Isoprene & Southeast US Chemistry

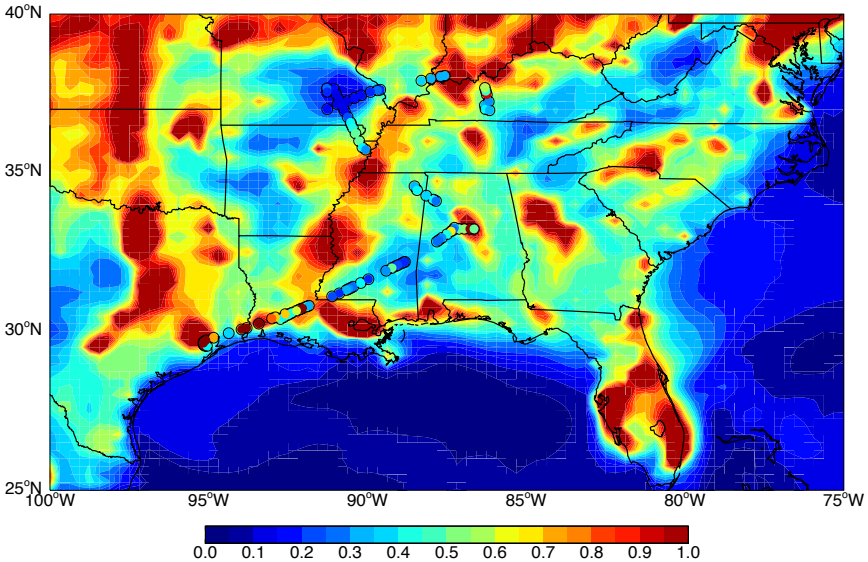
Data Sources:
Isoprene, Acetonitrile Data from A. Wisthaler's group
NO, NO_2, NO_y, and O_3 Data from T. Ryerson's group
LIF ANs Data from R. Cohen's group
LIF CH2O Data from T. Hanisco's group
AMS Organic Aerosol Data from J. Jimenez's group
4STAR Data from P. Russell's group

Patrick Kim / Jenny Fisher / Karen Yu / Daniel Jacob

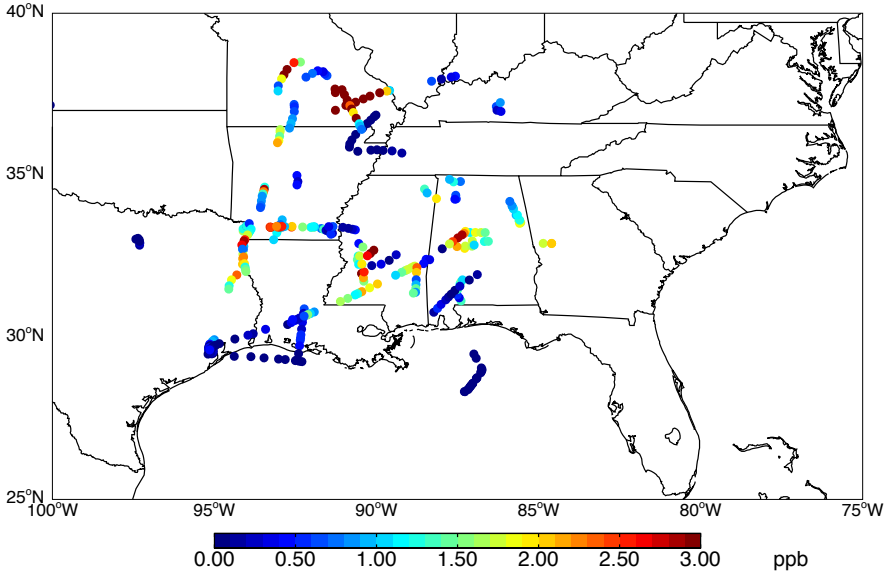
Isoprene Measured During SE US Flights

Campaign coverage of SE US boundary layer lets us probe isoprene chemistry in high and low NO_x regimes

