Size Distributions by SMPS and APS

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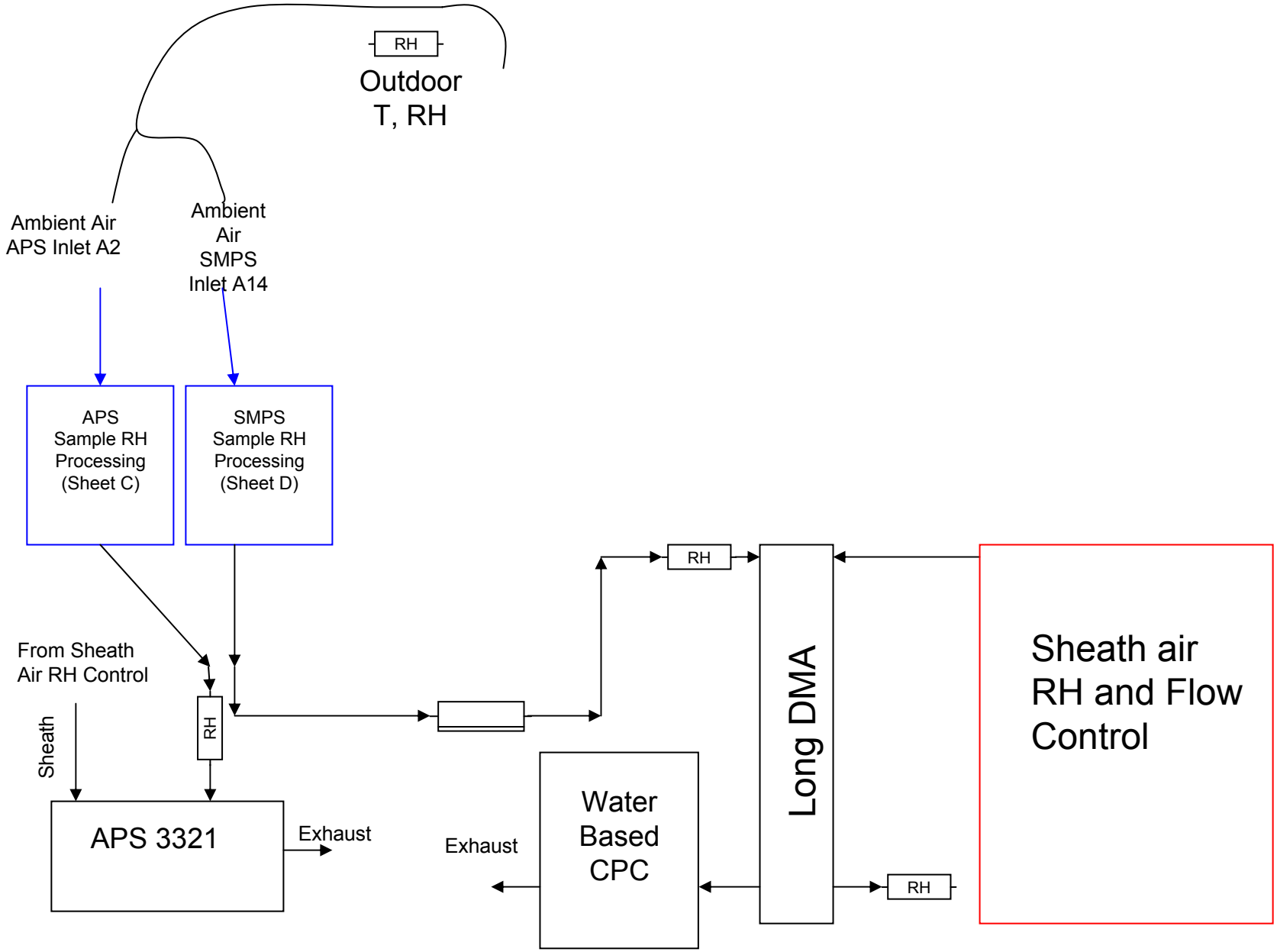
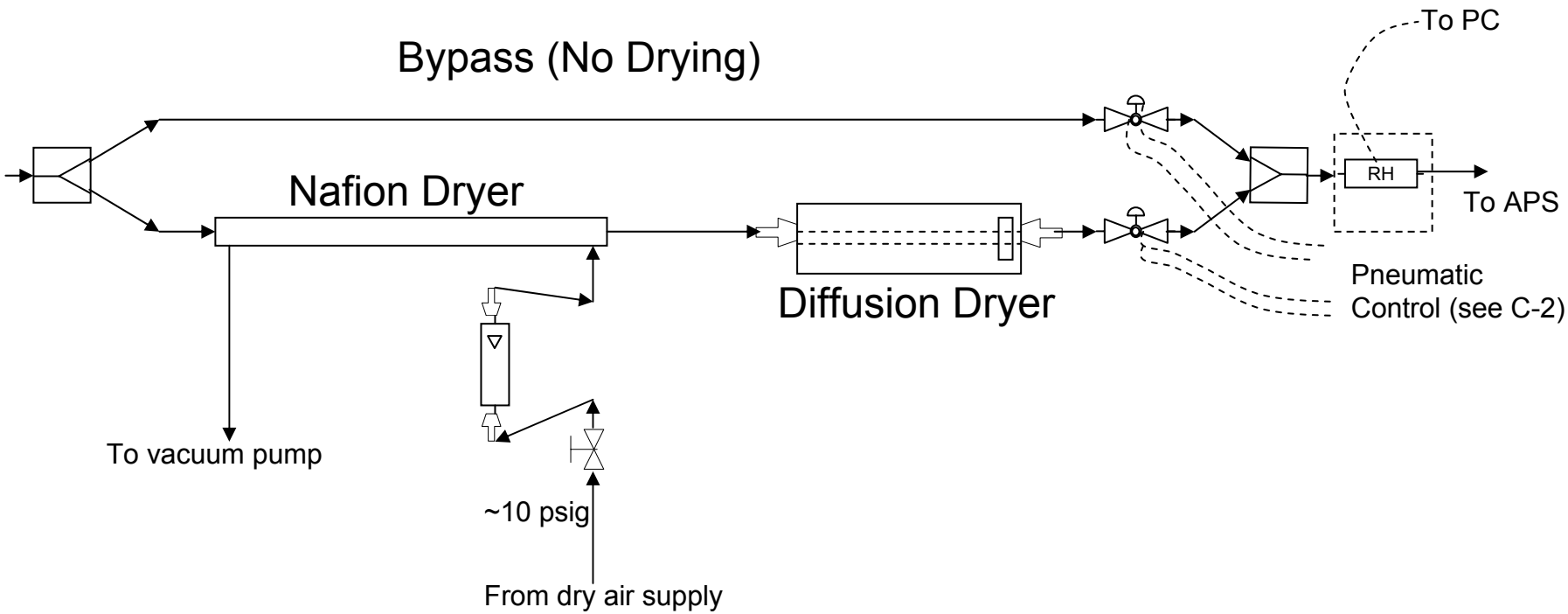
System Overview



