

Overview of **Submicron Aerosols**  
during ALC-IOP at BNL: *Preliminary*  
Results from HR-ToF-AMS

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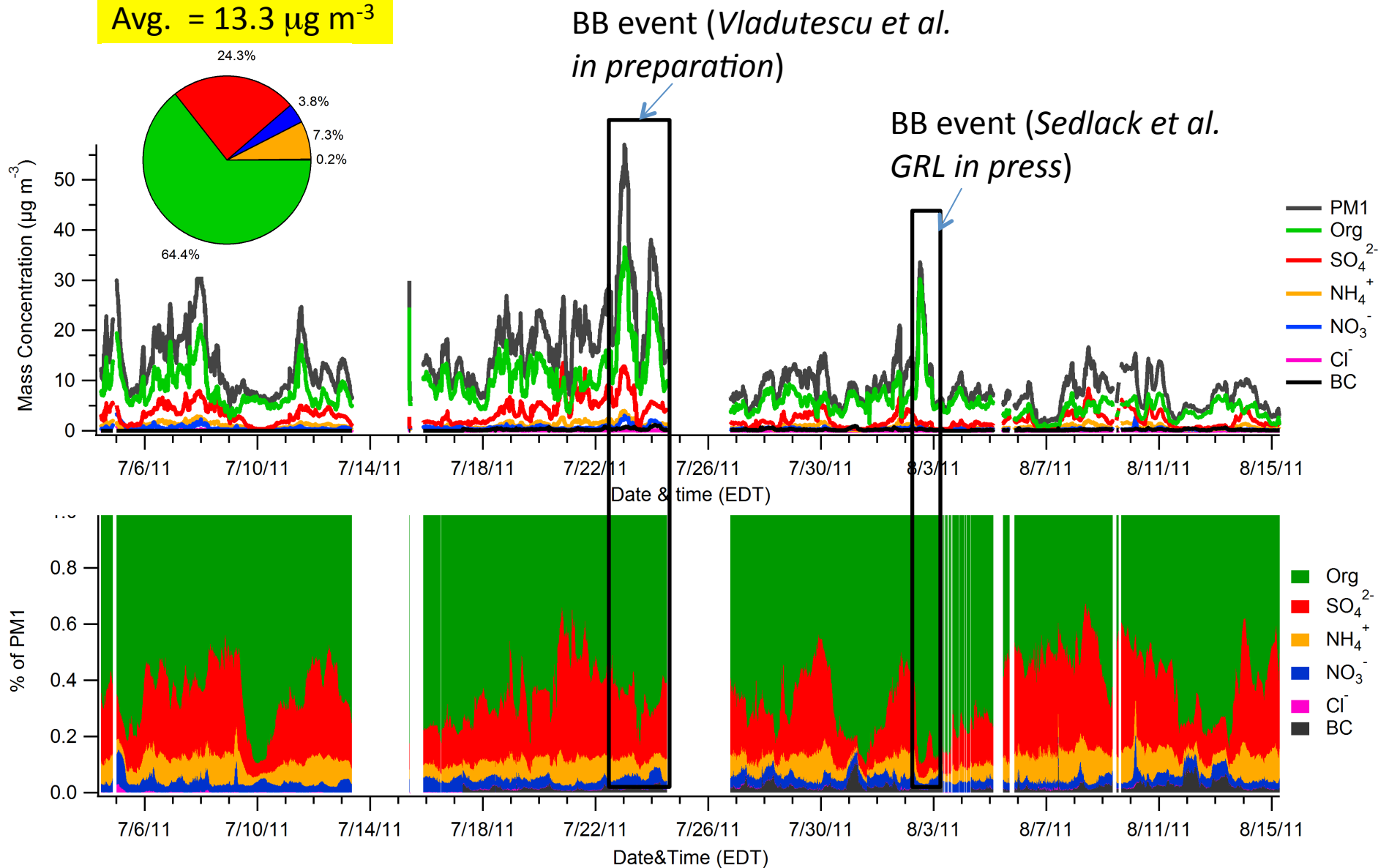
University of California at Davis

*2012/03/11, DOE ASR Meeting*

# Highly Variable PM<sub>1</sub> Conc., Comp., & Size Dist.

→ exciting dataset to study ALC processes!