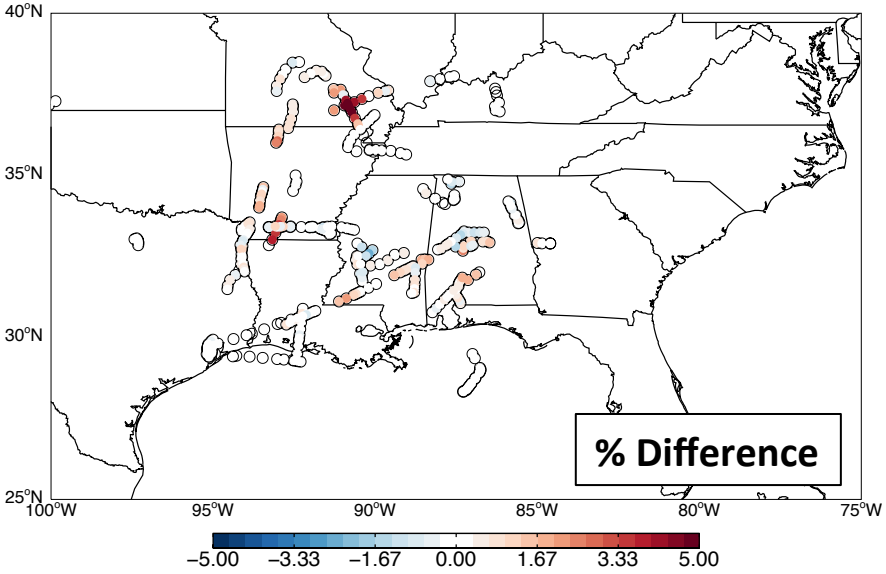
NOx 8/30 Flight (Ryerson, z < 1 km)



PTR-MS Isoprene (Wisthaler, z < 1 km)

