

## INTRODUCTION

► Semi-continuous Organic Carbon and Elemental Carbon (OCEC) instruments are becoming more widely employed to measure the carbonaceous fraction of atmospheric particulate matter. Determining accurate concentrations of atmospheric OC and EC is necessary for identifying their sources and predicting their effects on various atmospheric processes, but lacks the detail required to fully elucidate sources. We have obtained hourly time-resolved measurements of OC and EC at Pinnacle State Park (PSP) in upstate New York and the South Bronx, New York City. OC and EC were determined using a NIOSH-like protocol and a Sunset Real Time ECOC Analyzer - that is, using four temperature steps to a final temperature of 840 °C for OC and two steps to 850 °C for EC.

► There is currently no standard procedure for determining concentrations of the empirical parameters OC and EC in the atmosphere, and there is considerable controversy over measurement methods and parameter designations. In this study, we examine contour plots of the time series carbonaceous concentrations associated with the analysis temperature steps in the hope of providing additional information and details into the carbonaceous nature of sources.

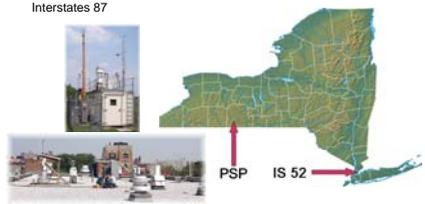
## SITE DESCRIPTION

**Pinnacle State Park (PSP)**

- Low population density rural village of Addison, New York
- Surrounded by parklands, and forested areas

**Intermediate School 52 (IS 52)**

- Residential area with high traffic density
- Bruckner Expressway (I-287)
- Interstates 87

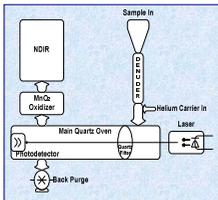


## Characteristics of the instrument

► Helium (He) Atmosphere  
Organic compounds volatilized  
Converted to CO<sub>2</sub>  
Measured by NDIR detector

► 2% Oxygen in Helium Atmosphere  
Elemental carbon completely burned  
Converted to CO<sub>2</sub>  
Measured by NDIR detector

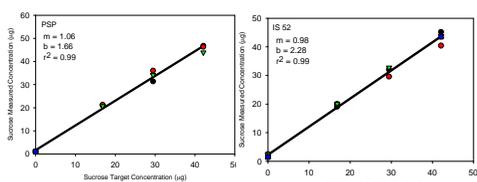
CH<sub>4</sub> Internal Calibration  
Monitoring of the Laser transmittance



Step	Gas	Hold Time (sec)	Temperature (°C)
1	Helium	10	1
2	Helium	80	600
3	Helium	80	840
4	Helium	25	0
5	He/Oxygen	35	650
6	He/Oxygen	105	850
7	Calibration	120	0

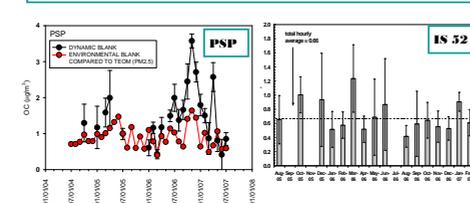
## FIGURE 1

► OC calibration by sucrose injection.



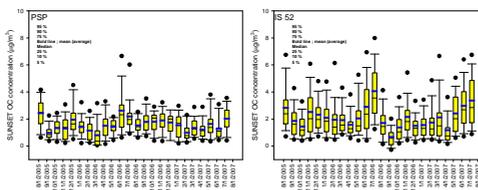
## FIGURE 2

► OC Blank correction: we used "Environmental Blanks" for the PSP site, and Dynamic Blanks for the IS 52 site.



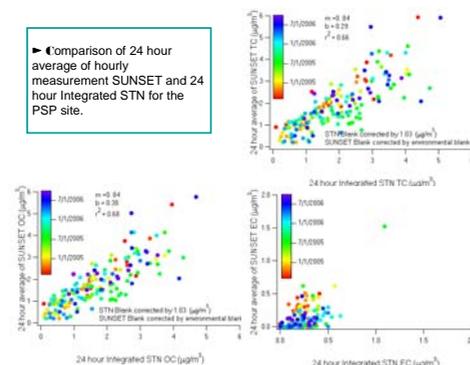
## FIGURE 3

► OC monthly variation for the PSP and IS 52 sites.



