AN INTEGRATED SYSTEM TO COLLECT LARGE AEROSOL SAMPLES FOR PAHs, OXY-PAHs, AND PARTICULATE EC, OC, IONS, TRACE ELEMENTS, $PM_{2.5}$ MASS AND OTHER CHEMICAL SPECIES OF INTEREST IN HUMAN HEALTH STUDIES

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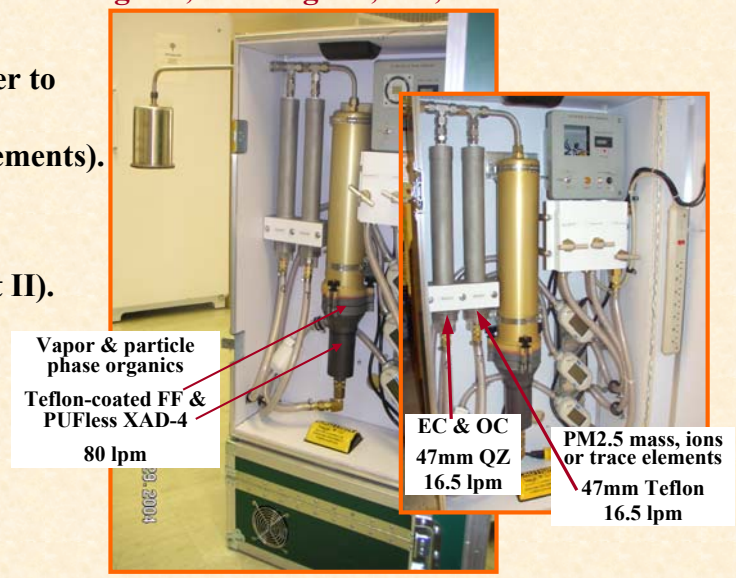
Objectives

1. Evaluate a new, commercially available, integrated sampler to measure atmospheric $PM_{2.5}$ mass (EPA FRM equivalent), vapor/particle phase organics, EC & OC, ions (or trace elements).
2. Measure profiles of vapor/particle phase species in air samples prior to 31Dec 2003 (Part I: This study) and after the mandated MTBE ban in California (Summer '04, Part II).

Schedule and chemical analysis

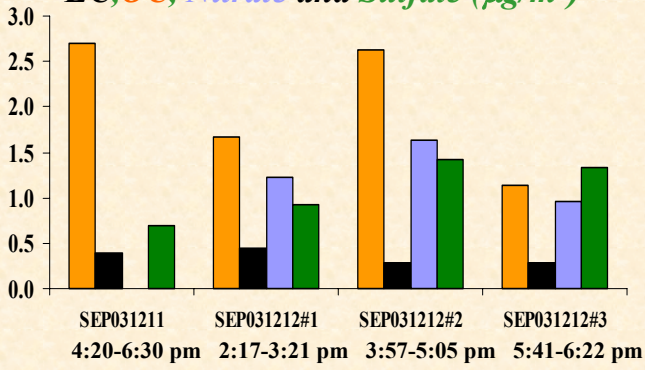
Site: Sepulveda tunnel (under LAX, 670m long), South exit
Dates: December 11-12, 2003; ca. 1-2 hr samples
Chemistry: PAHs by HPLC-FL; EC/OC by TOT (Sunset Lab); Ions by IC (or trace elements by ICP or XRF).



LS-TM-XAD and 47 mm x 2 Sampler
(L. Sheetz Enterprises, Reno, NV)

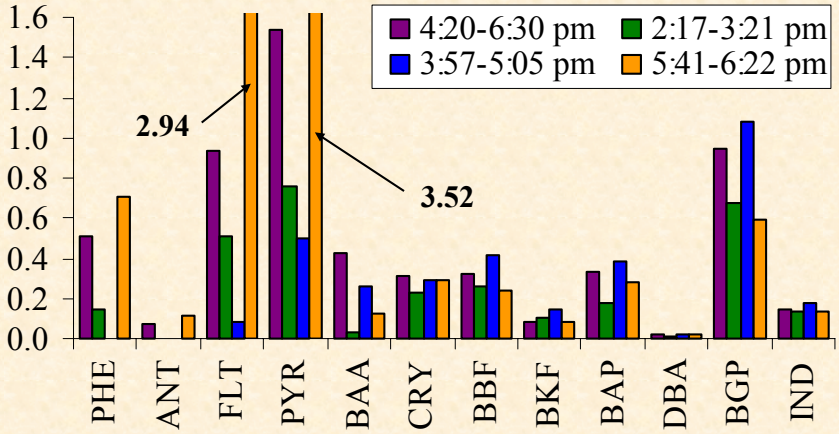
Results & Conclusions

EC, OC, Nitrate and Sulfate ($\mu g/m^3$)



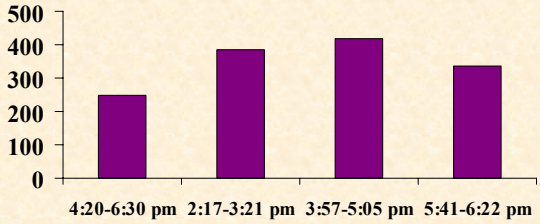
- Low OC/EC ratio (3.3) due to higher diesel contr.
- NO_3^- & SO_4^{2-}: Similar levels; bkgd contributions!
- All species: Highest level on Friday, during rush period

Particulate PAHs (ng/m^3)



phenanthrene (PHE); anthracene (ANT); fluoranthene (FLT); pyrene (PYR); benz[*a*]anthracene (BAA); chrysene (CRY); benzo[*b*]fluoranthene (BBF); benzo[*k*]fluoranthene (BKF); benzo[*a*]pyrene (BAP); dibenz[*a,h*]anthracene (DBA); benzo[*ghi*]perylene (BGP); indeno[*1,2,3-cd*]pyrene (IND)

Vapor-phase Naphthalene (ng/m^3)



- All-period ave = 347 ng/m^3
- Highest level on Friday
- For validation of NAP measurements using PUF-less XAD-4 sampling see Poster #29

- FLT and PYR spike: higher HDD contribution in the mix?
- BGP: highest conc. among higher MW PAHs (gasoline-fueled exhaust tracer)
- Overall highest conc. during the rush period, both days
- Simultaneous and integrated measurement of particle/vapor species, and FRM $PM_{2.5}$ mass greatly simplify field study operations and increase data quality. Gillies, Gertler, Sagebiel & Dippel (ES&T, 35, 1054, 2001) used a similar approach.

Acknowledgements

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