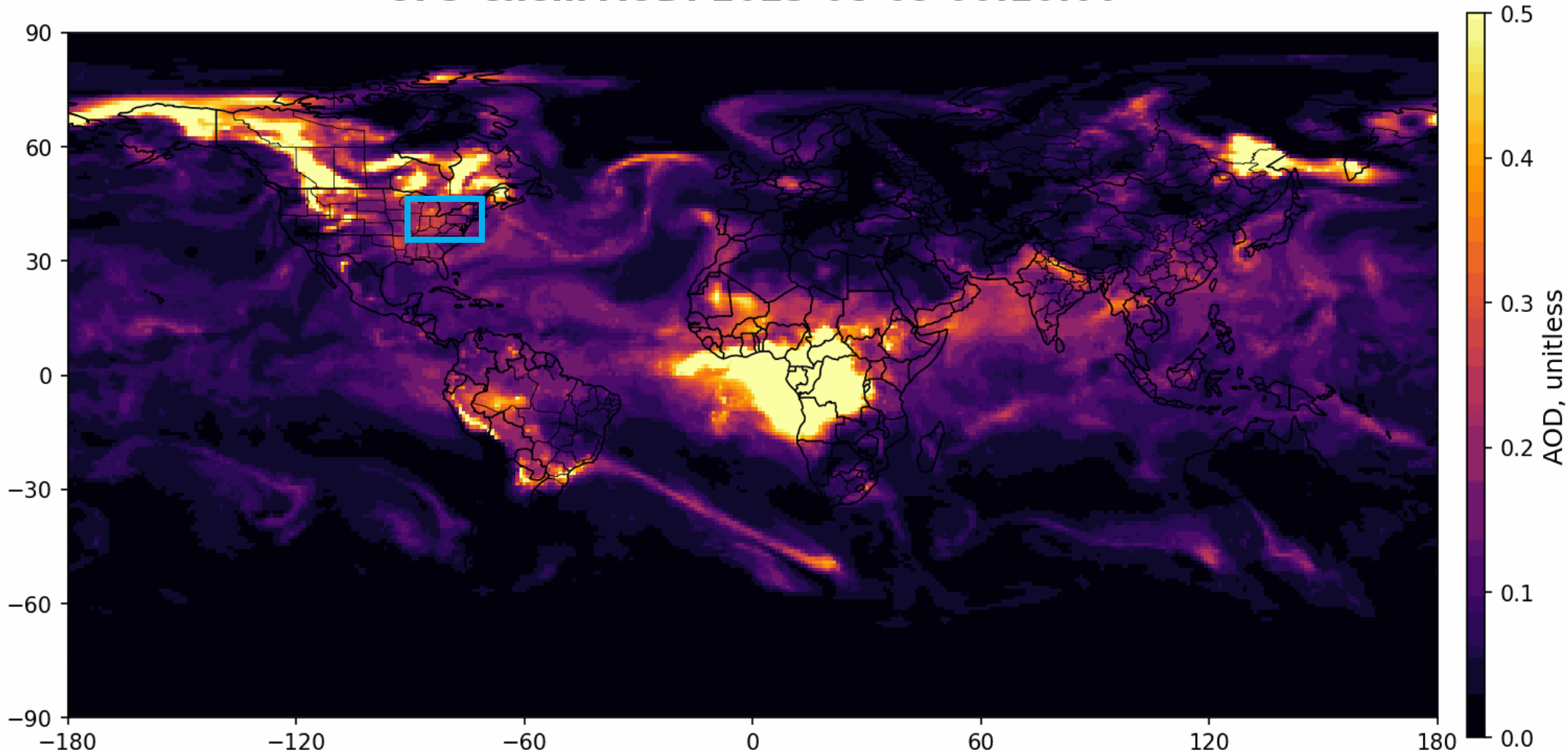
- 1) Evaluate TEMPO aerosols (AOD and ALH) with NASA DC-8 airborne in-situ observations
- 1) Evaluate UFS-Chem aerosols with NASA DC-8 airborne in-situ observations
- 1) Assess aerosol layer height with NASA GV airborne lidar

