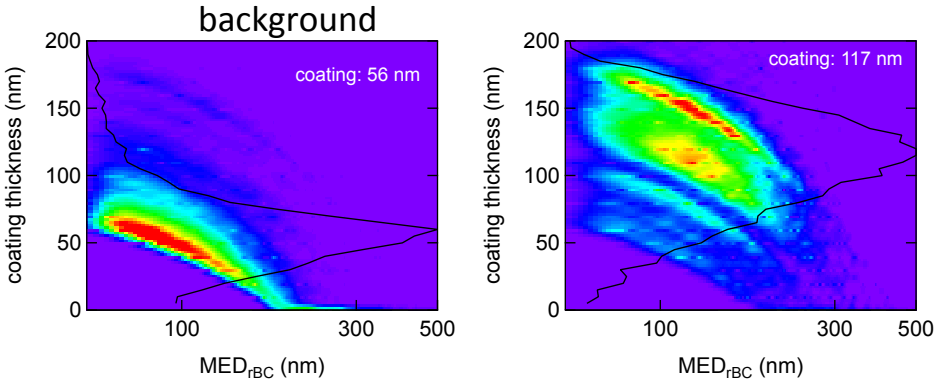
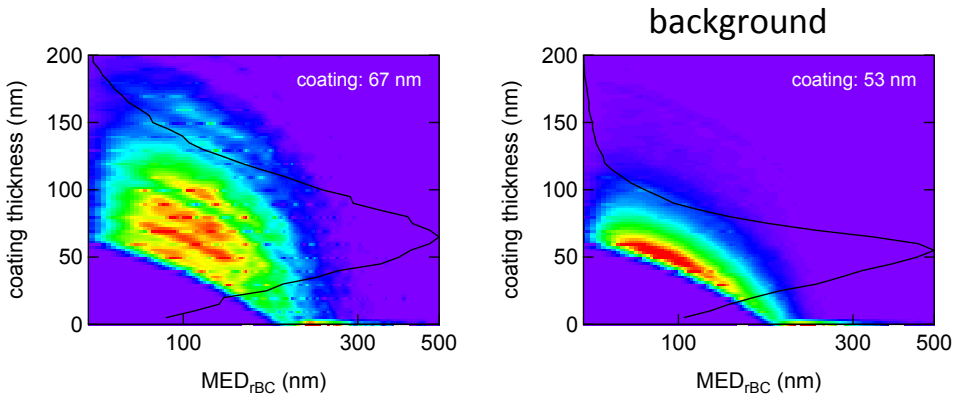
First Look at rBC Microphysics

Fuel Source Dependence on rBC 'Coating Thickness'?



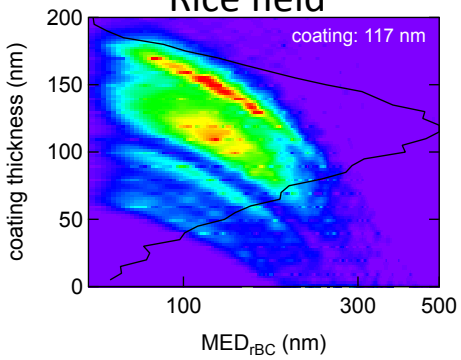
$\Phi_{aged/nascent} = 4.9$

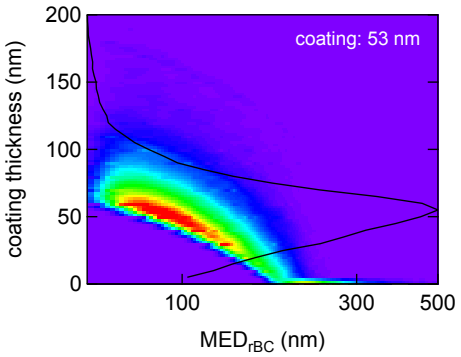


$\Phi_{aged/nascent} = 2.8$

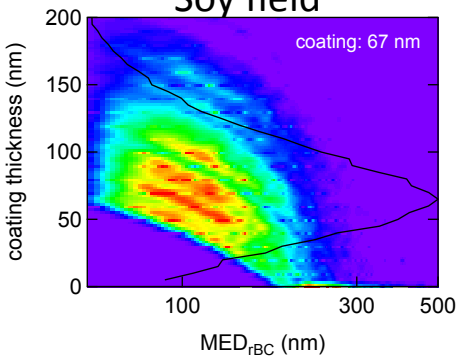
Fuel Source Dependence on rBC 'Coating Thickness'?