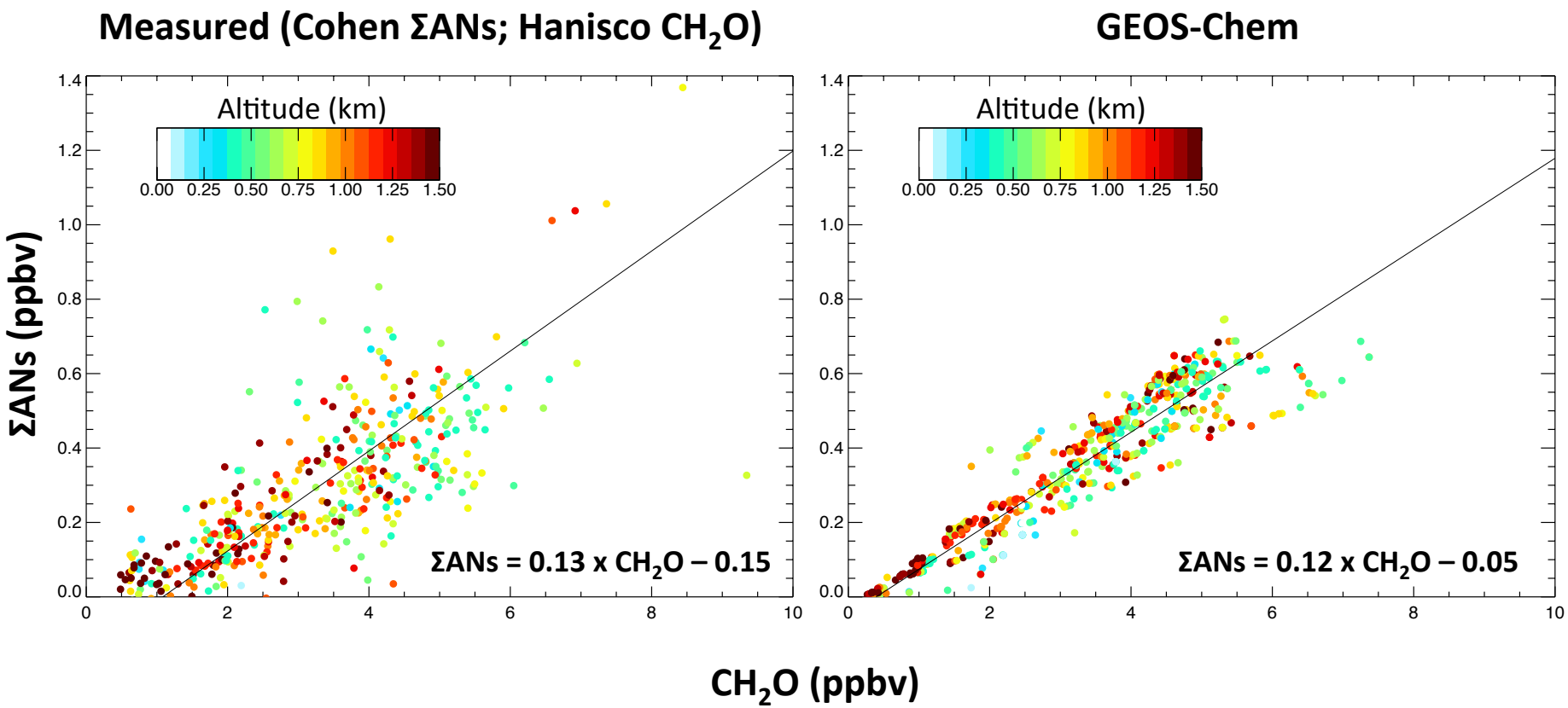


GEOS-Chem – PTR-MS Isoprene (z < 1 km)