AGES+ Airborne Field Campaigns in Summer 2023



Eastern US Flights were Impacted by Canadian Wildfires

UFS-Chem AOD: 2023-08-09 00:10:00



Maggie
Bruckner

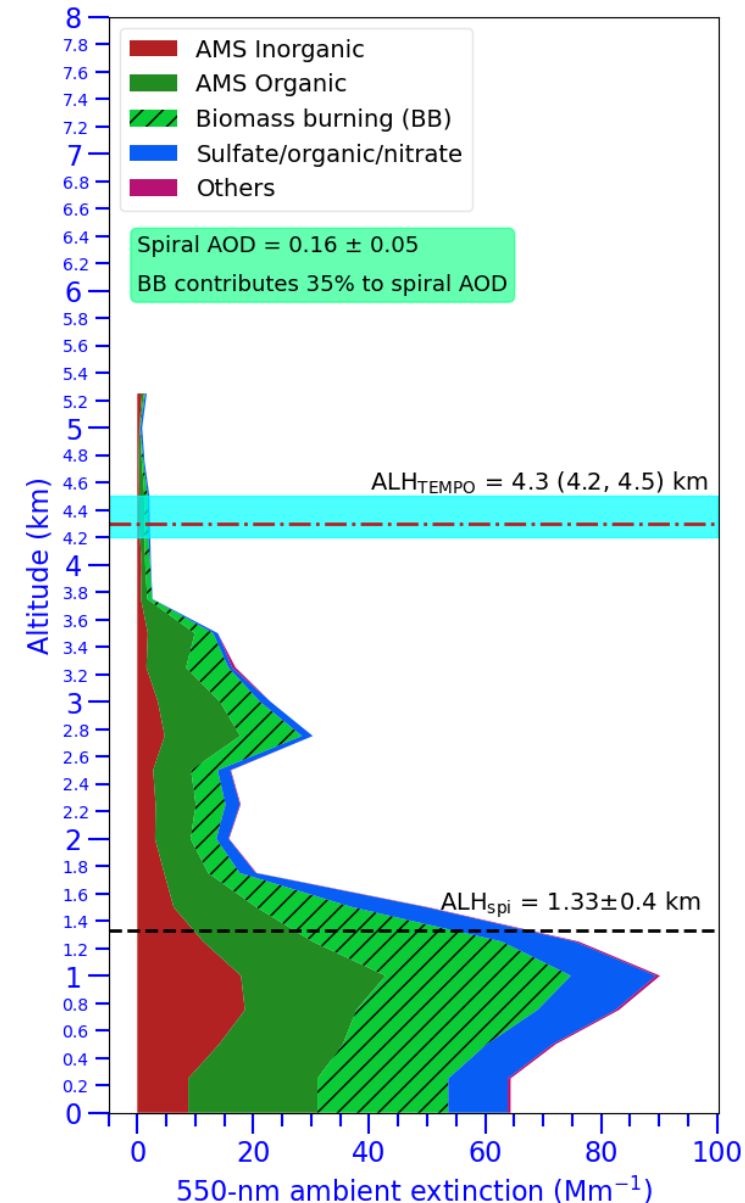
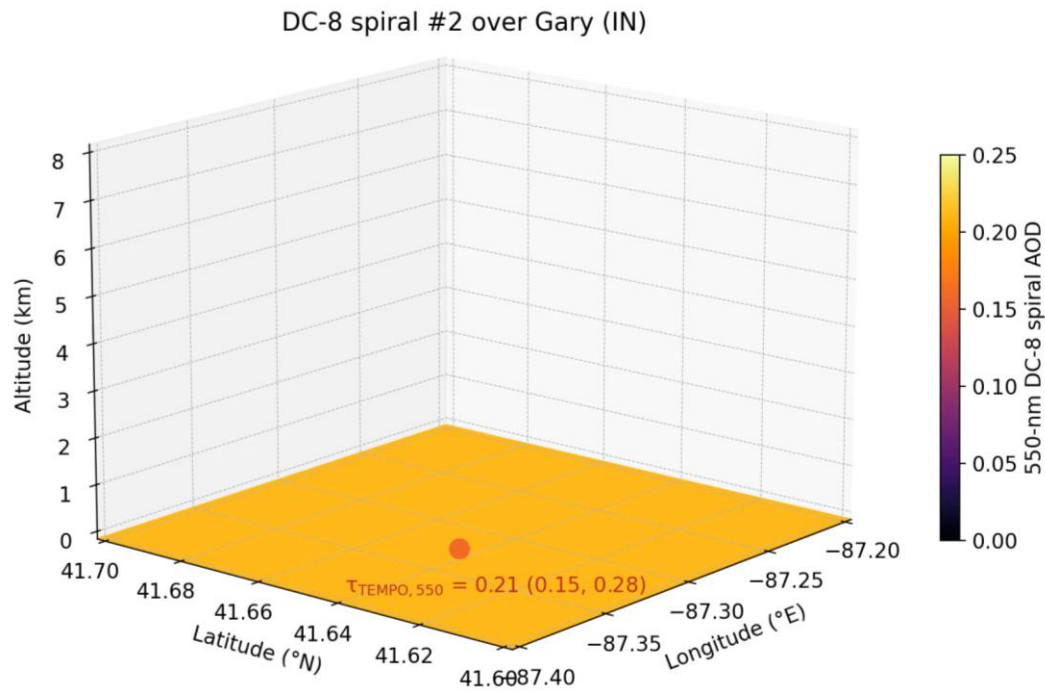