1014a (Ag-burn)
Rice field



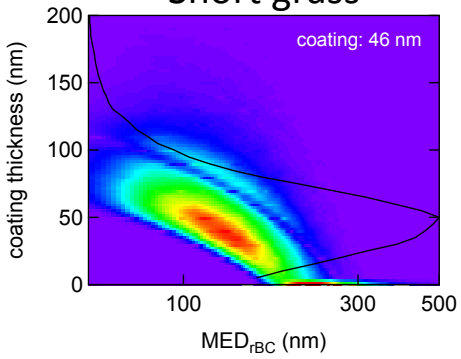


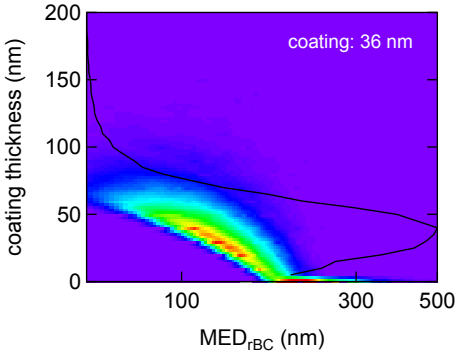
1014a (Ag-burn)
Soy field



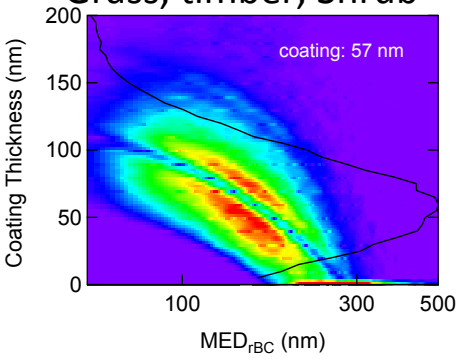
backgrounds

0730b (Colockum Fire)
Short grass





0726a (Mile Marker 28 Fire)
Grass, timber, Shrub



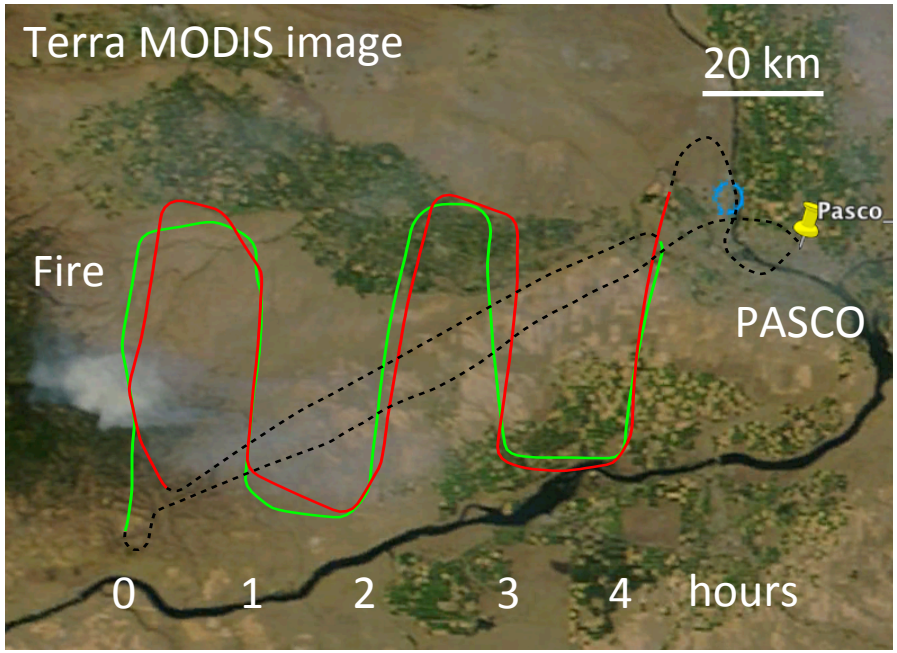
BBOP: Near-Field Evolution of Smoke Aerosol Properties