Role of Organic Nitrates in Isoprene Oxidation

Correlation of Alkyl Nitrates with Formaldehyde below 1.5 km



Correlation = 0.75

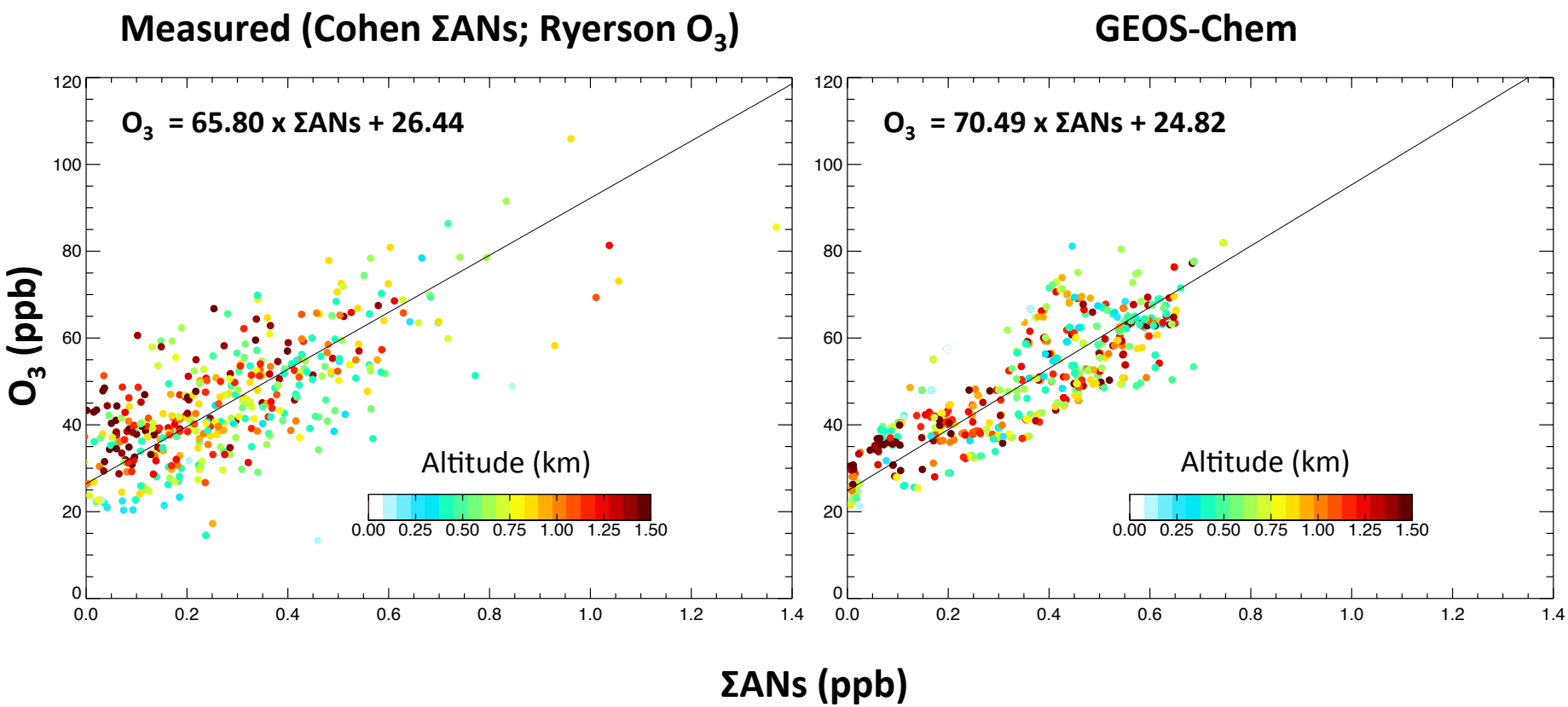
Correlation = 0.93

GEOS-Chem

ΣANs = ISOPND + ISOPNB + MVKN + MACRN + PROPNN + R4N2 as in Mao et al. (2013)

Role of Organic Nitrates in Isoprene Oxidation

Correlation of O_3 with Alkyl Nitrates below 1.5 km



Correlation = 0.73

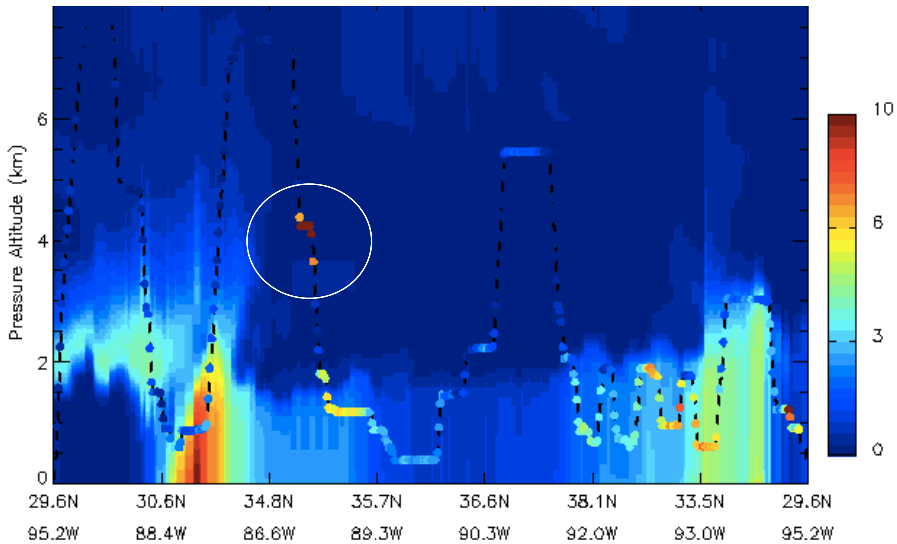
Correlation = 0.85

GEOS-Chem

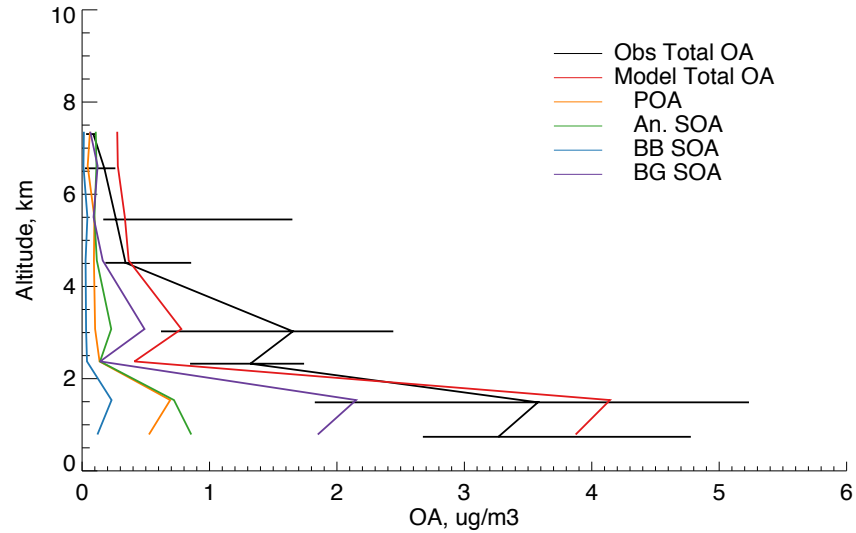
ΣANs = ISOPND + ISOPNB + MVKN + MACRN + PROPNN + R4N2 as in Mao et al. (2013)

