



Impact of Local Traffic Exclusion on Near-Road Air Quality: Findings from New York City “Summer Streets” Campaign



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ROUTE MAP



www.nyc.gov/summerstreets

Summer Streets

Free admission
11th Street
12th Street
13th Street
14th Street
15th Street
16th Street
17th Street
18th Street
19th Street
20th Street
21st Street
22nd Street
23rd Street
24th Street
25th Street
26th Street
27th Street
28th Street
29th Street
30th Street
31st Street
32nd Street
33rd Street
34th Street
35th Street
36th Street
37th Street
38th Street
39th Street
40th Street
41st Street
42nd Street
43rd Street
44th Street
45th Street
46th Street
47th Street
48th Street
49th Street
50th Street



Stationary Sampling Locations



23rd St.

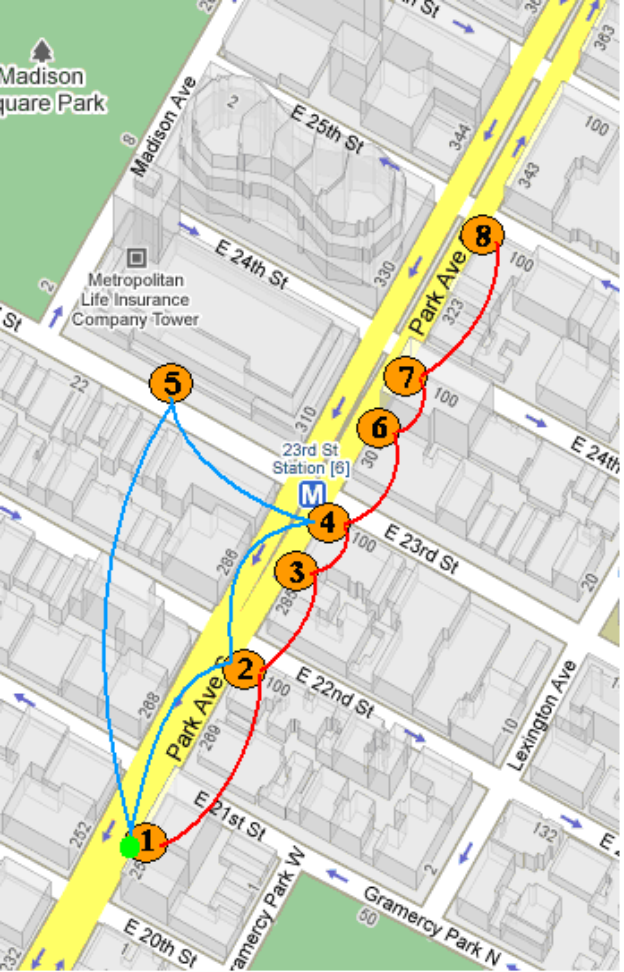
Park Ave.

Park. Ave.



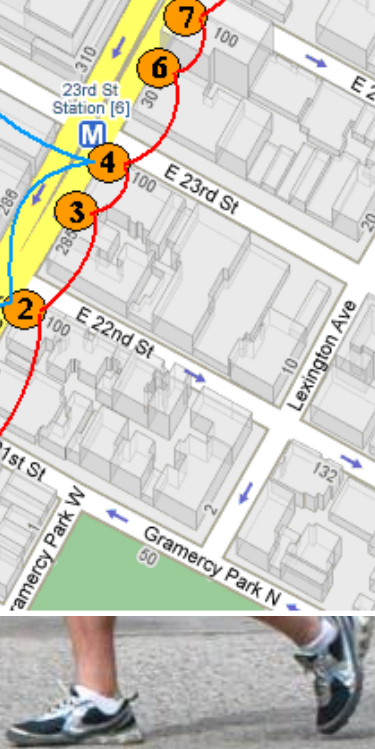
23rd St. Instruments cross-calibrated





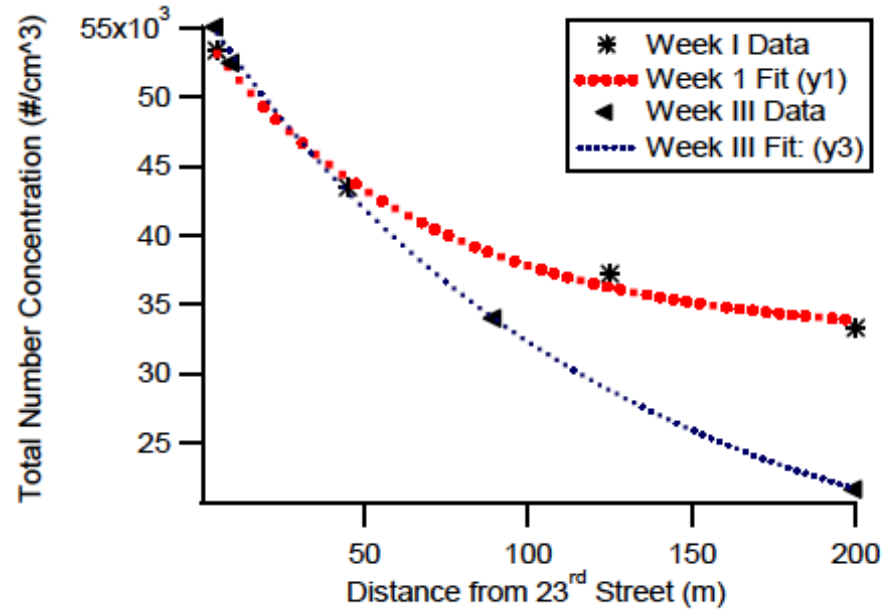
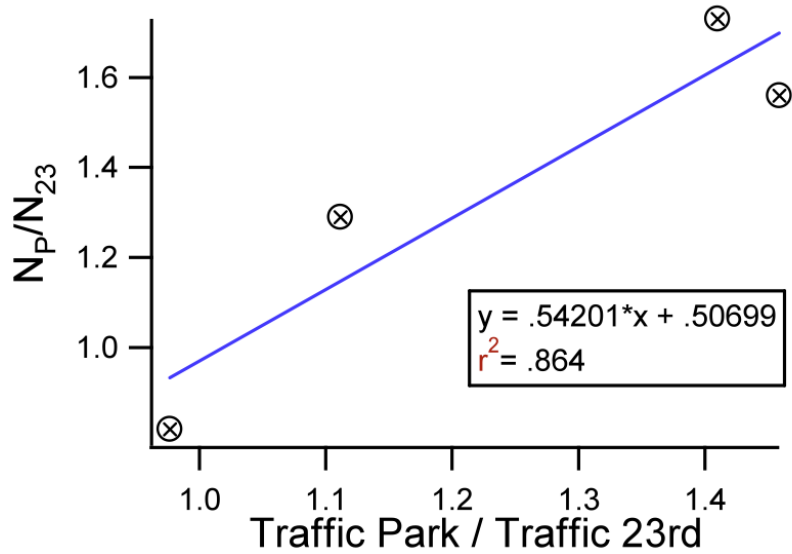
- Week 1
- Week 2
- Week 3