Becky
Schwantes

UFS-Chem model described in He et al. (*JAMES*, 2026)
Supported by Bipartisan Infrastructure Law



NASA DC-8 Spirals of Aerosol Optics and Composition

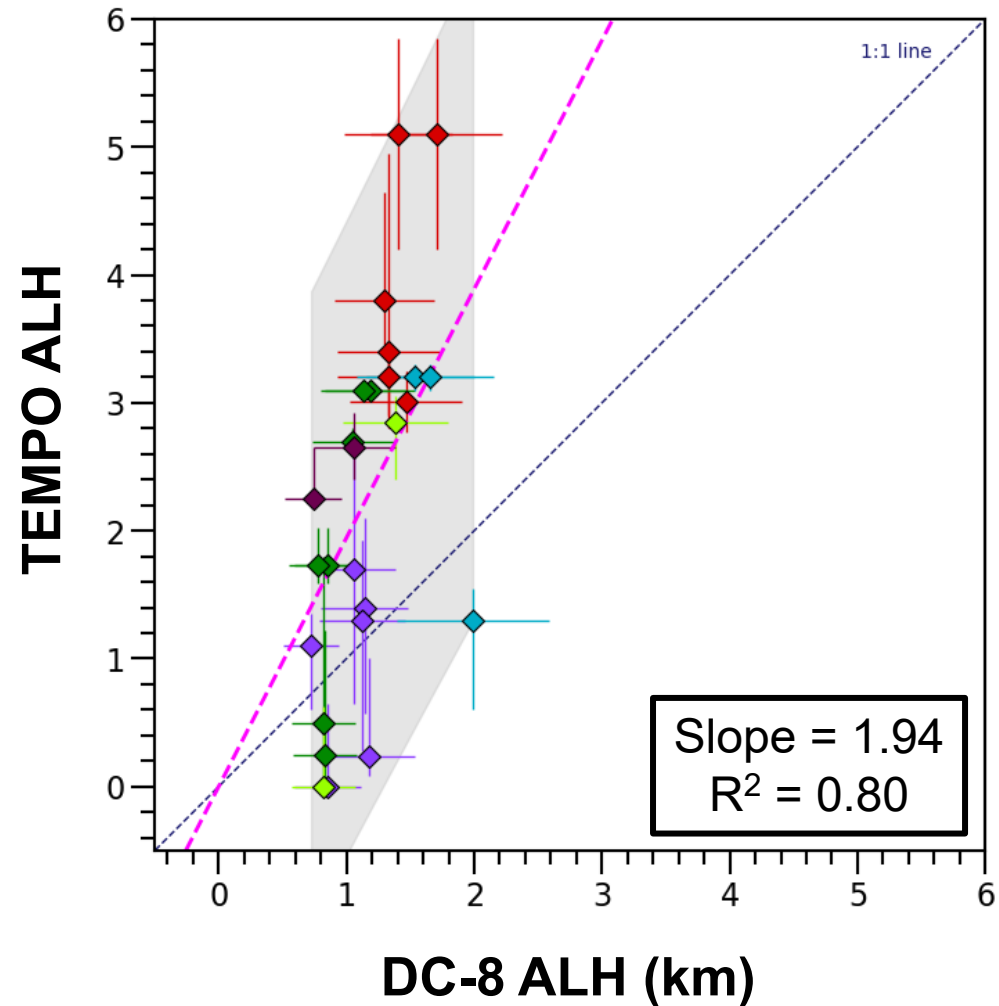
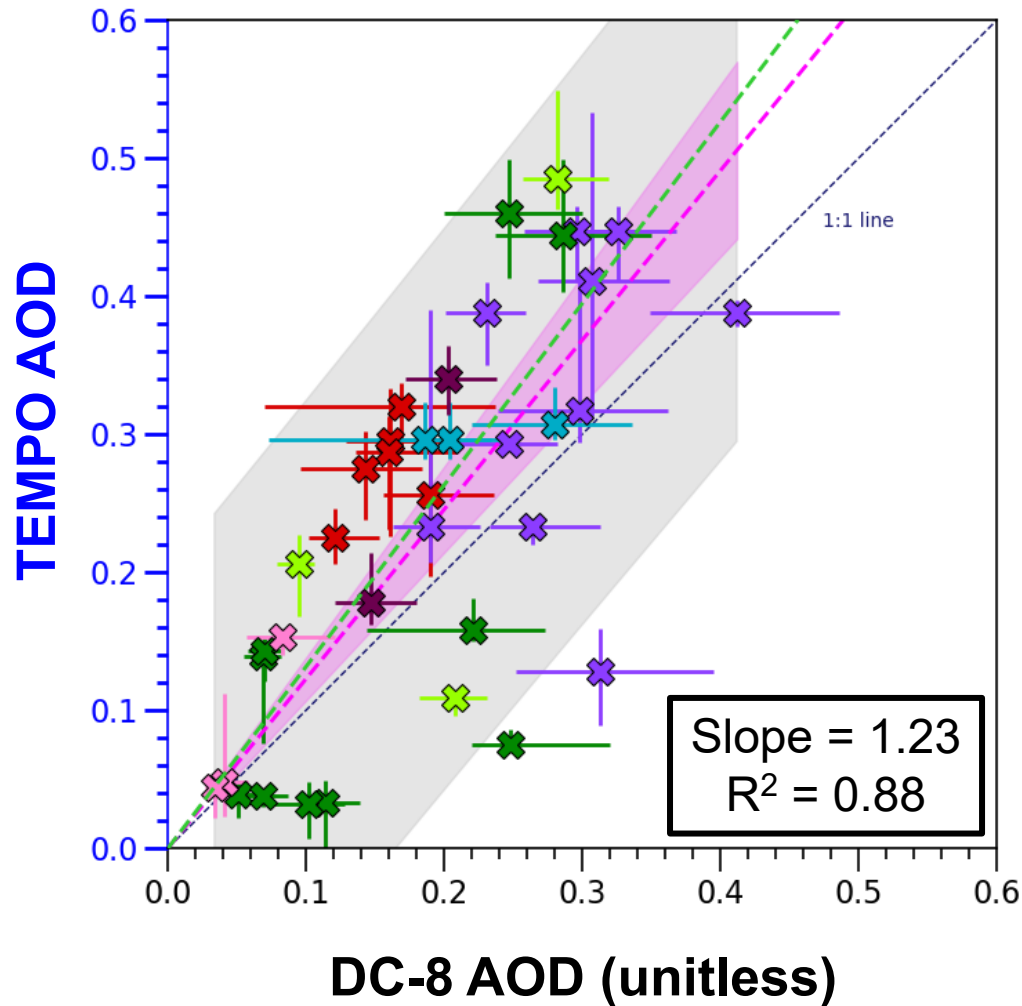