Elevated Organic Aerosol Layers Not Captured by the Model

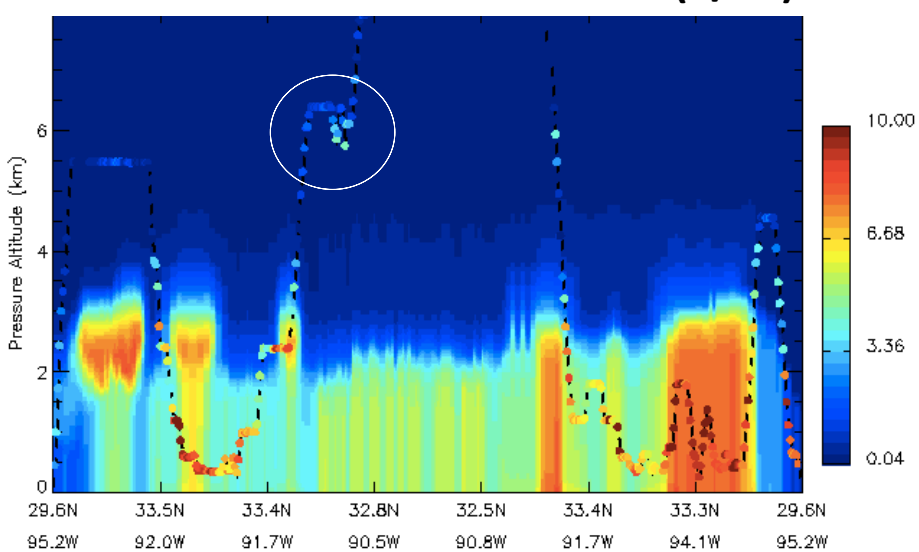
AMS Curtain over GEOS-Chem (8/14)



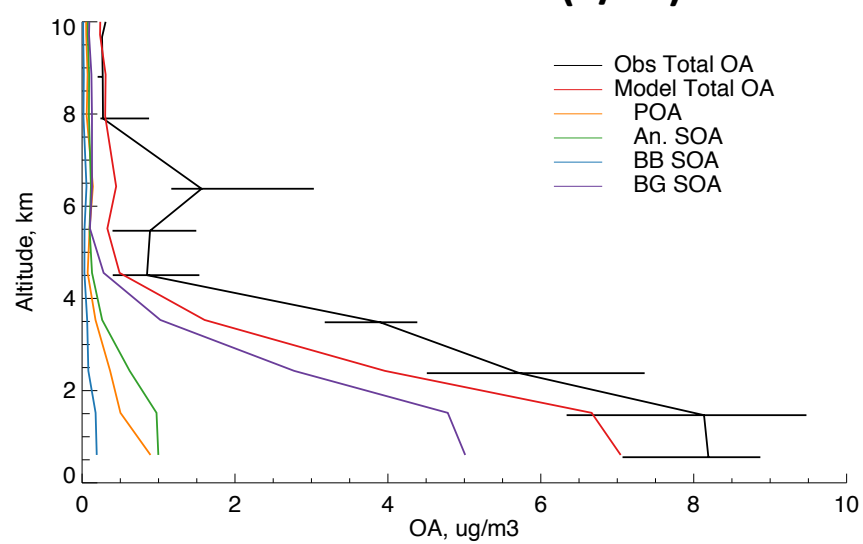
AMS OA Profile (8/14)