FMPS roving samples



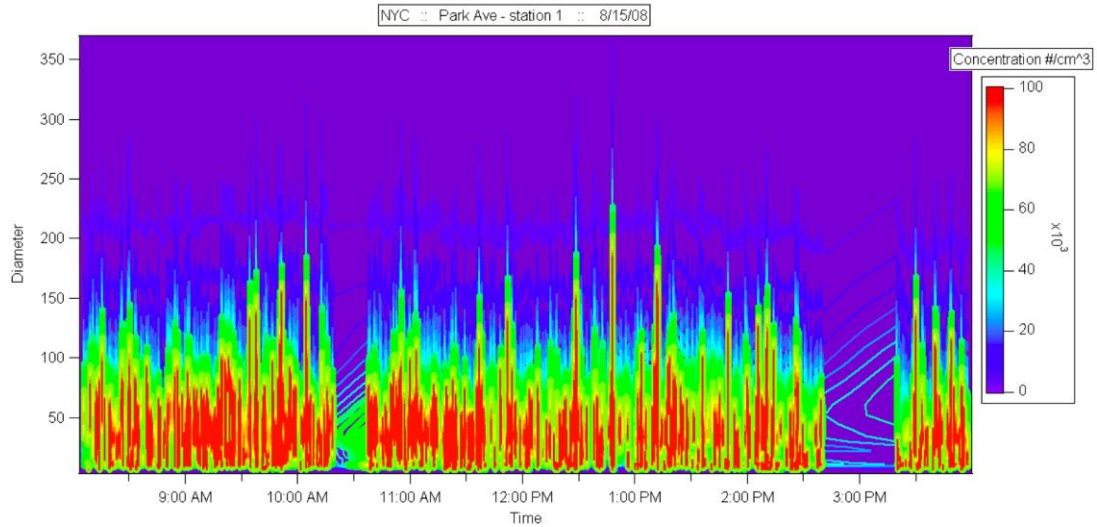


Ultrafine Particles and Traffic

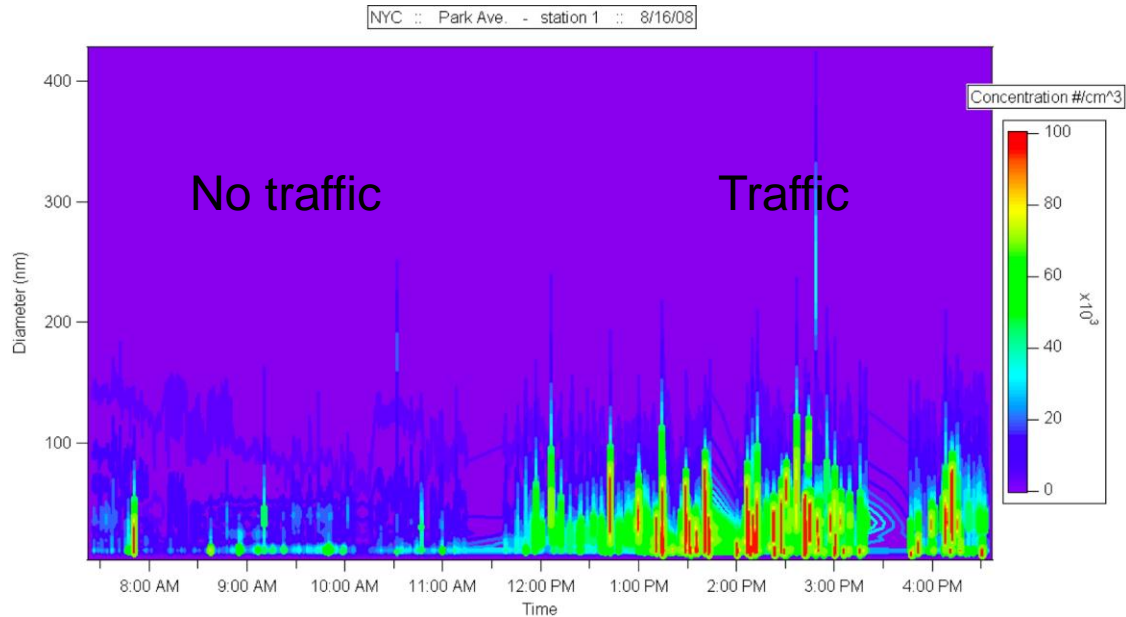


Ultrafine Particles and Traffic

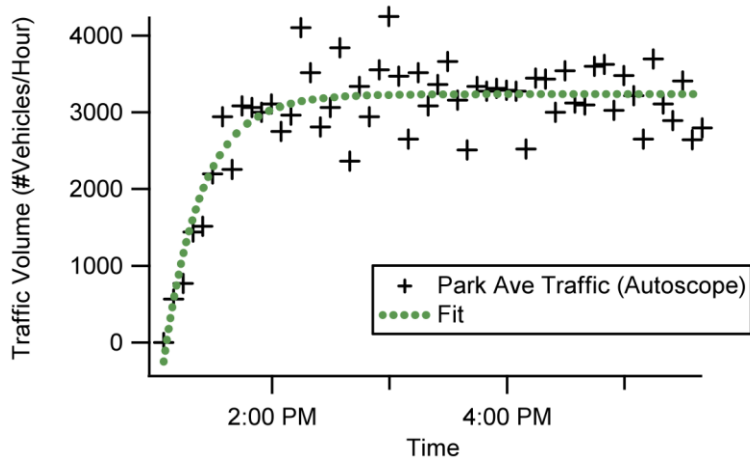
Friday



Saturday