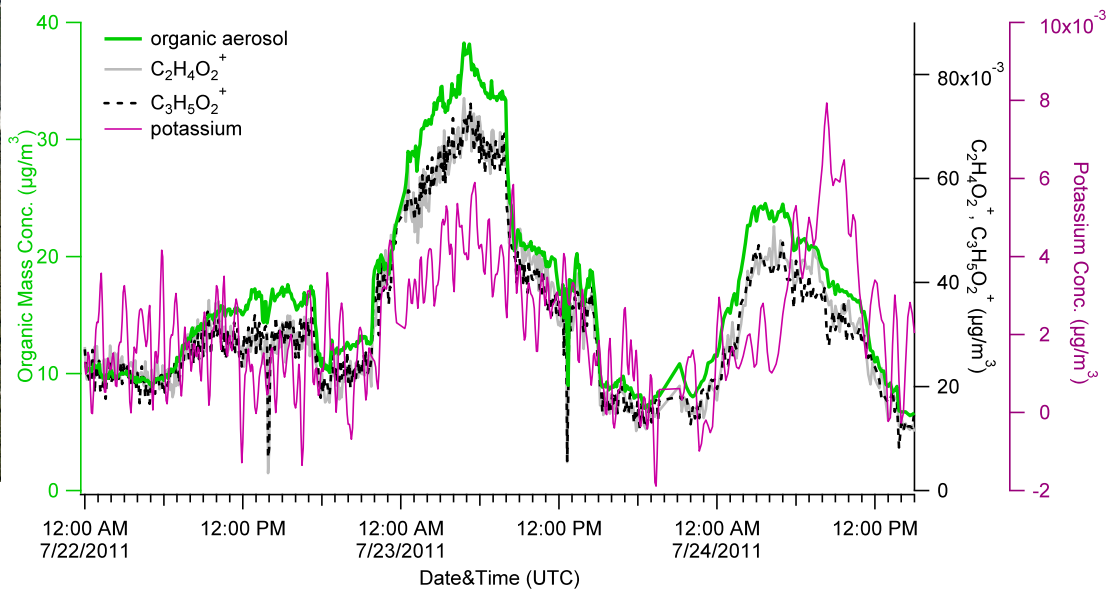
Avg. = 13.3  $\mu\text{g m}^{-3}$



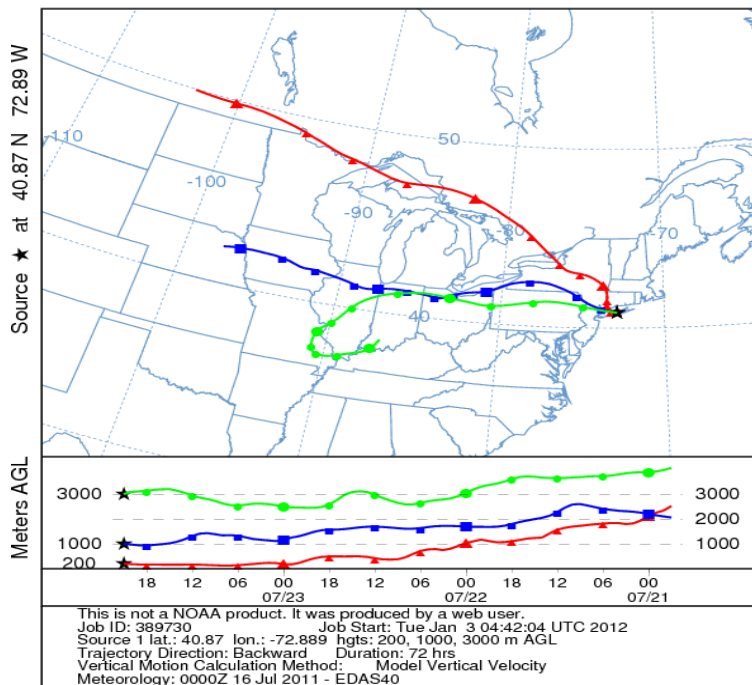
# Biomass Burning Influence



Backward trajectories ending at 2100 UTC 23 Jul 11  
EDAS Meteorological Data

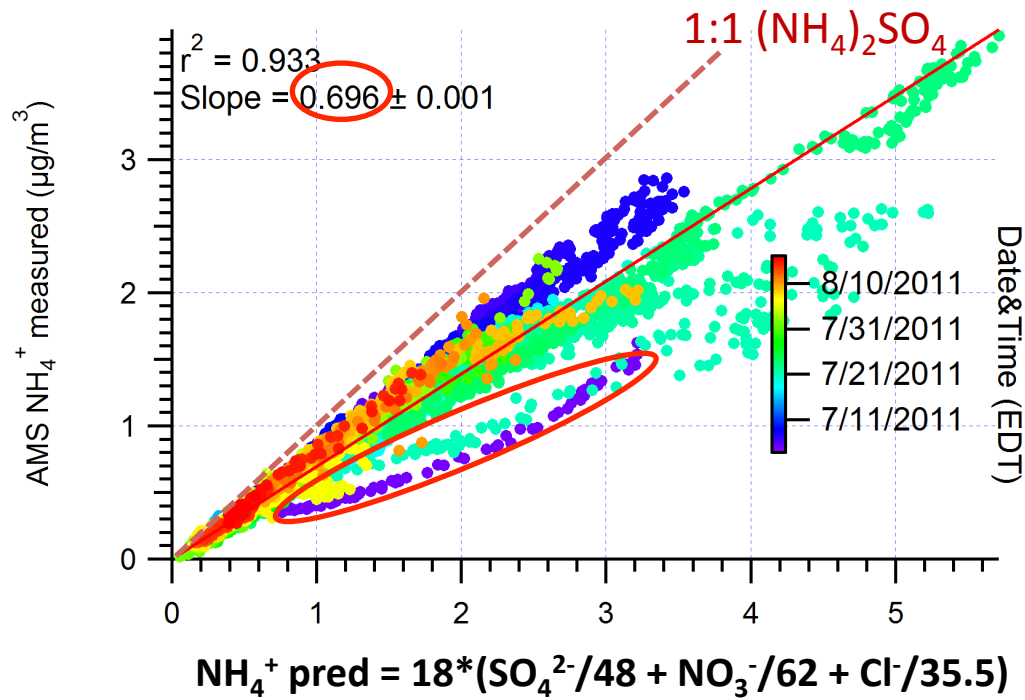