AMS Curtain over GEOS-Chem (8/23)

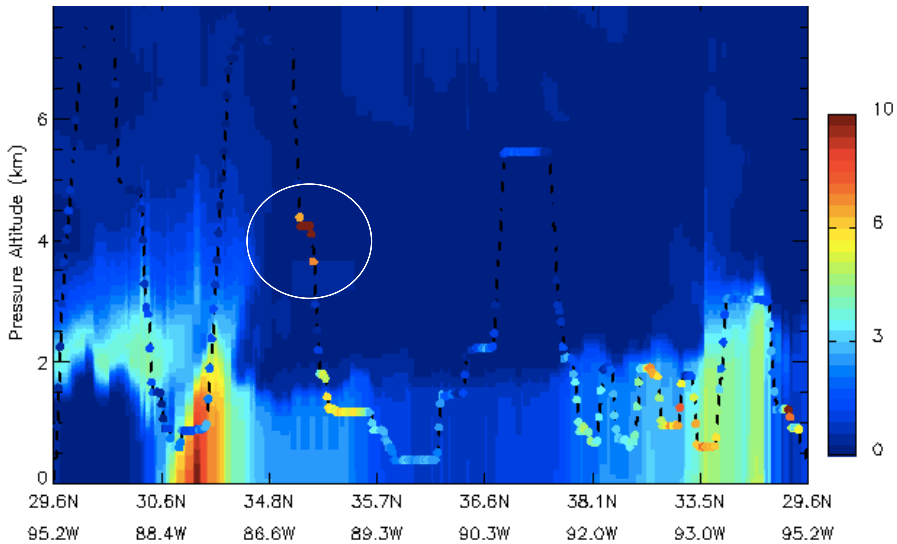


AMS OA Profile (8/23)