Han
Hyun



Adam
Ahern

TEMPO Aerosols versus NASA DC-8 Spirals

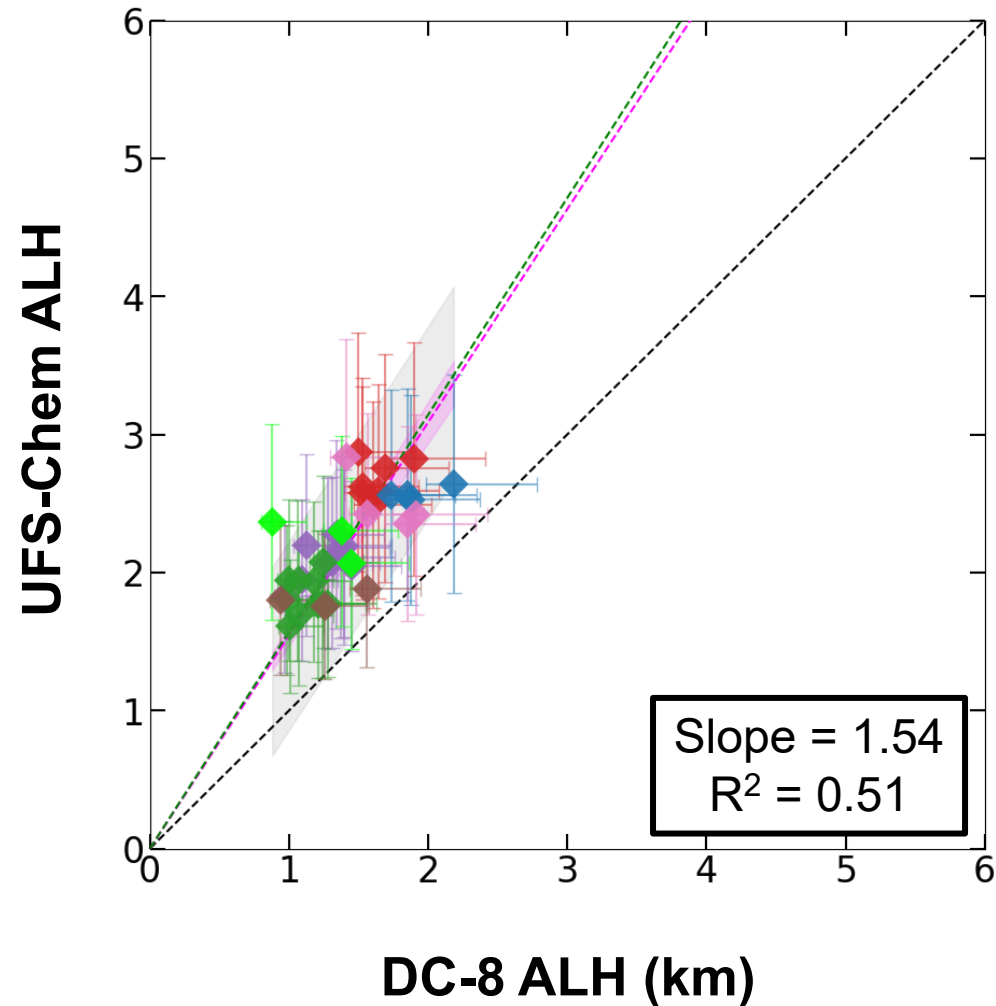
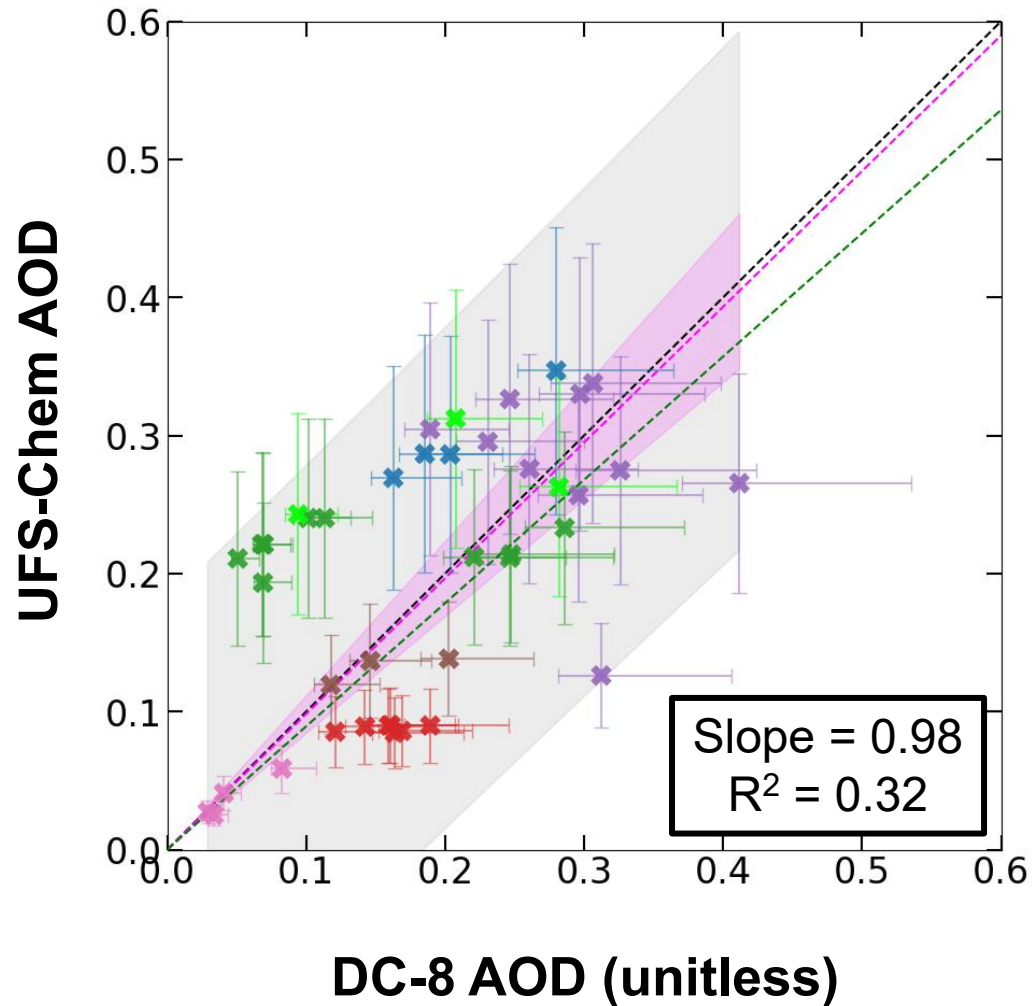