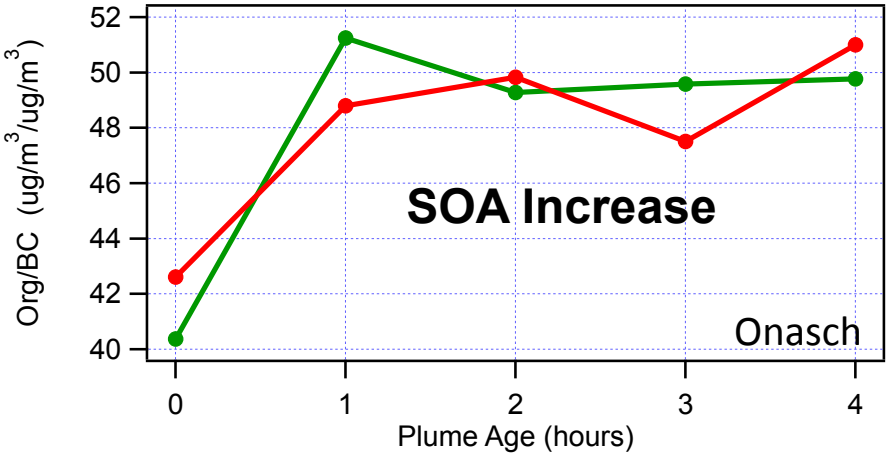
“28 Mile Marker” Fire sampled on 07-26-2013

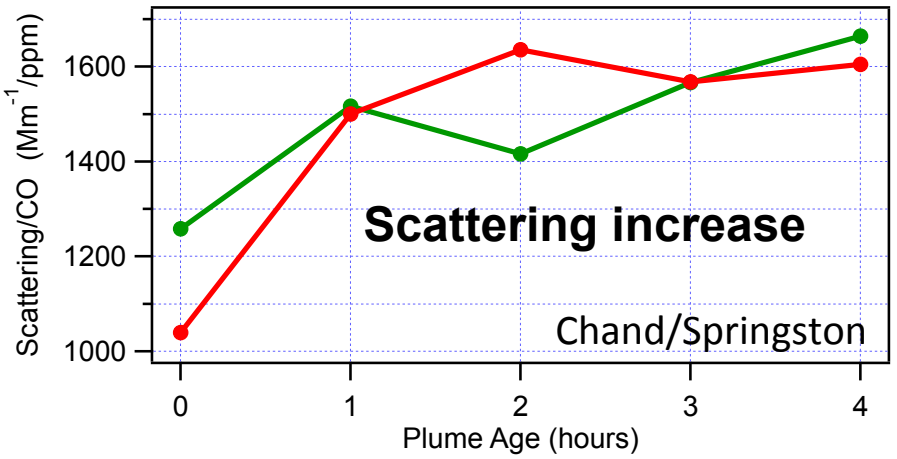
BBOP: Near-Field Evolution of Scattering & SOA