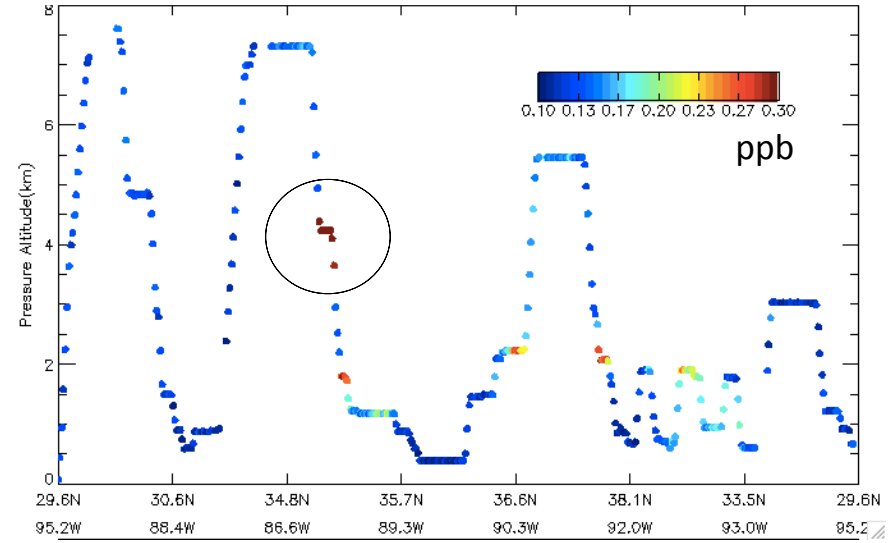


Organic Aerosol Layers Associated with Biomass Burning

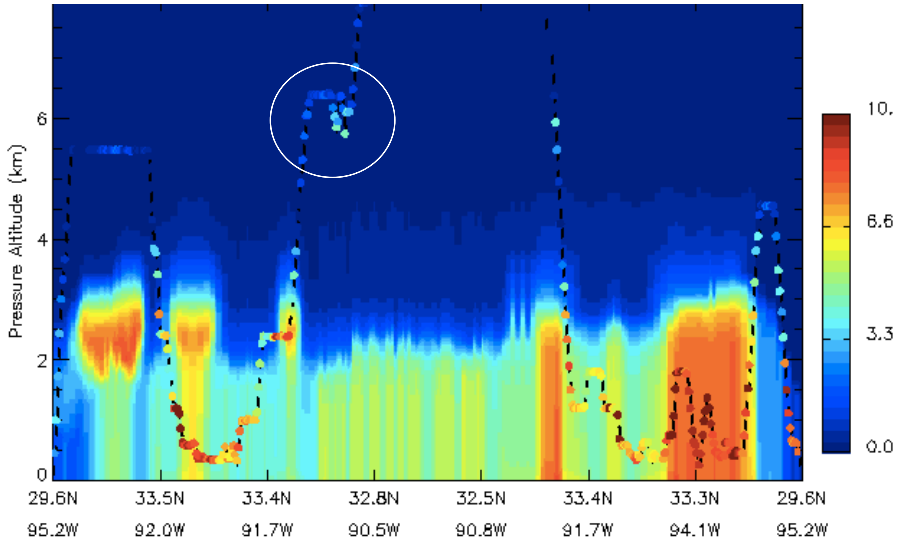
AMS Curtain over GEOS-Chem (8/14)



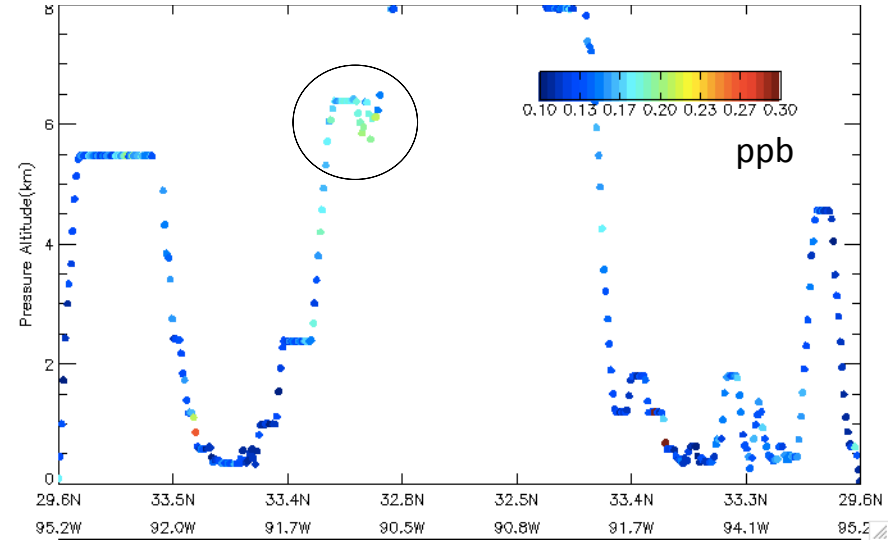
PTR-MS Acetonitrile Curtain (8/14)



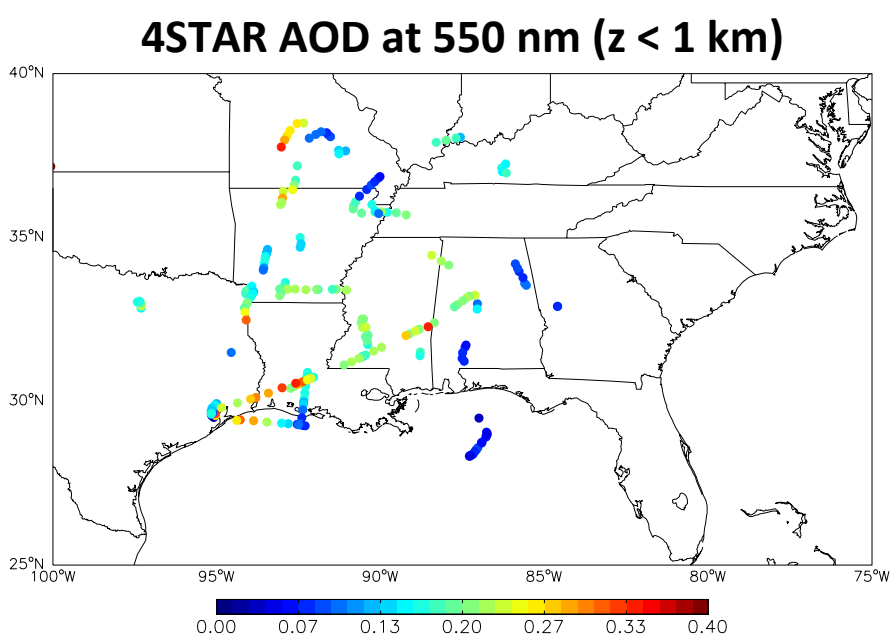
AMS Curtain over GEOS-Chem (8/23)