Vladutescu et al., in preparation

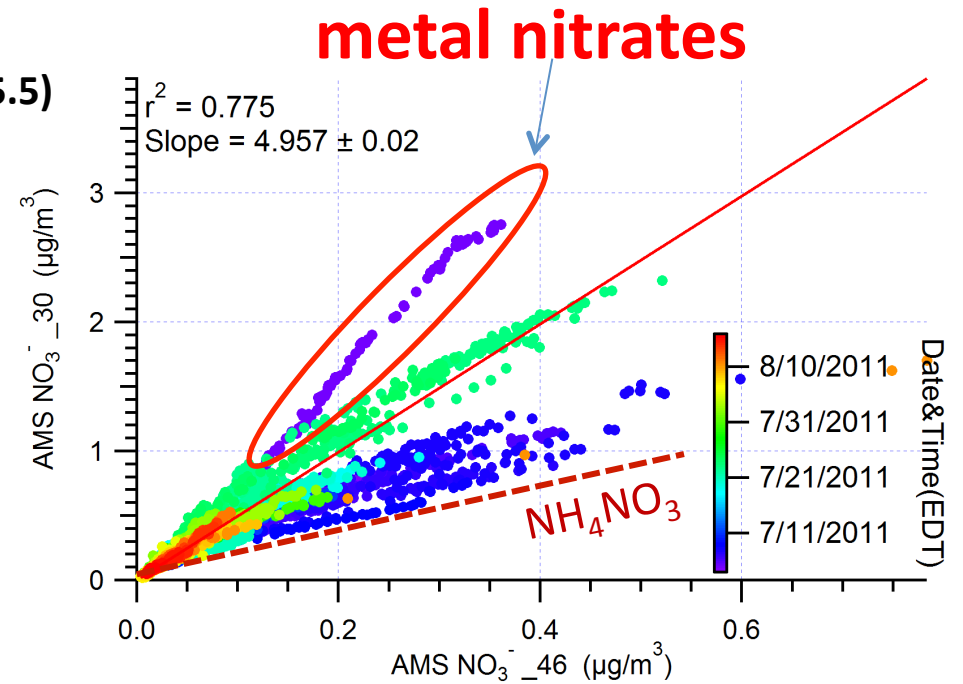


Backtrajectory and satellite data from  
Viviana Vladutescu, CUNY

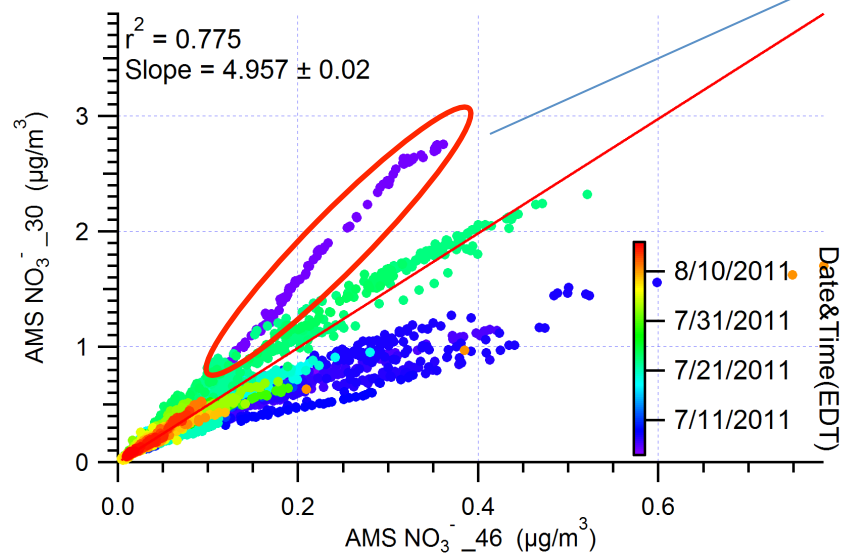
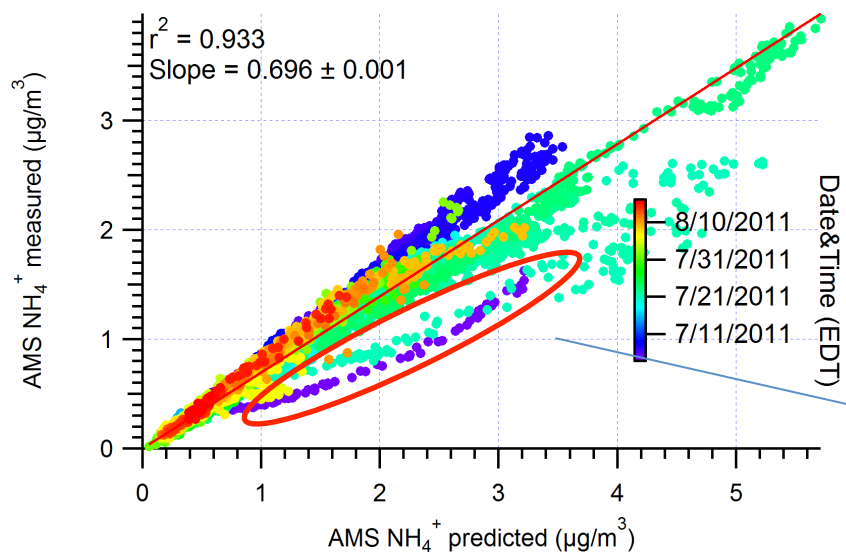
# “Interesting” Aerosol Ion Chemistry