"28 Mile Marker" Fire sampled at source and 1, 2, 3, 4 hour downwind

Targeted 07-26-2013



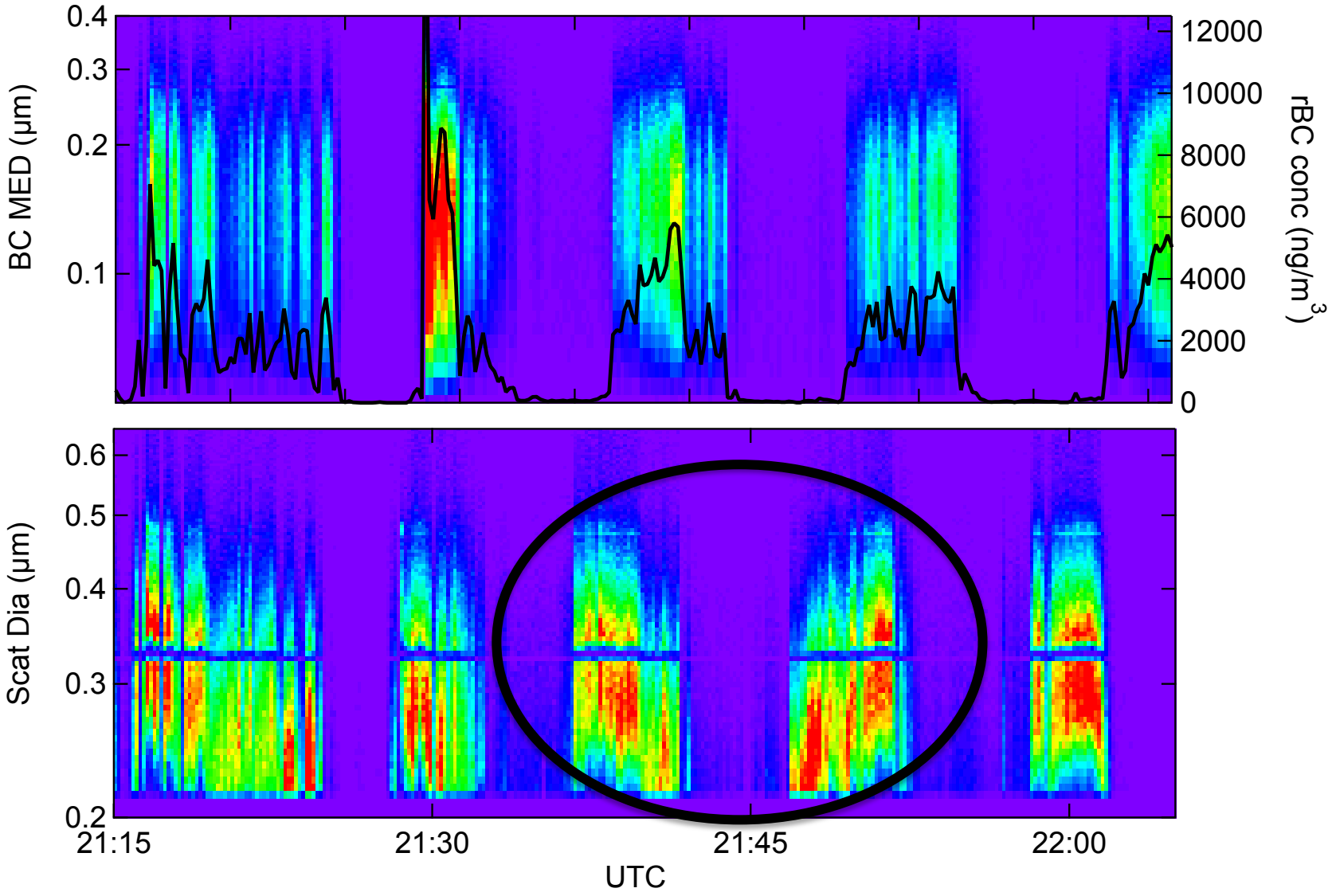