APS Inlet


Bypass (No Drying)
To PC
Nafion Dryer
RH
To APS
Diffusion Dryer
Pneumatic
Control (see C-2)
To vacuum pump
~10 psig
From dry air supply

Measurement Objectives

- Measure aerosol size distribution from 10 nm – 2.5 microns
  - Measure at dried RH
  - Measure at ambient RH

Post Analysis Objectives

- Quantify aerosol nucleation / growth events
- Analysis influence of vertical motions on aerosol size distribution in conjunction with the University of Iowa LIDAR group (Eichinger)
- Quantify aerosol water content (μg m^{-3} aerosol water)
  - If hydrated and non-hydrated periods – explain by meteorology and aerosol chemistry, in collaboration with other groups

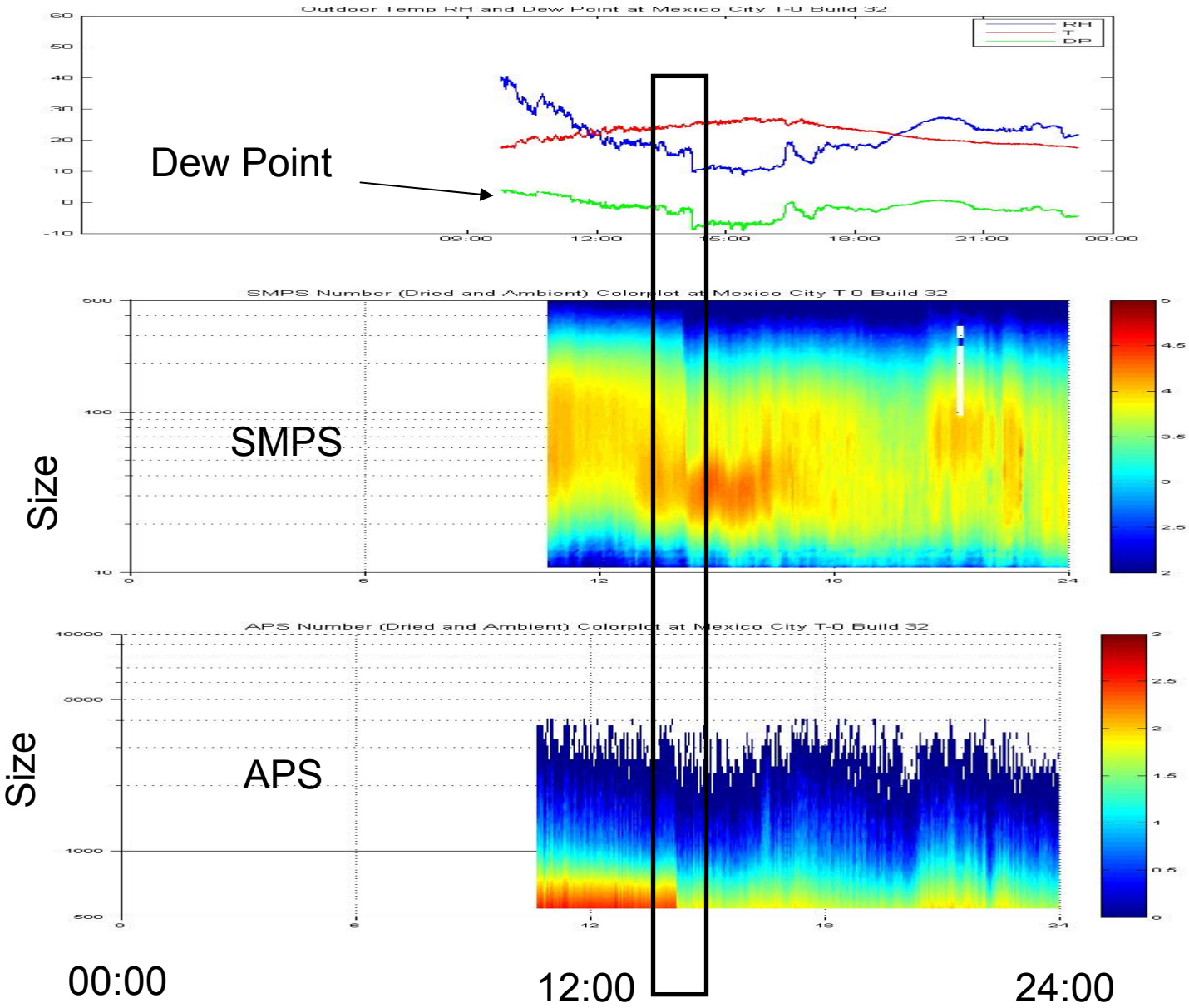
Data Online

- Raw data is online at:
  - http://www.engineering.uiowa.edu/~cs_proj/mexico_data_toc.htm
  - Not flagged. Includes many periods of data that will eventually be flagged as invalid due to operator checks and (unfortunately) particle counter malfunctions