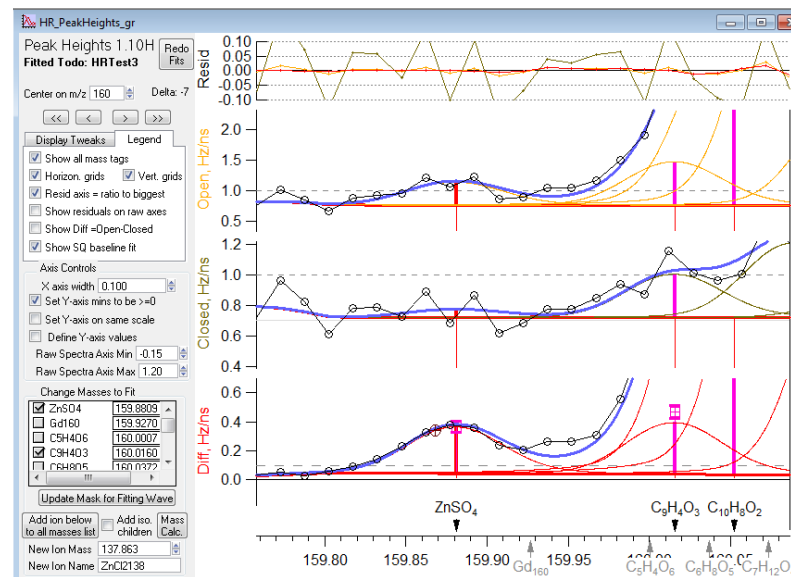
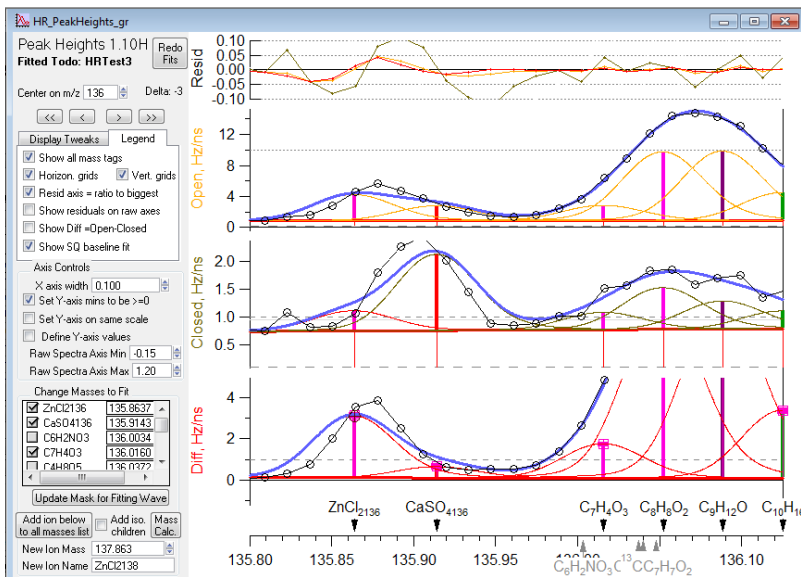
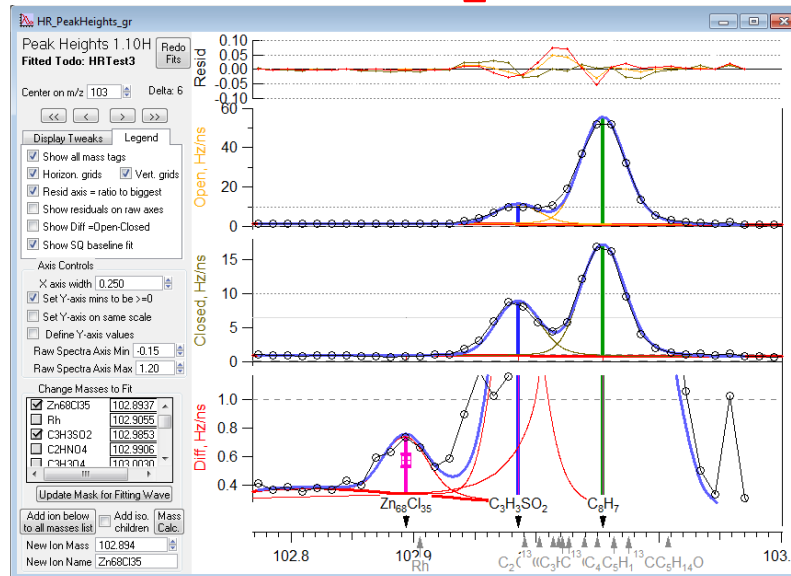
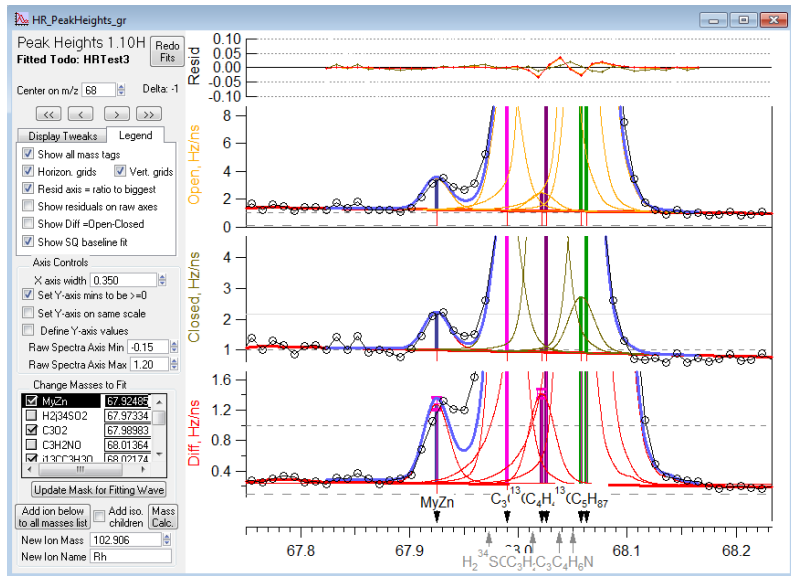
“Acidic” particles? “Missing” ions?