Han
Hyun



Adam
Ahern

UFS-Chem Aerosols versus NASA DC-8 Spirals

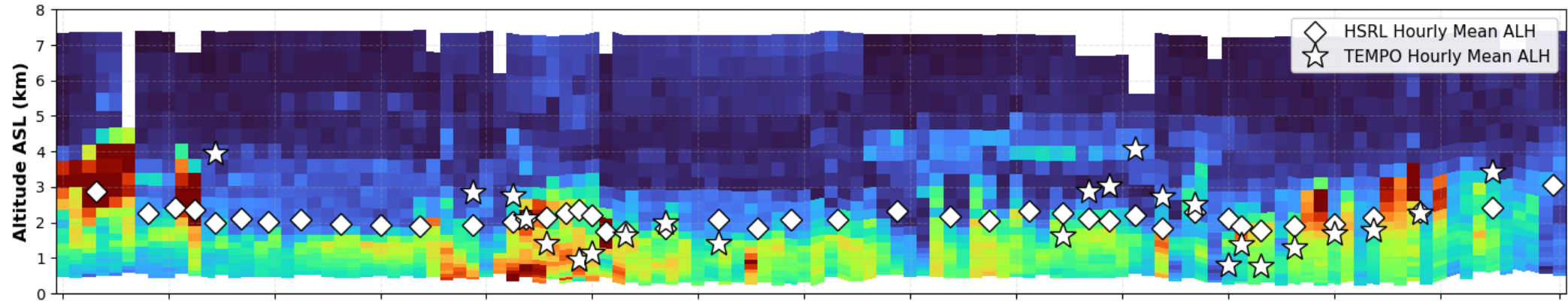


Trammell
Lyu (CIRES)