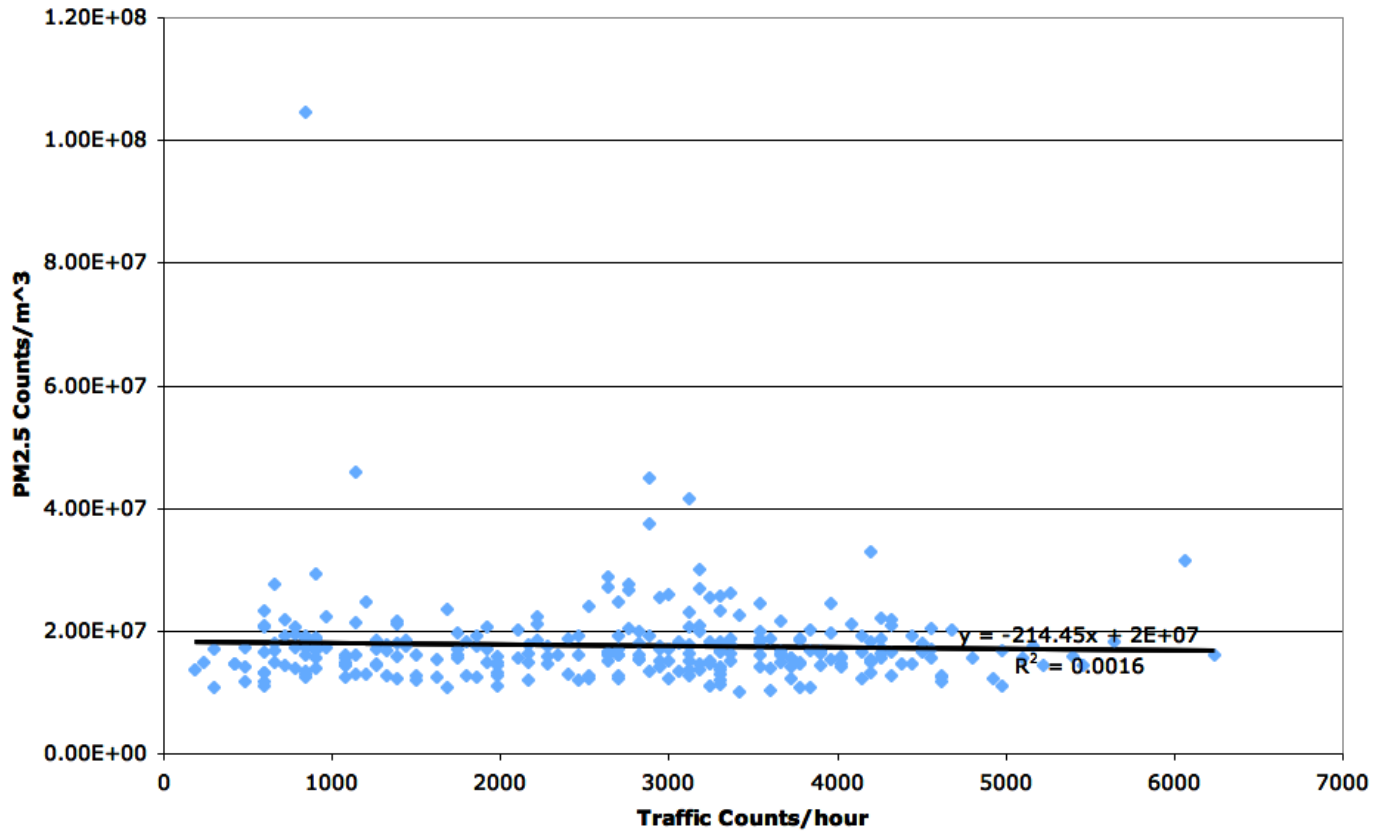
Ultrafine Particles and Traffic



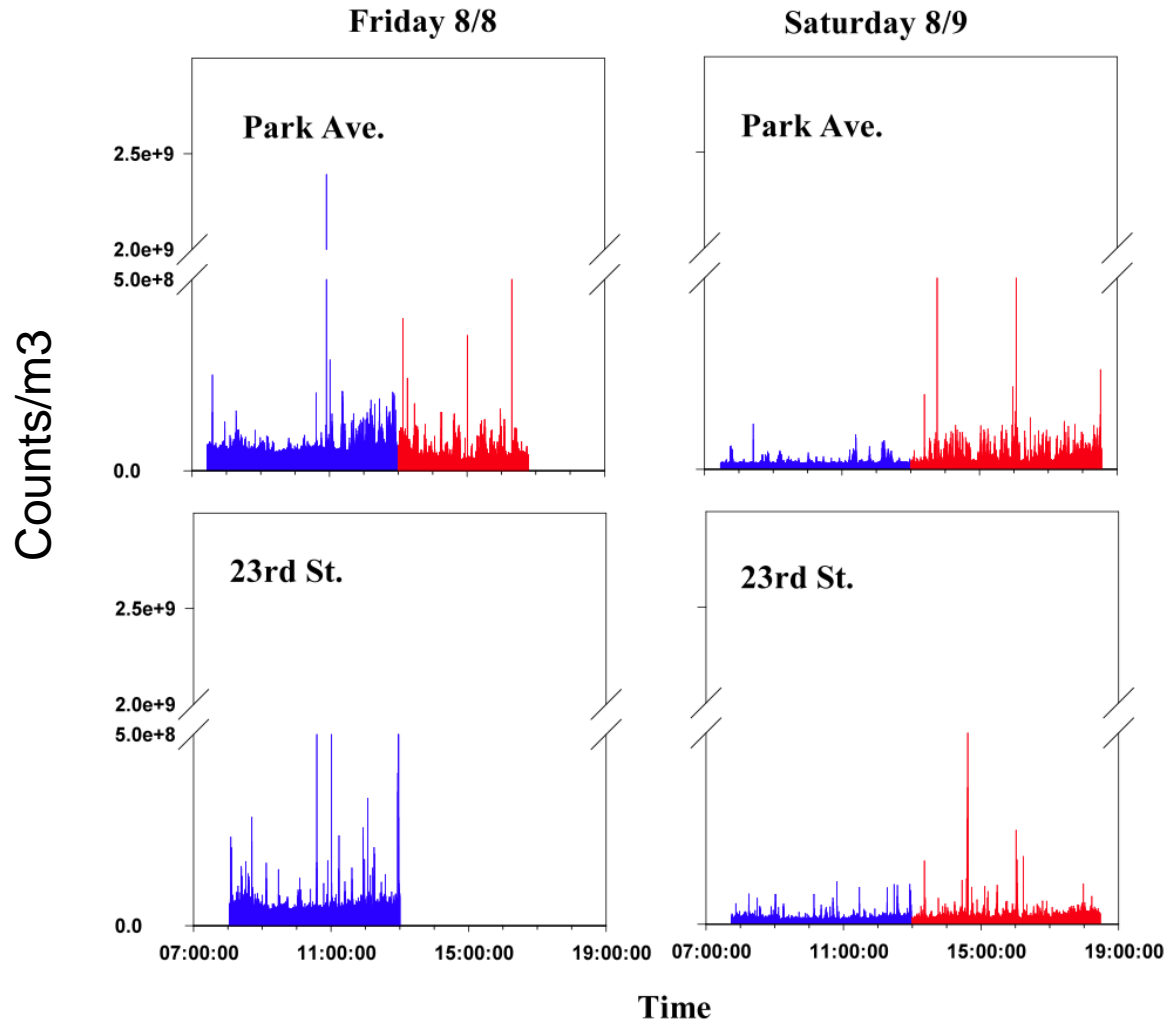
Date	τ_T (min)	τ_P (min)
Week I (8/9/2008)	34.4	57.0
Week II (8/16/2009)	19.4	56.1
Week III (8/23/2009)	35.1	48.4