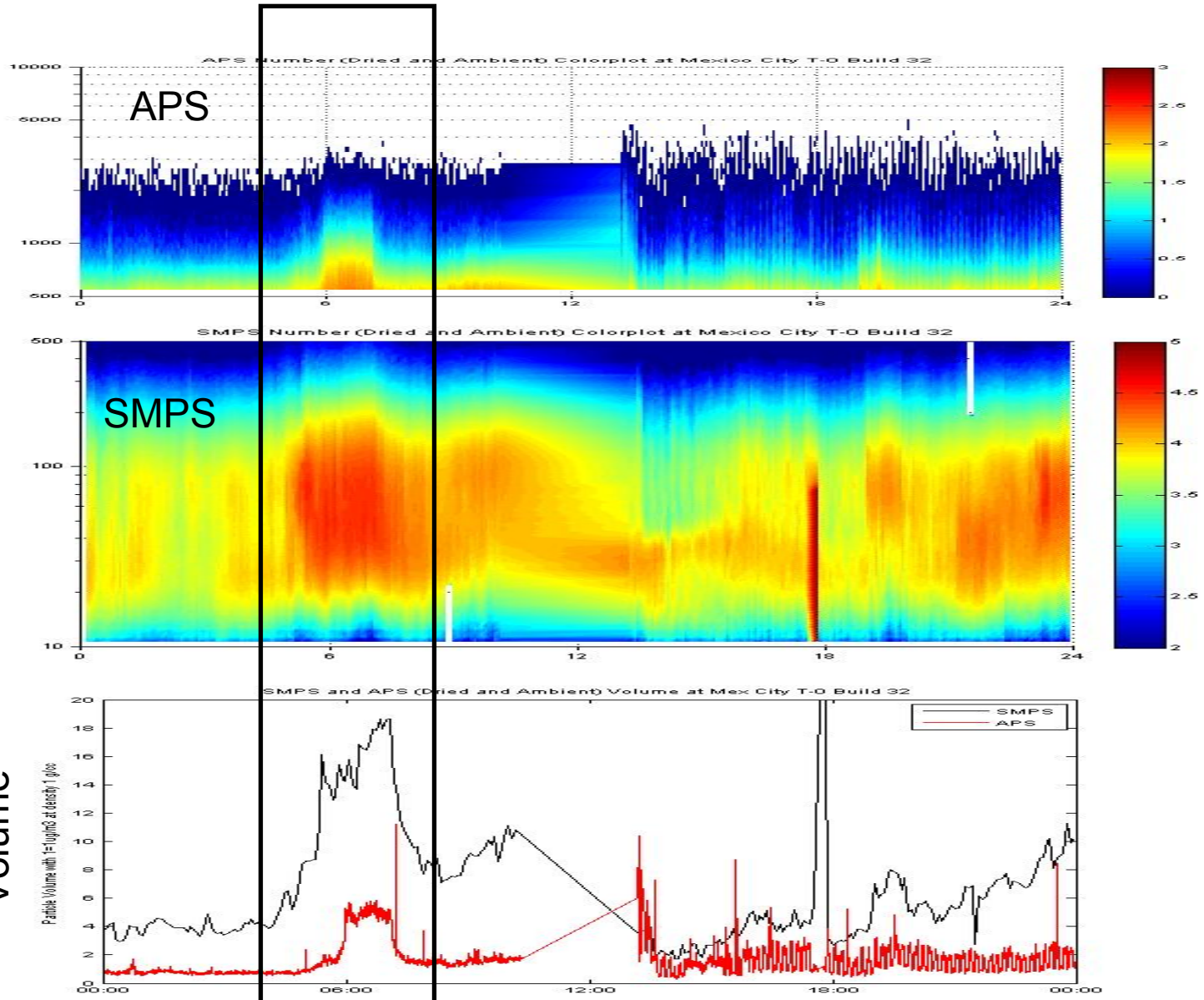
Interesting Features So Far

- Rapid “step function” transitions between polluted / clean conditions
  - Morning rush hour
  - Afternoon ventilation
- Examples