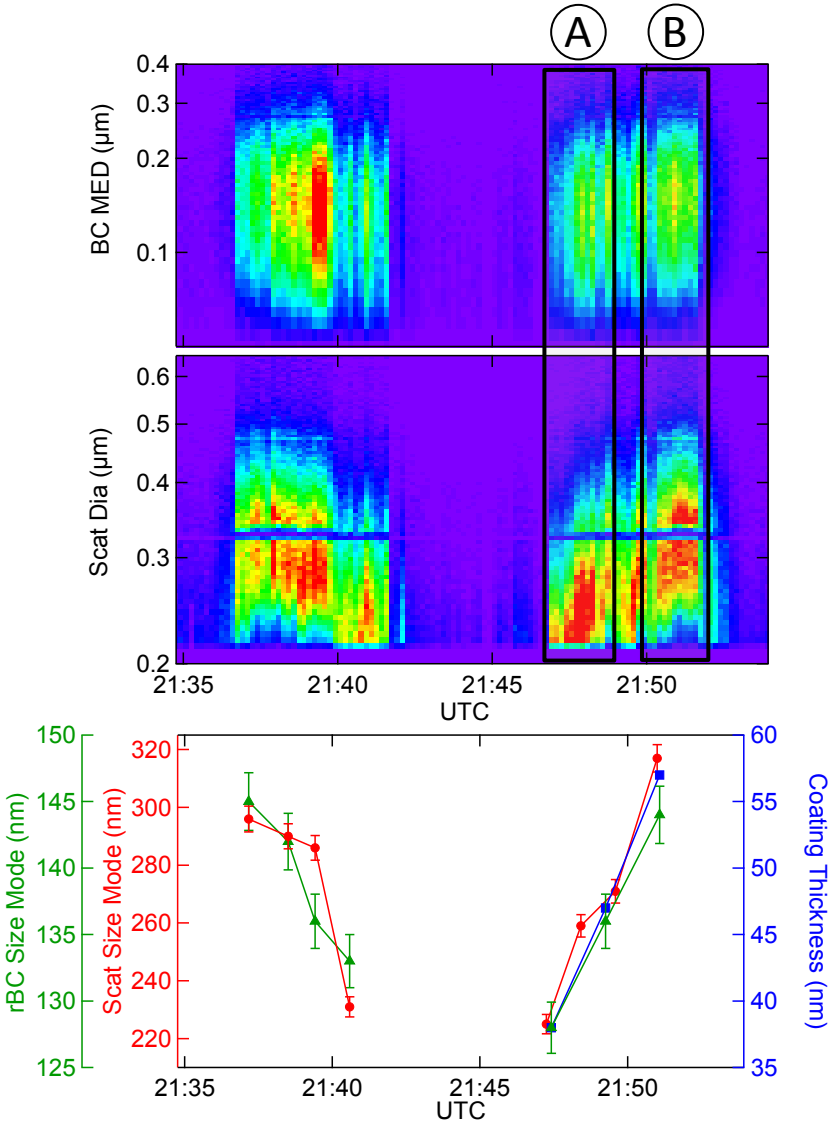
Repeatable

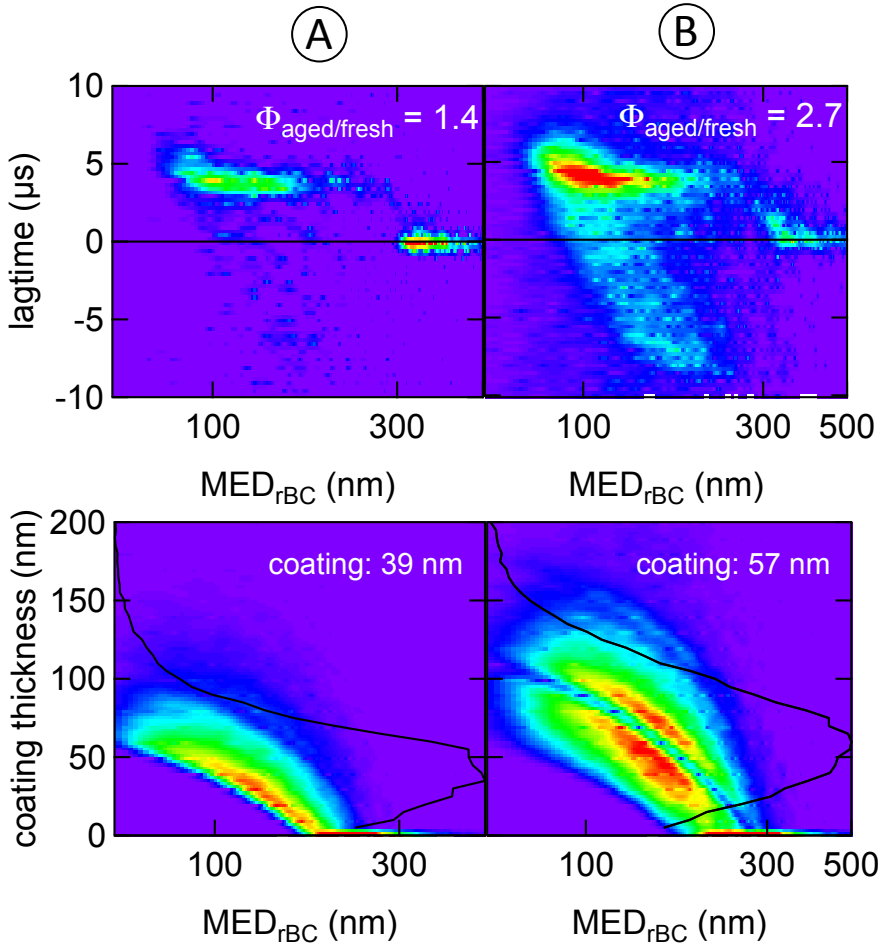
Rapid increase within 1st hour in SOA (25%) and scattering (50%)