PM_{2.5} and Traffic

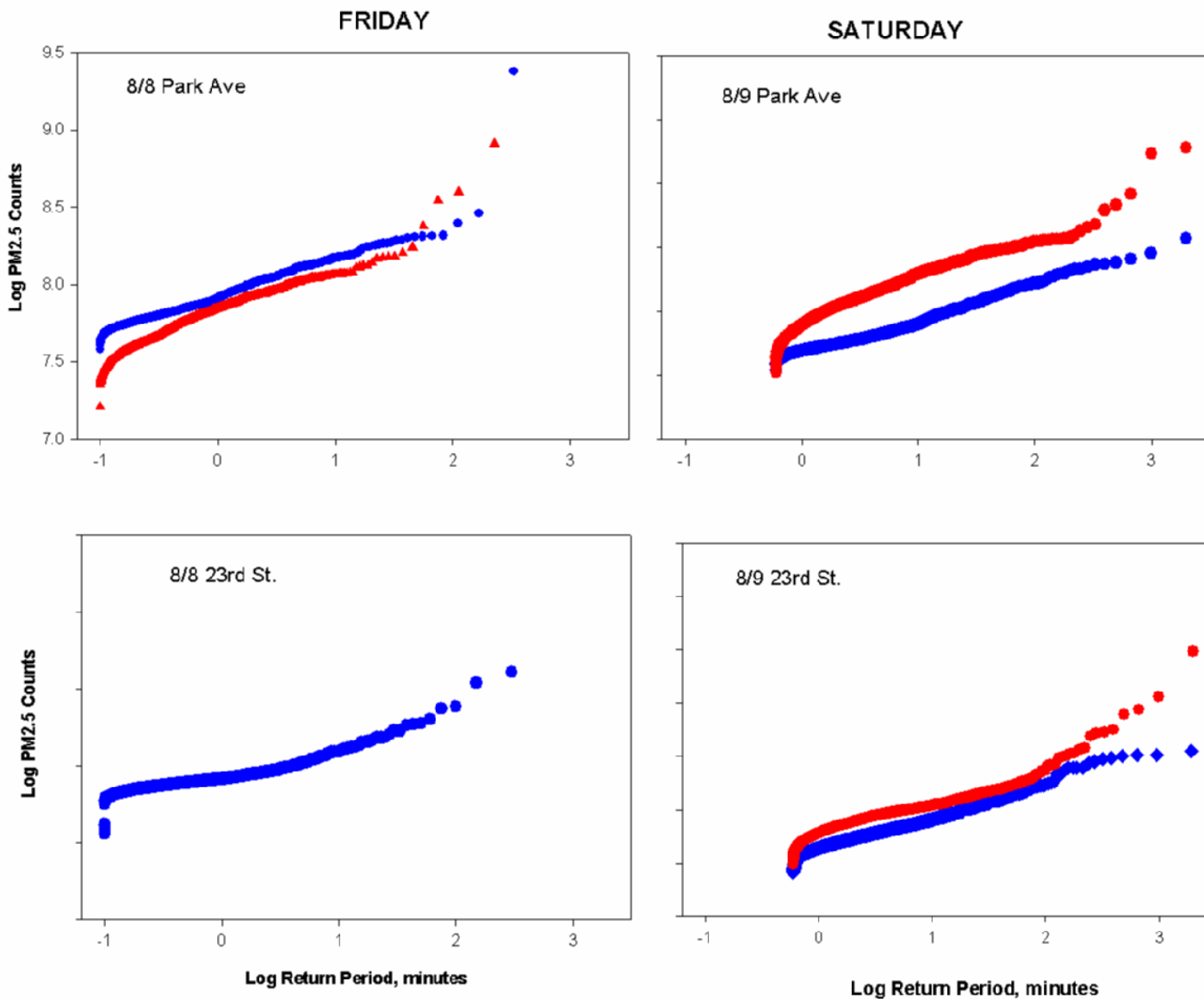
Saturday 8/16 23rd St. AM



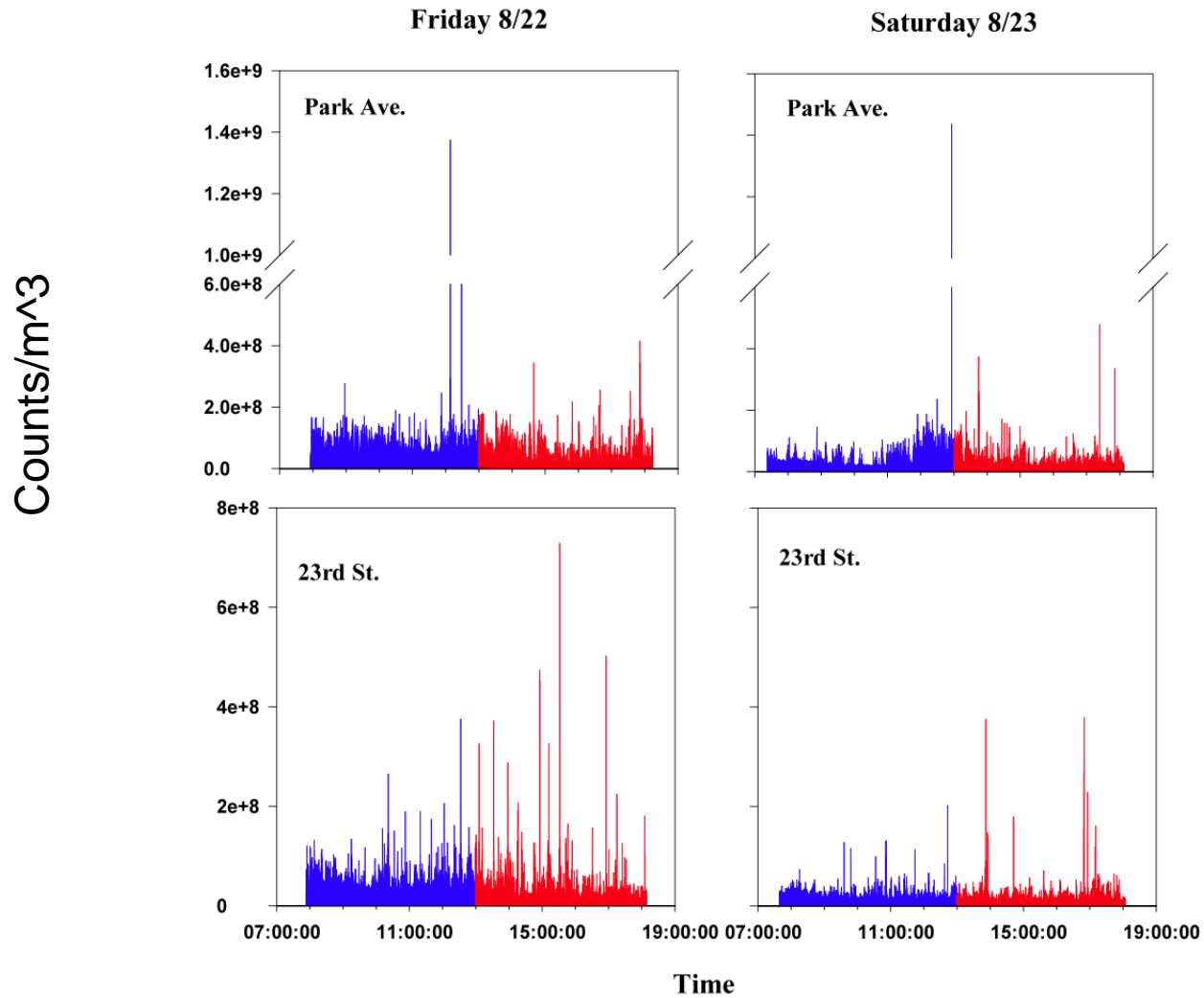
PM_{2.5}



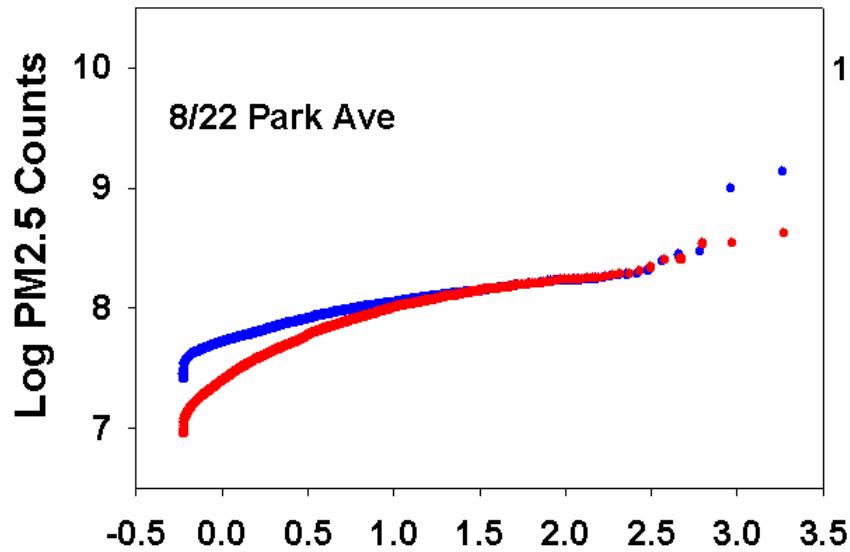