# Detection of metal salts



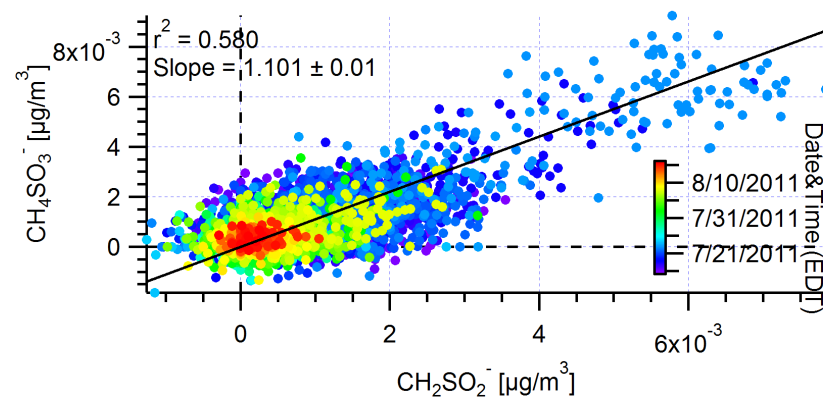
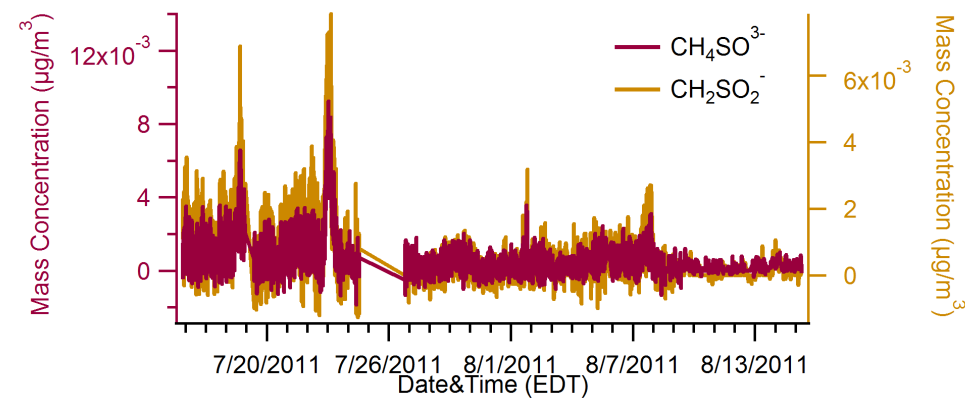
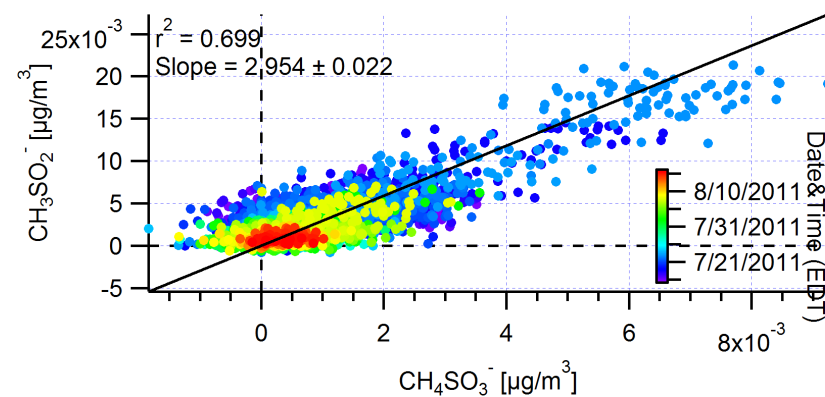
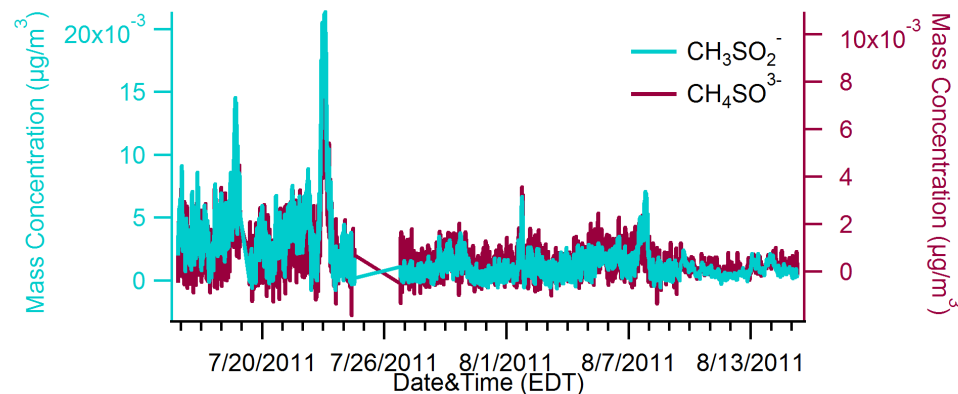
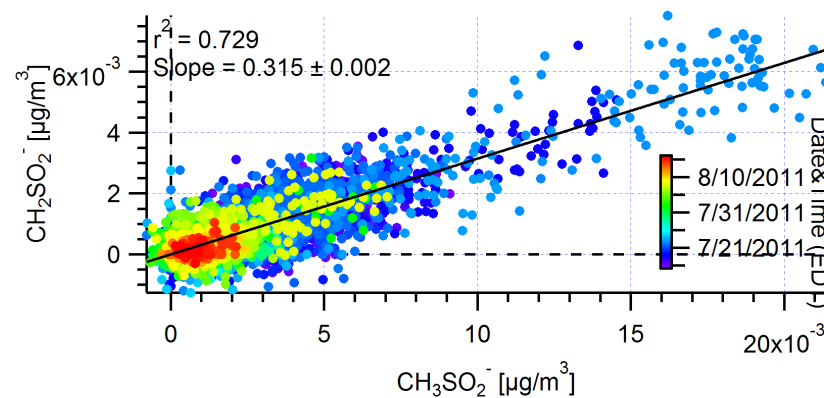
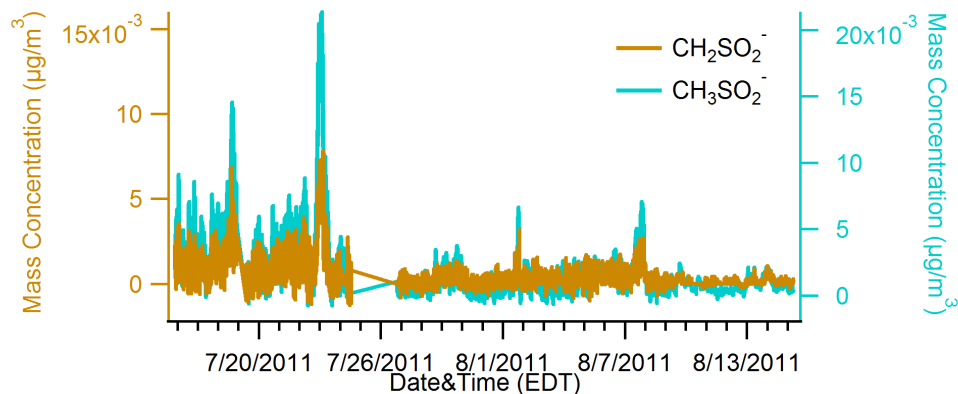
Name	Exact Mass	Abundance
$^{64}\text{Zn}$	63.929145	48.6
$^{66}\text{Zn}$	65.926035	27.9
$^{68}\text{Zn}$	67.924846	18.8
$^{64}\text{Zn}^{35}\text{Cl}$	98.897998	36.8
$^{66}\text{Zn}^{35}\text{Cl}$	100.894888	21.1
$^{68}\text{Zn}^{35}\text{Cl}$	102.89370	14.2
$^{64}\text{Zn}^{37}\text{Cl}$	100.895048	11.8
$^{66}\text{Zn}^{37}\text{Cl}$	102.891938	6.8
$^{68}\text{Zn}^{37}\text{Cl}$	104.890749	4.6
$^{64}\text{Zn}^{35}\text{Cl}_2$	133.866851	27.9
$^{66}\text{Zn}^{35}\text{Cl}_2$	135.863741	16.0
$^{68}\text{Zn}^{35}\text{Cl}_2$	137.862552	10.8
$^{64}\text{Zn}^{35}\text{Cl}^{37}\text{Cl}$	135.863901	17.8
$^{66}\text{Zn}^{35}\text{Cl}^{37}\text{Cl}$	137.860791	10.2
$^{68}\text{Zn}^{35}\text{Cl}^{37}\text{Cl}$	139.859602	6.9
$^{64}\text{Zn}^{37}\text{Cl}_2$	137.860951	2.9
$^{66}\text{Zn}^{37}\text{Cl}_2$	139.857841	1.6
$^{68}\text{Zn}^{37}\text{Cl}_2$	141.856652	1.1
$^{64}\text{ZnO}$	79.92406	48.5
$^{66}\text{ZnO}$	81.92095	27.8
$^{68}\text{ZnO}$	83.919761	18.8
$^{64}\text{ZnSO}_4$	159.880877	48.6
$^{66}\text{ZnSO}_4$	161.877767	27.9