Particle Evolution as Seen Through the SP2



Growth of Non-refractory material on rBC Particles



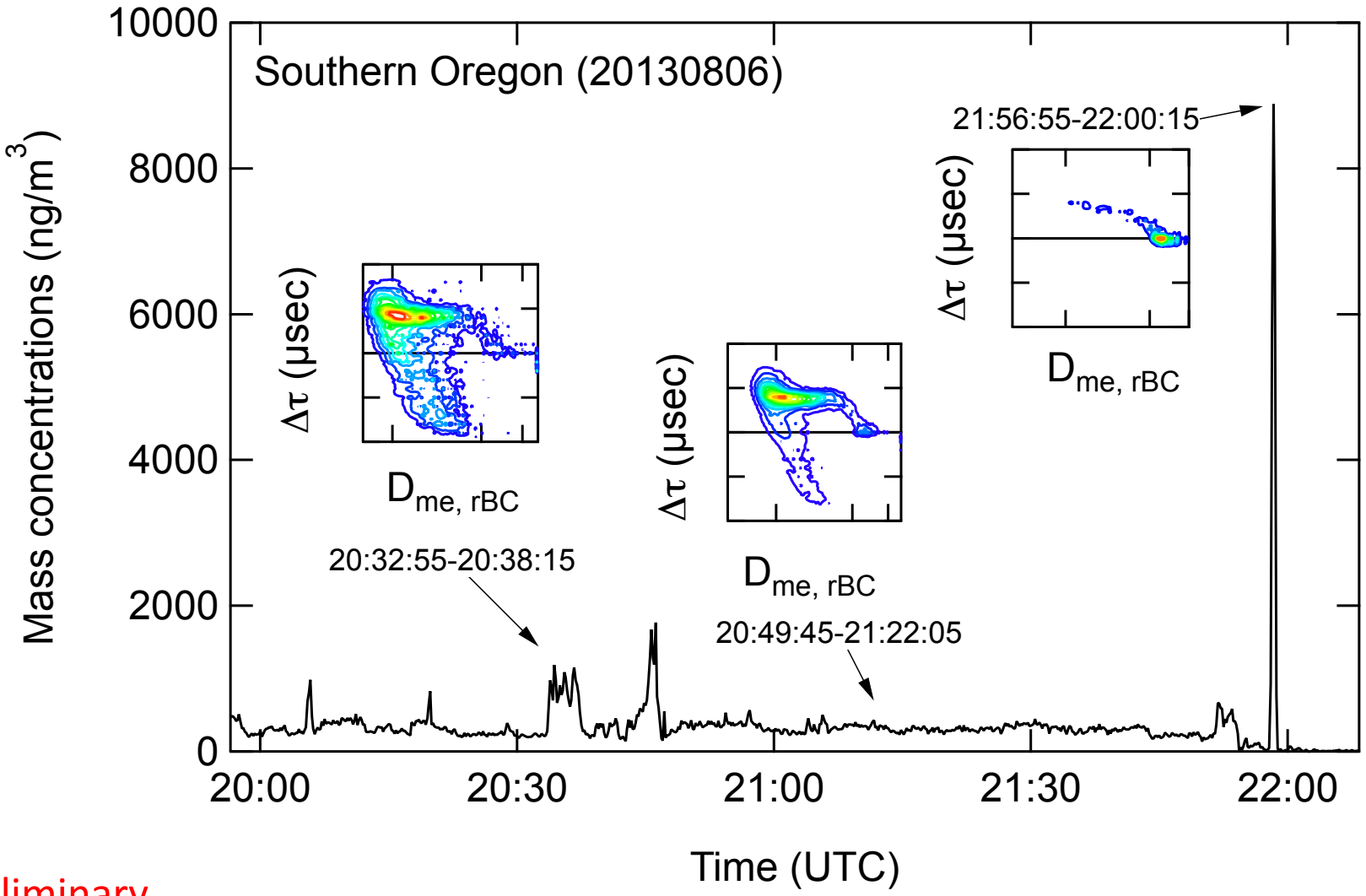


Need estimates of photochemical age:

- NOx/NOy
- O/C
- benzene/toluene

Single Particle Soot Photometer (SP2)

Incandescence lagtime analysis suggests varying rBC-containing particle morphology.
Opportunity to compare with TEM analysis.



preliminary

A word on ‘negative’ lagtimes: It has been observed by another group

The Pagami Creek smoke plume after long-range transport to the upper troposphere over Europe – aerosol properties and black carbon mixing state: Dahlkötter et al., ADPD (13) 2013)

The first two reports of disintegrating BC particles in ambient aerosols are from forest 5 fire plumes (Sedlacek et al., 2012 and this study). The question if disintegrating particles are uniquely or predominantly associated with biomass burning aerosol remains to be addressed.