Event return period analysis



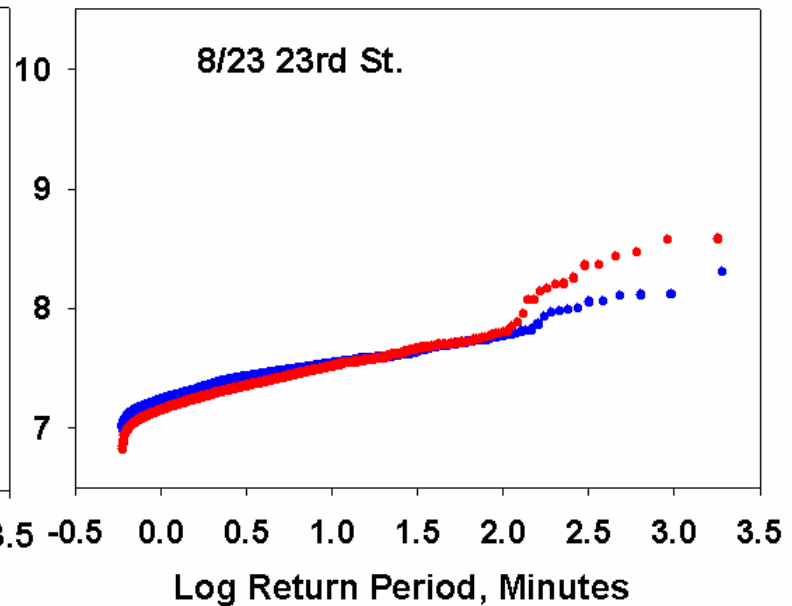
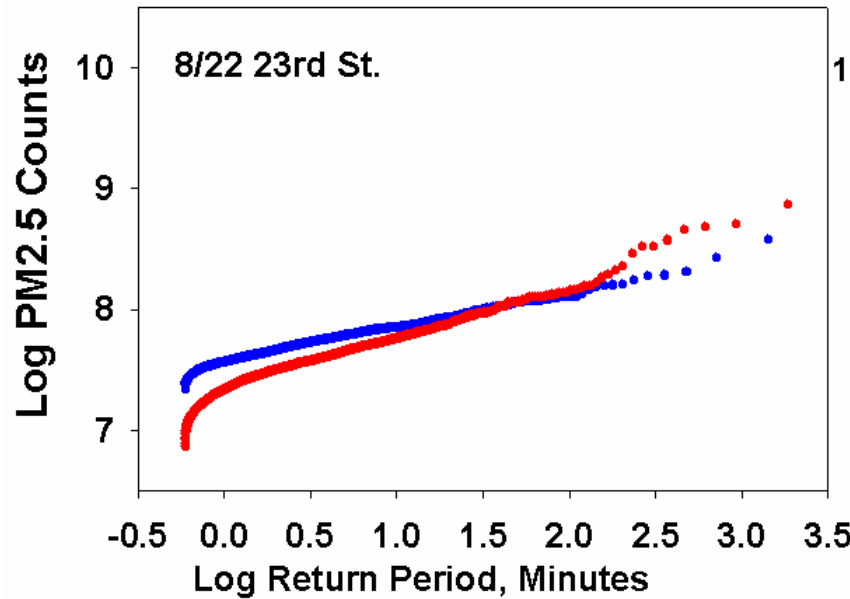
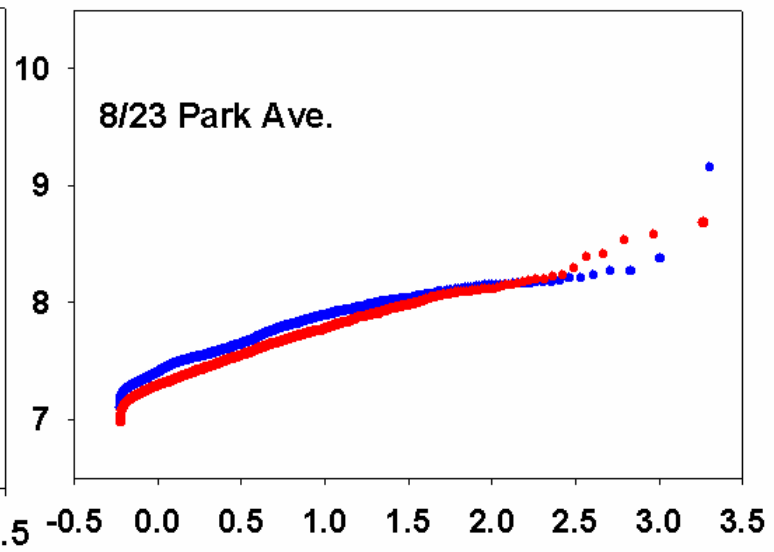
PM_{2.5}