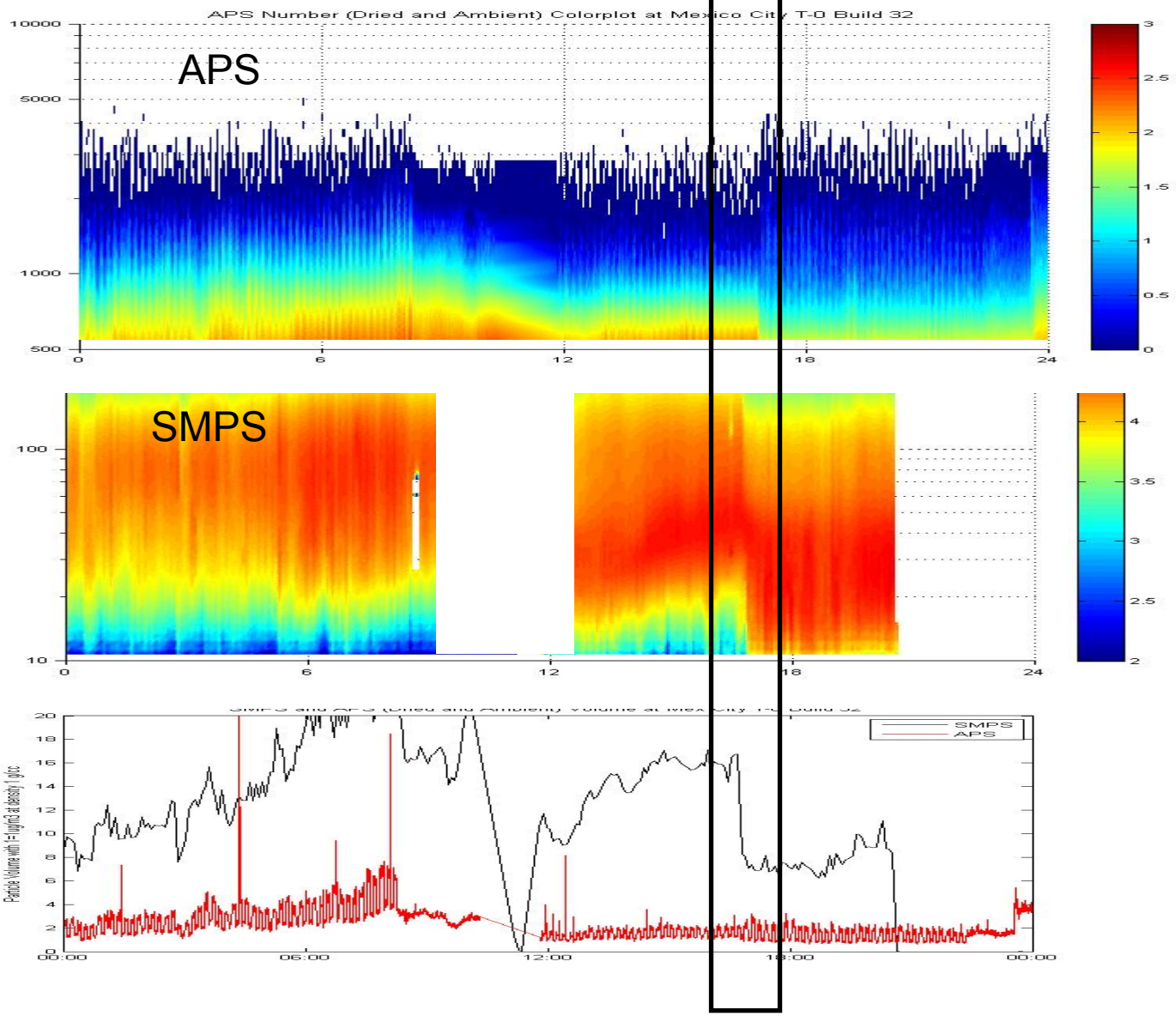
March 9, 14:00 Hours -- 50% decrease in PM2.5 in 20 min