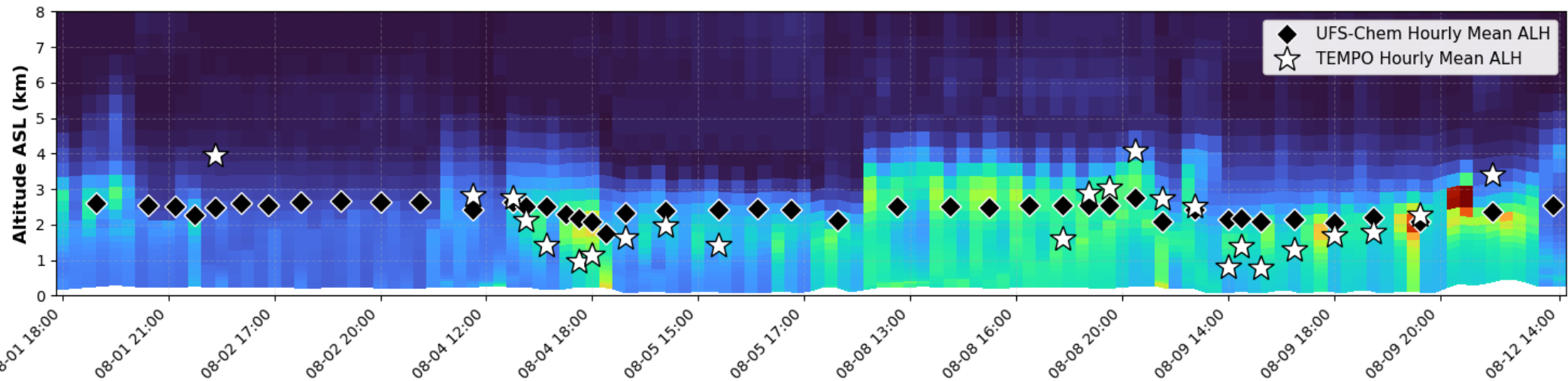
Owen
Cooper

TEMPO and UFS-Chem versus NASA GV5 Airborne Lidar



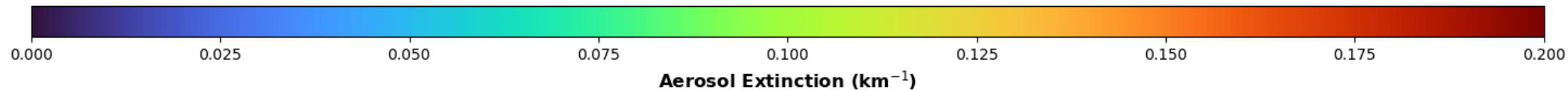
HSRL-2 (532 nm)
TEMPO (550 nm)

ALH ~ 2.2 km



UFS-Chem
(550 nm)

ALH ~ 2.4 km



Summary

- TEMPO and UFS-Chem AOD **agree** with NASA DC-8 in-situ obs
- TEMPO and UFS-Chem ALH **~2x higher** than NASA DC-8 in-situ obs
- TEMPO and UFS-Chem ALH **agrees** with NASA GV5 airborne lidar



Han
Hyun



Adam
Ahern



Owen
Cooper



Trammell
Lyu



Siyuan
Wang



Becky
Schwantes



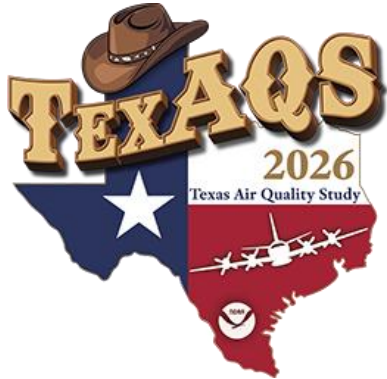
Maggie
Bruckner



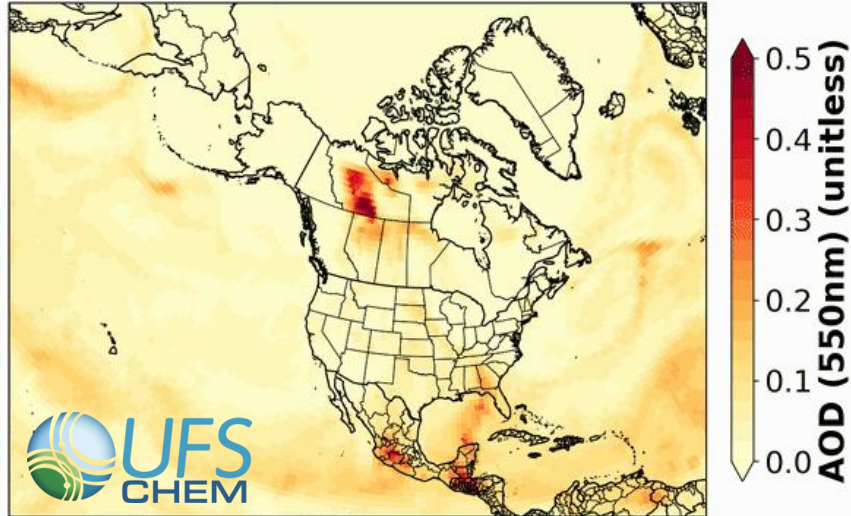
Shobha
Kondragunta

Acknowledgment: Hai Zhang (NESDIS) for TEMPO aerosol products, Dan Cziczo and Chuck Brock for aerosol measurements, John Hair for HSRL-2, AEROMMA-STACS teams, Bipartisan Infrastructure Law, NOAA Climate Program Office

Texas Air Quality Study (TexAQS) and NASA SARP



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