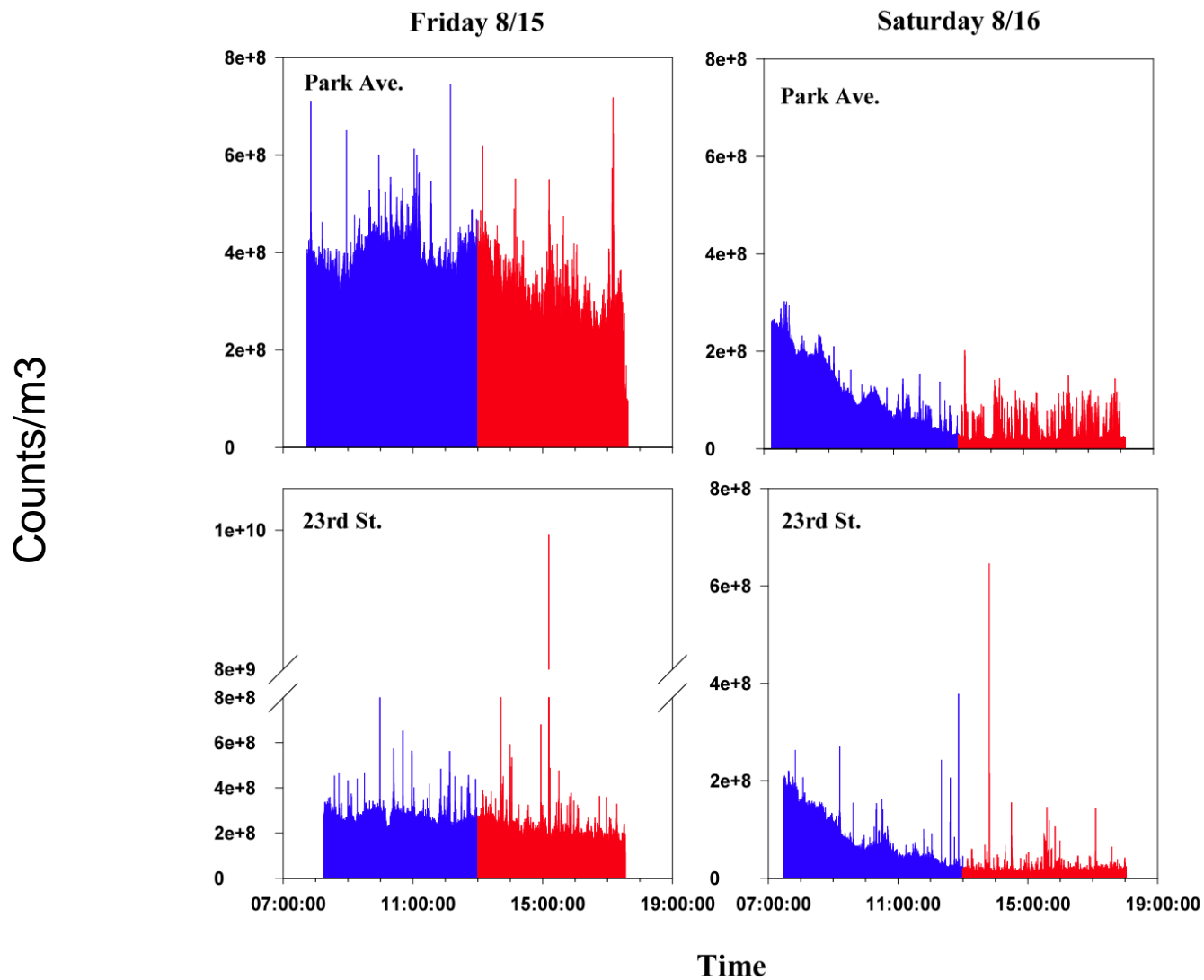
FRIDAY

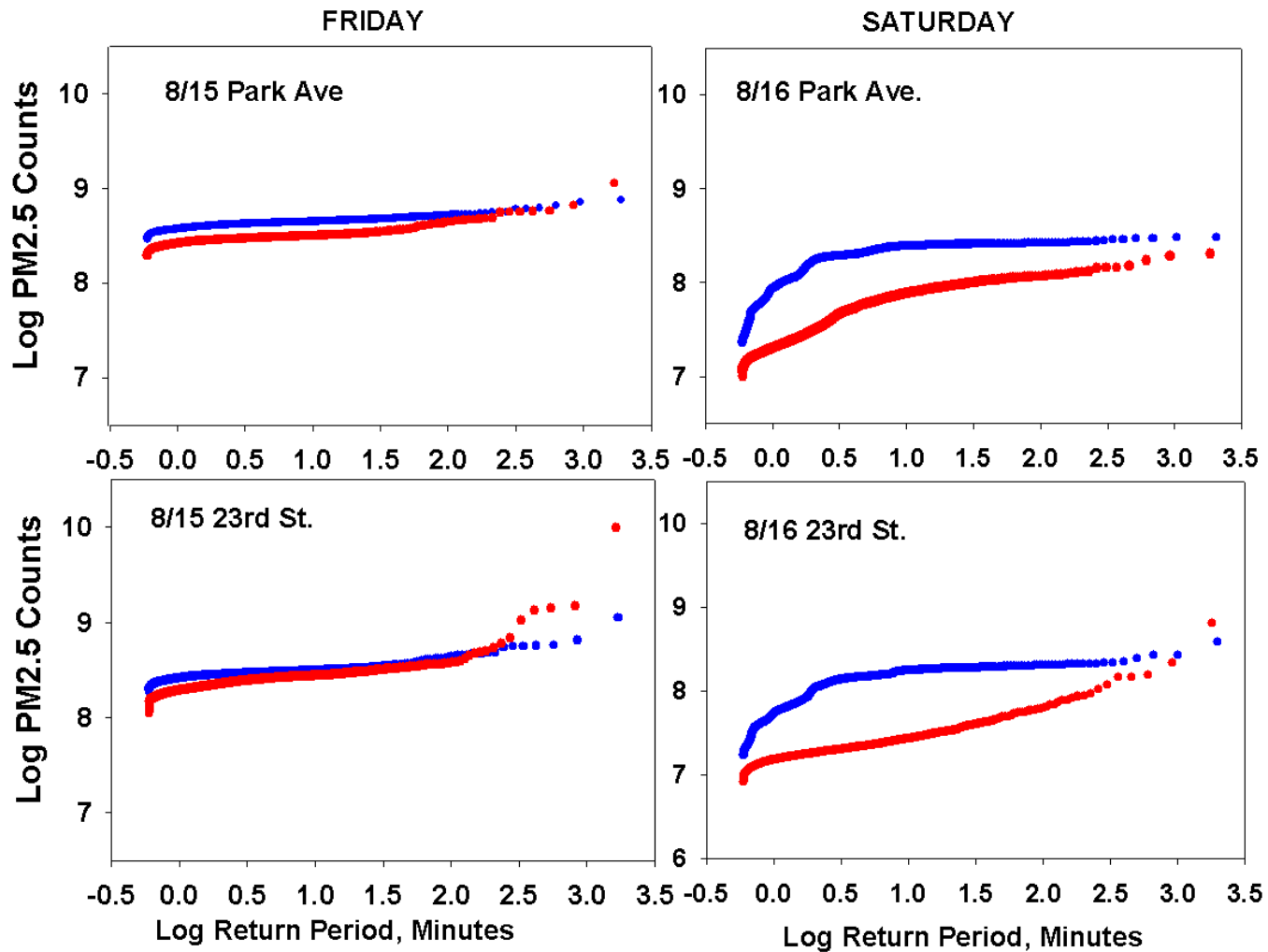


SATURDAY

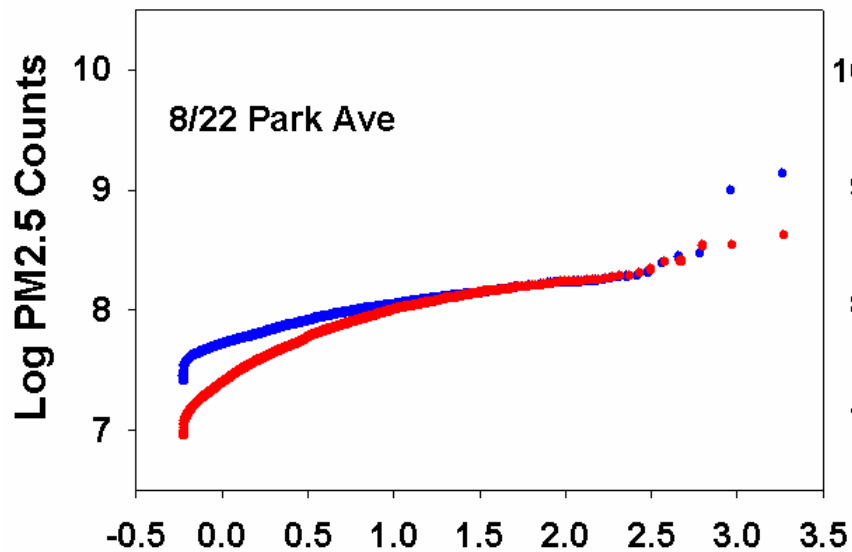


PM_{2.5}

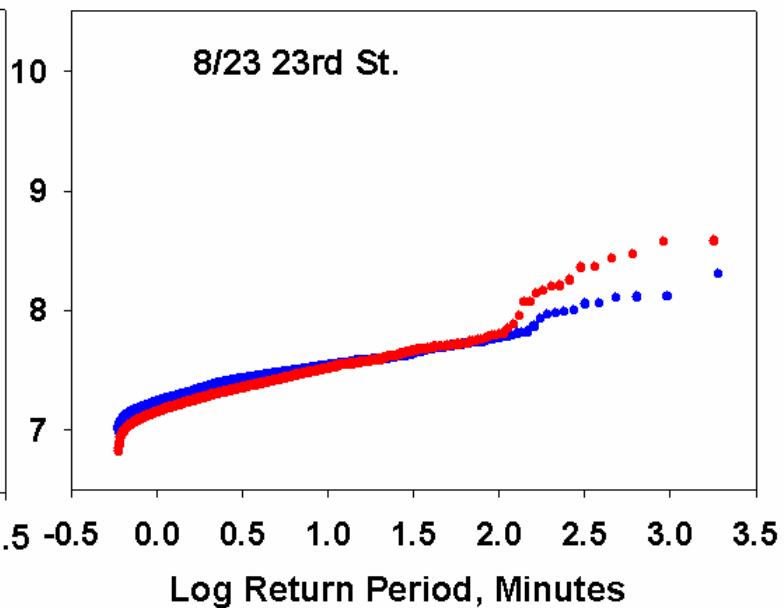
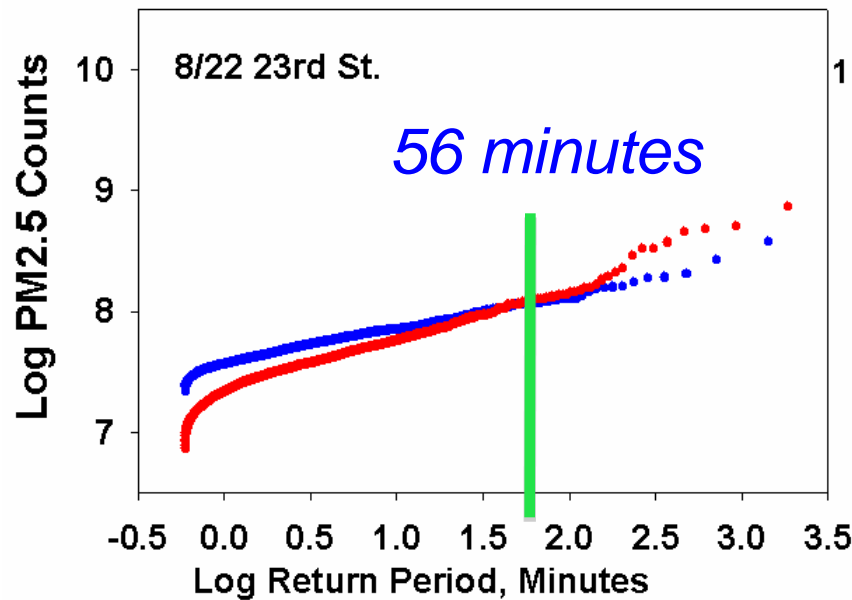
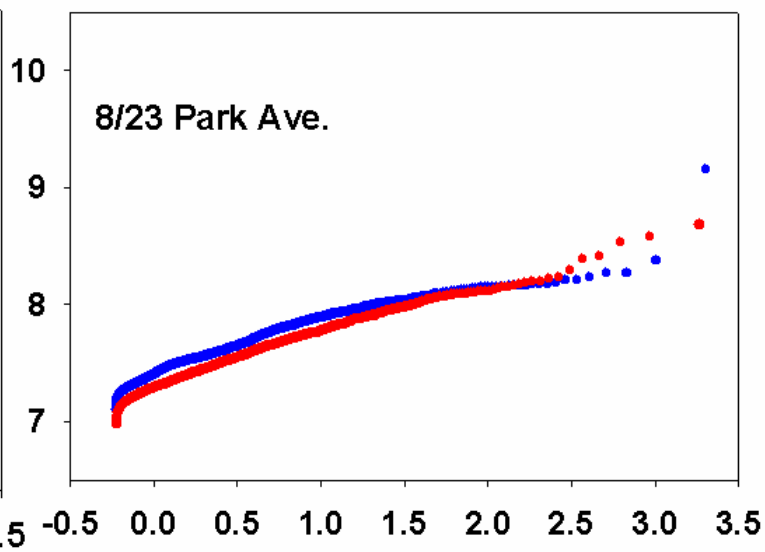