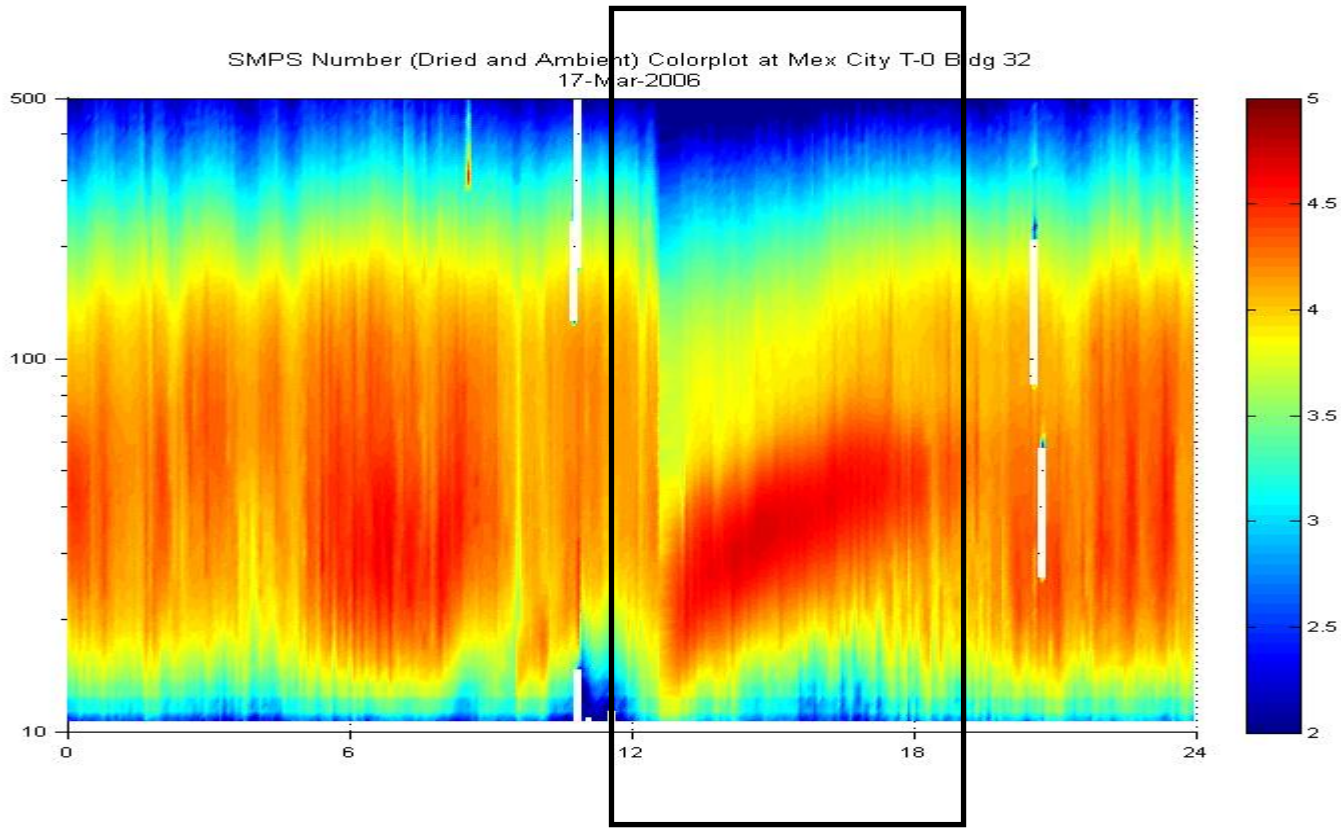
Friday March 10, 6 – 7 AM. Very “sharp” rush hour. IMP Traffic? Local Vehicle Depot?



Sat March 11, 5 PM. 50% decrease in $PM_{0.5}$ in 20 min. No change in $PM_{0.5-2.5}$ as new air mass brings fewer particles, but larger in size.



Fri March 17, 5 PM. 60% decrease in $PM_{0.5}$ at 12:30 PM followed by new particle formation / growth event



Other “events”

- Monday Mar 13. 50% drop in $PM_{0.5}$ at 1 PM.
- Saturday Mar 18. Ventilation at 1 PM, with a step change back to high concentrations from about 2:30 – 3:30, then back to “clean” conditions
- Tuesday Mar 21. New particle formation.