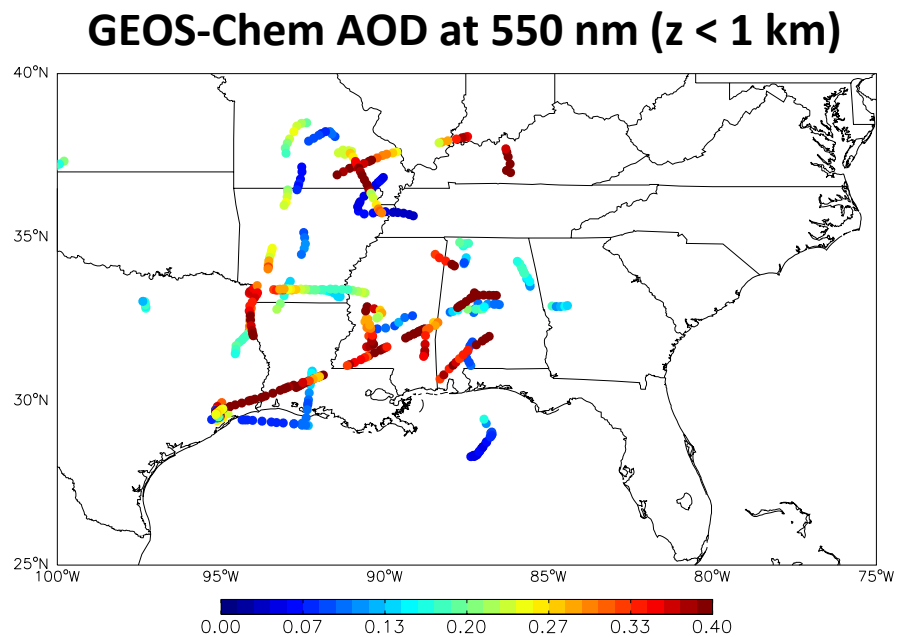


PTR-MS Acetonitrile Curtain (8/23)



Aerosol Optical Depths





GEOS-Chem strongly overestimates AOD - consistent with comparisons to AERONET

> We think this is largely due to an overestimate of NH_3 emissions

Near Real Time GEOS-Chem Output for SEAC4RS

NASA Airborne Science Da | GEOS-Chem NRT Simulatio

https://www-air.larc.nasa.gov/cgi-bin/ArcView/seac4rs?MODEL=

Current list for the MODEL Data:

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20130816 20130819 20130821 20130823 20130826 20130827

PI Directory	Last Updated	Project Description
JACOB.DANIEL/		GEOS-Chem Near Real Time Model Output
OLSON.JENNIFER/	Sep 05, 2013	

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» GEOS-Chem Near-Real-Time Comparisons to Observations for SEAC4RS

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	SEAC4RS-BoxModel_MODEL_20130819_RB.ict	Sep 5 10:31	86.7
	SEAC4RS-BoxModel_MODEL_20130821_RB.ict	Sep 5 10:31	79.2
	SEAC4RS-BoxModel_MODEL_20130823_RB.ict	Sep 5 10:32	76.4
	SEAC4RS-BoxModel_MODEL_20130826_RB.ict	Sep 5 10:32	79.1
	SEAC4RS-BoxModel_MODEL_20130827_RB.ict	Sep 5 10:32	89.1

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