# Metal Ions Identified

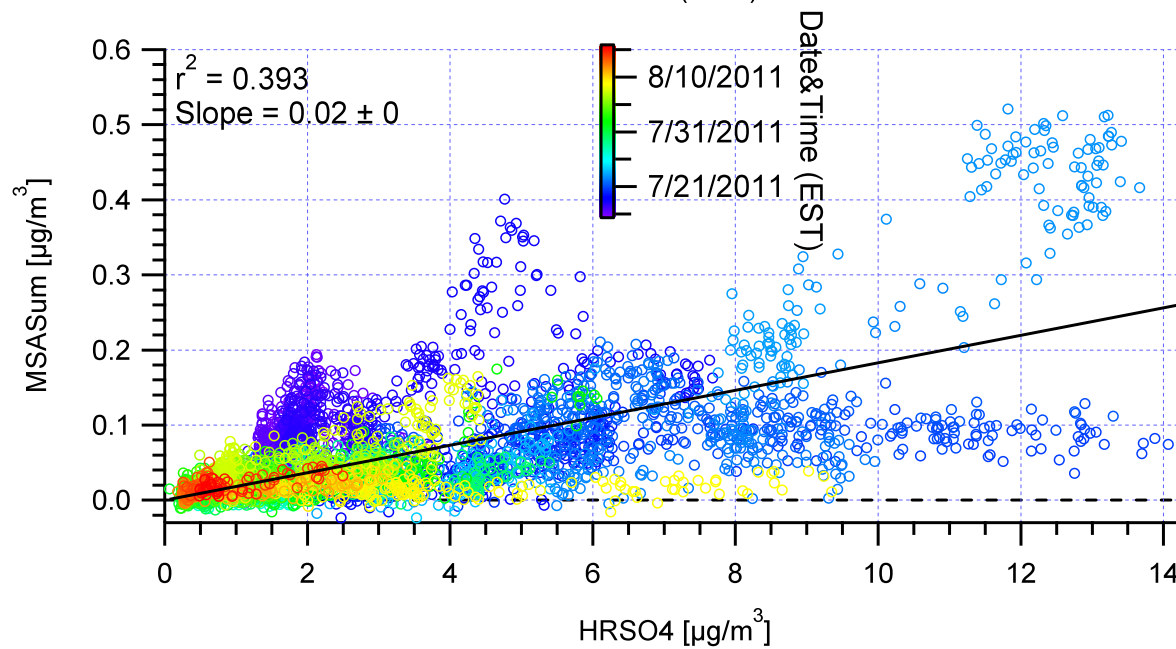
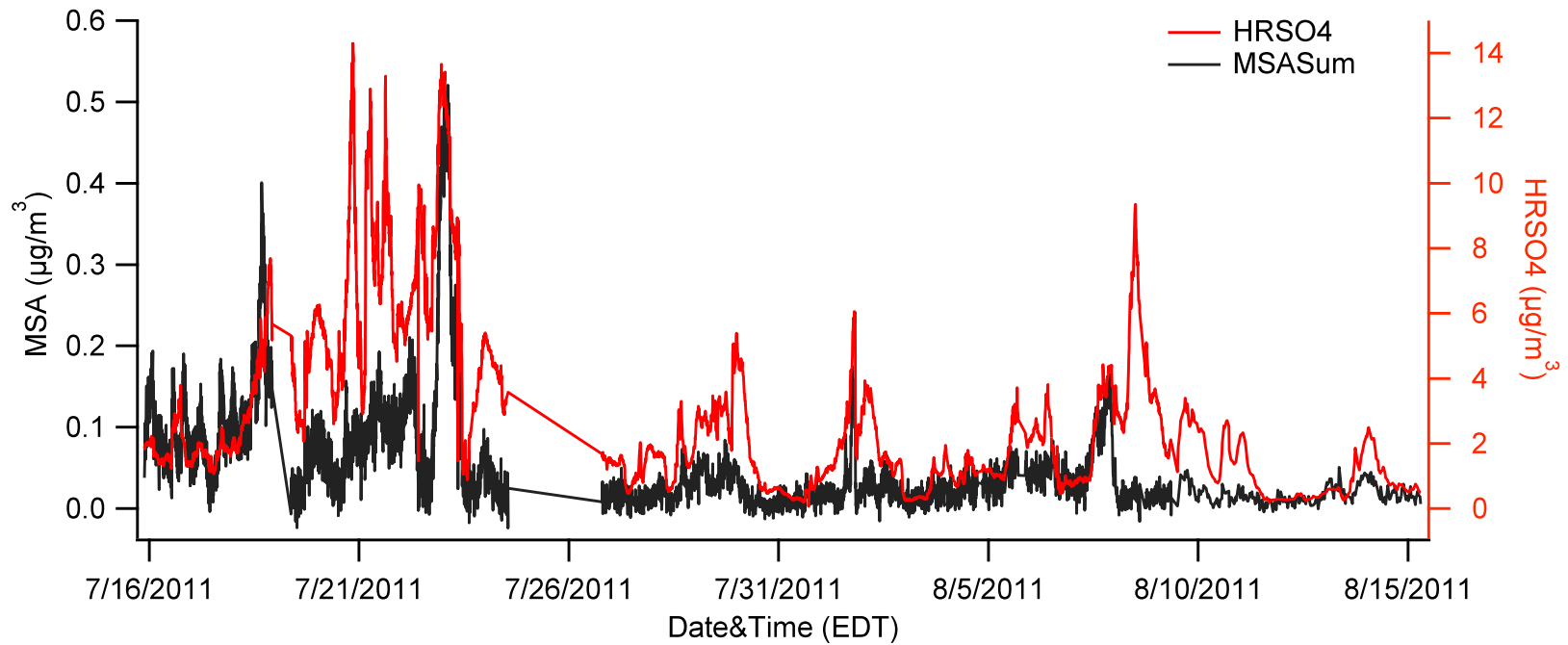
- Na/Mg/K/Ca/Fe/Mn/Cu/Zn/As/Sn/Hg/Pb
- MgCl/MgCl<sub>2</sub>/AlCl/AlCl<sub>2</sub>/
- FeCl/FeCl<sub>2</sub>/MnCl<sub>2</sub>/CuCl/ZnCl/ZnCl<sub>2</sub> ....
- MgSO<sub>4</sub>/CaSO<sub>4</sub>/MnSO<sub>4</sub>/ZnSO<sub>4</sub>...
- CaO/MnO/ZnO