FRIDAY

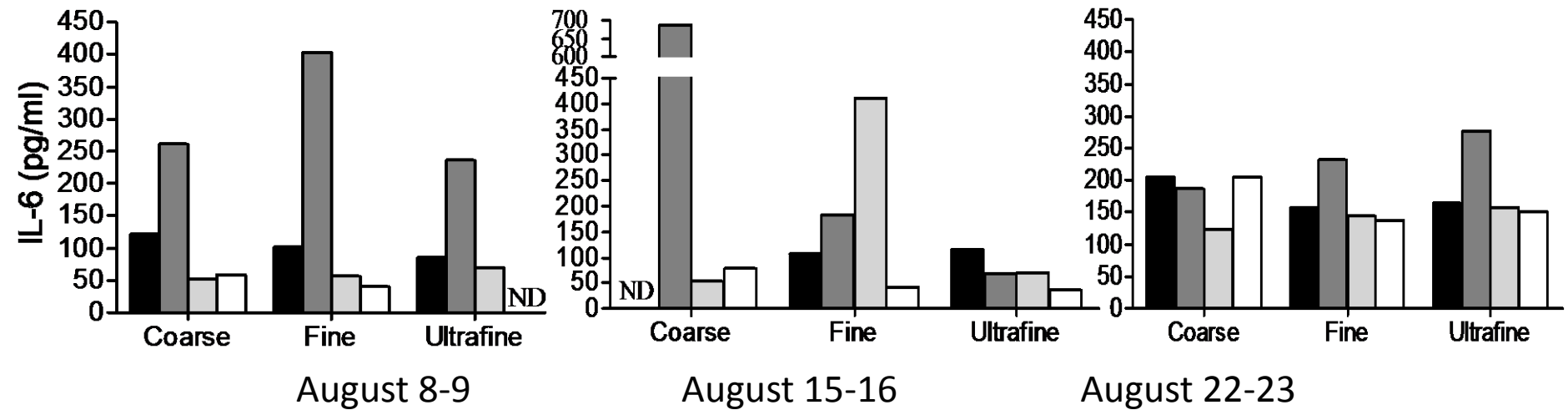


SATURDAY



PARK AVE.

IL-6 induction per m³



COARSE: > 2.5 μm

FINE: .25 – 2.5 μm

ULTRAFINE: < 0.25 μm



Figure 2. IL-6 production in response to particulate matter size for Friday AM to Saturday PM on Park Ave.

