Post-processing of PMF solution...

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PMF output...

- “Chemical” grouping via mass spectra of factors
- Sources and processes
- Chemical grouping not necessarily equivalent to “source”
- e.g. LV-OOA can come from any “source”
- Post-processing can improve “source” apportionment
Post Processing

- Regression with tracers
  - Correlation AND Slope
- Chemical Signatures
  - Sources / Processes
  - Primary / Secondary
  - OOA to Ox (Wood et al. ACPD 2010)

- Estimating “Source” Apportionment
- Use of other information
  - Slopes/regressions
  - a priori information
  - “Reasonable” assumptions
1. City/Outflow
2. Different fire influences
3. Combination of flights forces same factor MS
Factor MS

HOA

O:C = 0.06
H:C = 1.79
N:C = 0.003
OM/OC = 1.23

BBOA

O:C = 0.42
H:C = 1.42
N:C = 0.013
OM/OC = 1.69

SV-OOA

O:C = 0.64
H:C = 1.29
N:C = 0.007
OM/OC = 1.97

LV-OOA

O:C = 1.02
H:C = 1.12
N:C = 0.007
OM/OC = 2.46

Ion Grouping:
- $C_xH_y$
- $C_xH_yO_z$
- $C_xH_yN_z$
- $C_xH_yN_zO_p$
- $H_xO_y$
Time series Factors

Urban Portion RF 3
Urban Portion RF 12

Red points correspond to RF 3
Green Points correspond to RF 12

HOA (µg sm⁻³)
BBOA (µg sm⁻³)
SV-OOA (µg sm⁻³)
LV-OOA (µg sm⁻³)

CO (ppbv)
HCN (ppbv)
NO₃ (µg sm⁻³)
SO₄ (µg sm⁻³)

some values offscale

3/10/06
3/29/06
16:00 18:00 20:00 22:00
16:00 18:00 20:00 22:00

Tuesday, February 23, 2010
• HOA/dCO change
• Some CO from fire
• LV-OOA/SO$_4$ change
Slope/correlation

- HOA/dCO change
- Some CO from fire
- LV-OOA/SO$_4$ change
- HOA/dCO change
- Some CO from fire
- LV-OOA/SO$_4$ change
Post-processing apportionment

• Research Flight 3 has fire influence
  • some “HOA” associated with open burning
  • some “LV-OOA” from fire source
• Research Flight 12 assume “0” influence of fire on “HOA” and “LV-OOA”

• Fire = BBOA + a*LV-OOA + b*HOA

• Urban = (1-b)*HOA + SV-OOA + (1-a)*LV-OOA

• RF3: a = 0.64 ; b = 0.49
• RF12: a = 0 ; b = 0
Conclusions

• When should you post process?
  • Do you have factors that may be from mixed sources, and PMF can’t tell them apart? (Do you care?)

• How can you post process?
  • Depends on your particular dataset and what other information is available.

• If you post process, be clear on the details of your post processing.
Solution Choice... seed analysis
F-Peak variability example