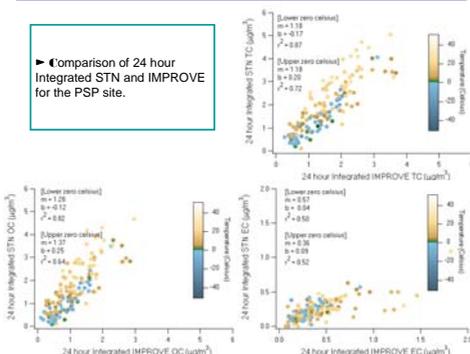
## FIGURE 4

► Comparison of 24 hour average of hourly measurement SUNSET and 24 hour Integrated STN for the PSP site.



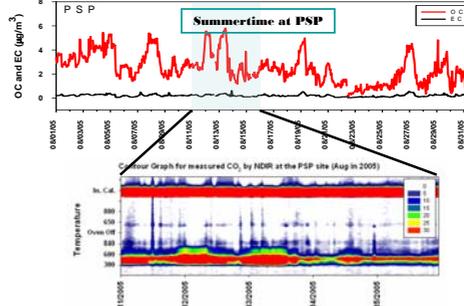
## FIGURE 5

► Comparison of 24 hour Integrated STN and IMPROVE for the PSP site.

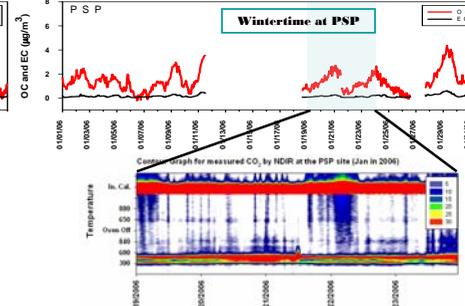


► STN and IMPROVE use different quartz filter substrates and different post-sampling handling protocols - which may help explain the observed differences in the warm and cold season intercepts for the TC and OC regression plots.

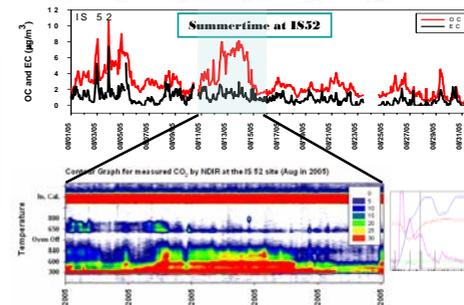
## FIGURE 6



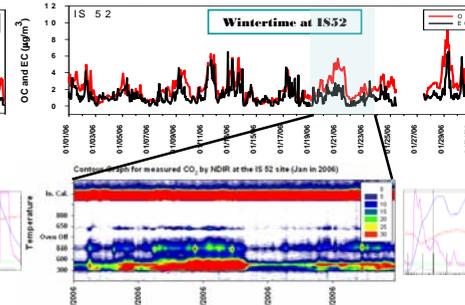
## FIGURE 7



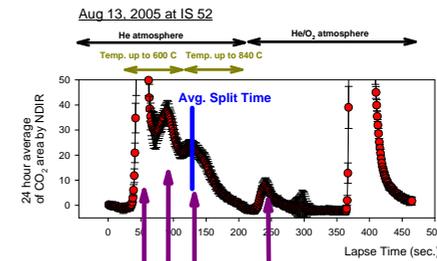
## FIGURE 8



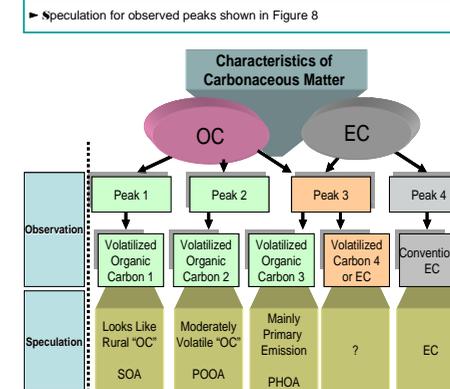
## FIGURE 9



## FIGURE 8

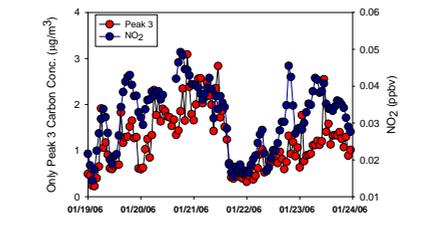


## FIGURE 10



## FIGURE 9

► Comparison of only Peak 3 conc. and NO<sub>2</sub> at the IS52 site.



## CONCLUSIONS AND SUGGESTIONS

- Data validation by sucrose calibration and blank correction.
- Fair agreement with 24 hour integrated STN measurement.
- Differences between STN and IMPROVE possibly due to material of filter substrates for sampling and post-sampling filter handling protocol.
- A contour method can be used for the extraction of additional information
- The thermogram peaks are quite different at the rural and urban sites.
- Thermal peaks measured with the SUNSET analyzer can be related to different classes of carbonaceous material.

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