INTRINSIC PROINFLAMMATORY CAPACITY OF THE PMs

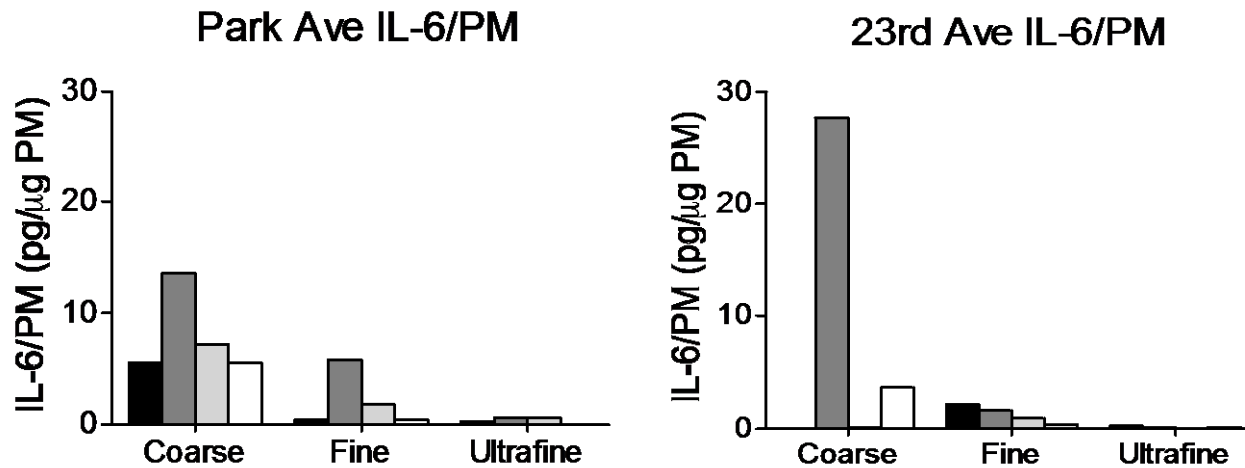


Figure 4. Intrinsic capacity of different sized particulate matter to cause an inflammatory response

INTRINSIC PROINFLAMMATORY CAPACITY OF THE PMs

*Coarse fraction relatively more toxic.
Likely to be re-suspended, not tailpipe emissions.*

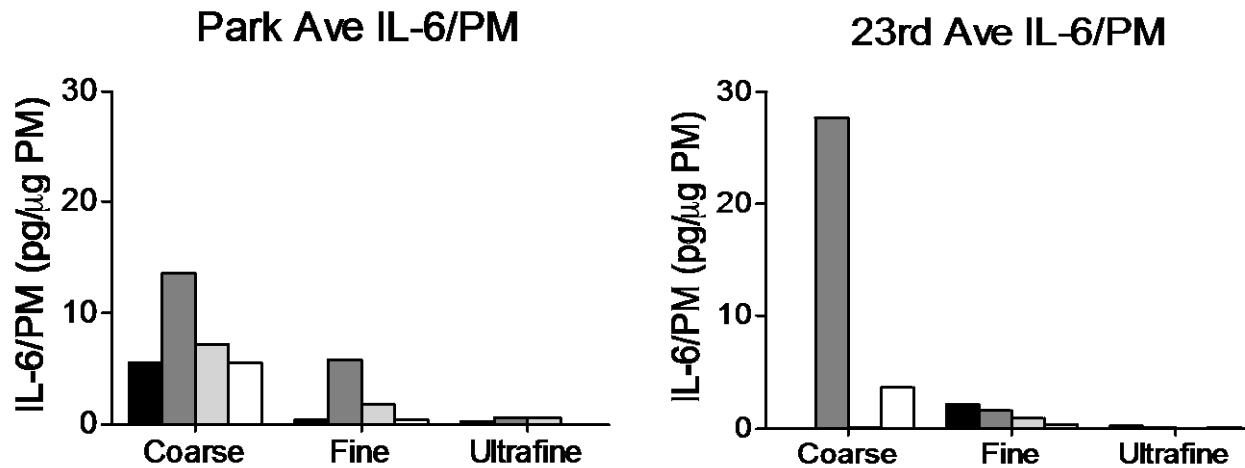


Figure 4. Intrinsic capacity of different sized particulate matter to cause an inflammatory response

Summary

Fine PM is not correlated with traffic flow, but ultrafine is

The frequency and intensity of extreme events were dramatically reduced without traffic.

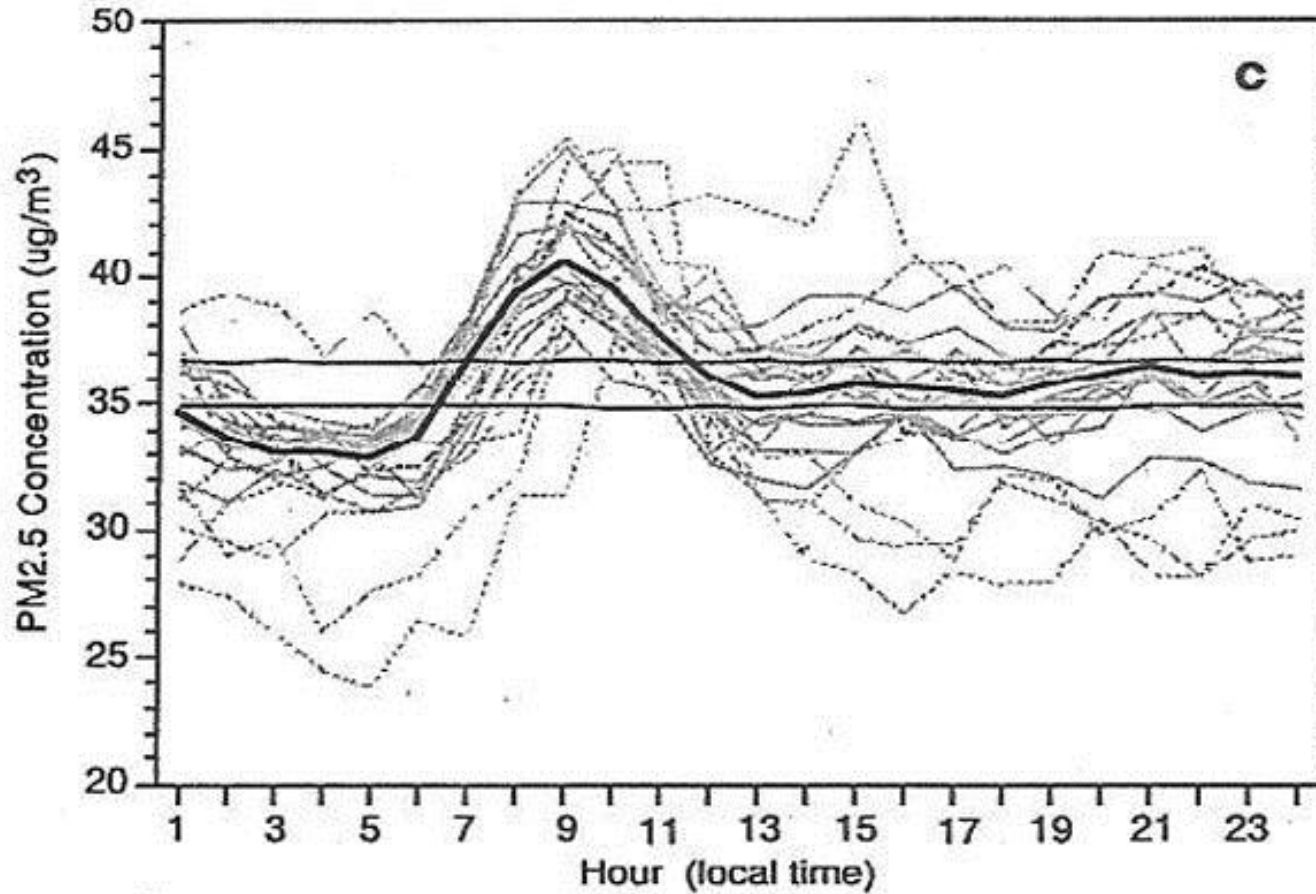
UFP concentrations decayed exponentially with distance from a cross street with unrestricted traffic flow, reaching background levels at ~ 100 m from the source

It is suggested that coarse fraction more toxic: the importance of re-suspension

Implications for human health?



Average [PM2.5] for NYC monitors



PM2.5 concentrations are typically higher in the morning