# Marine Influence: Methanesulfonic Acid (MSA)



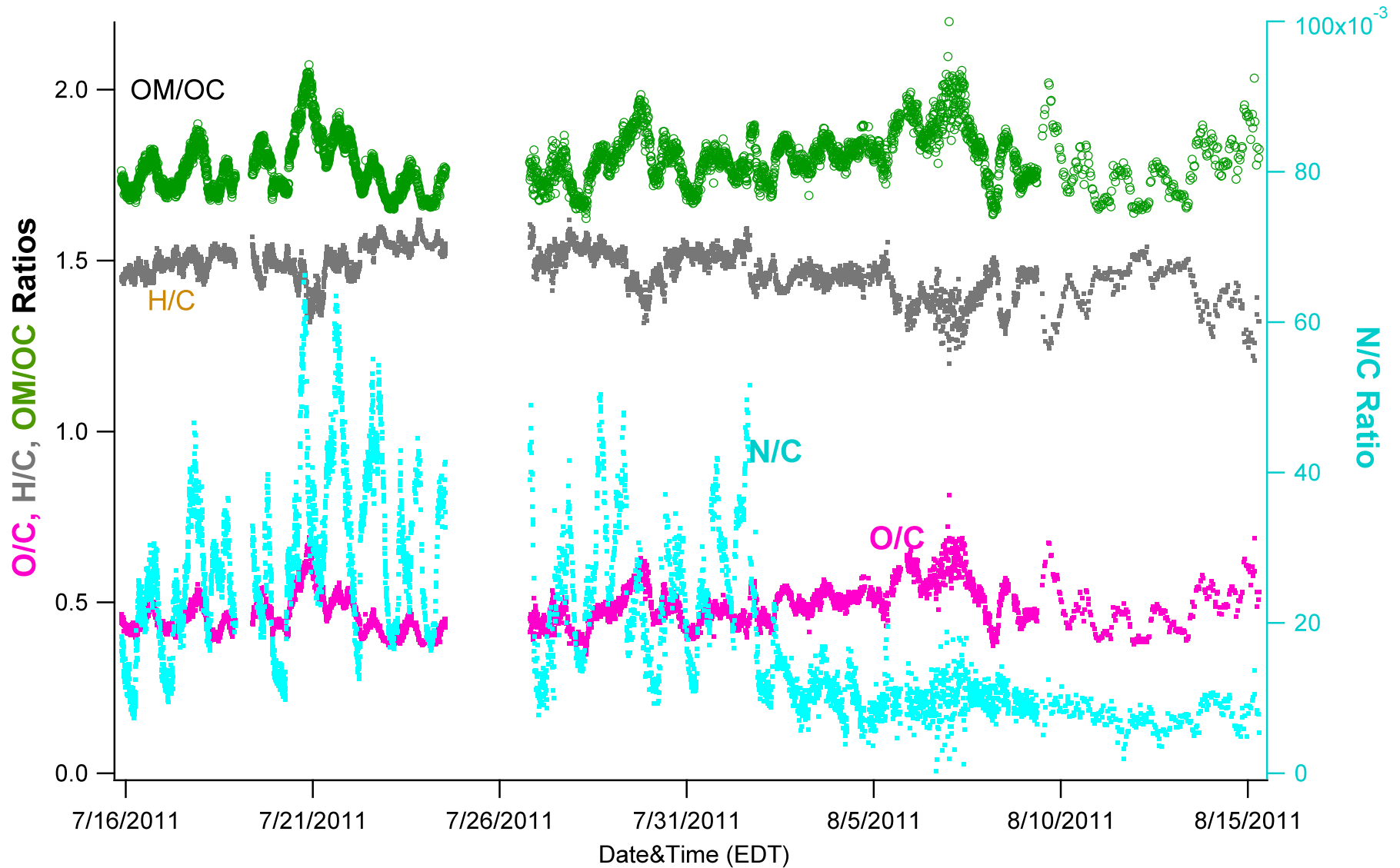


# Secondary Aerosols: Marine vs. Regional



# Generally Oxidized OA $\rightarrow$ SOA Dominance

OA/PM<sub>1</sub> = 64%



# Different OA Sources and Processes

