Inter-comparisons between HR-ToF-AMS and ACSM

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AMS/ACSM Measurements in China (July 2016)

Urban
N=22

Non-urban
N=13
ACTRIS ACSM Inter-comparisons

Reproducibility expanded uncertainties of Q-ACSM concentration measurements (%)

Crenn et al., AMT, 2015

Tower Measurements

- **PM$_2.5$ Composition:**
  - Organics, sulfate, nitrate, ammonium, and chloride
  - Time res.: 5min

- **Gaseous species:**
  - CO, SO$_2$, O$_3$
  - Time res.: 1min

- **CAPS + AE33:**
  - Particle ext (1 s)
  - BC (1 min)

- **SMPS:**
  - Particle number size distributions (5 min)
ACSM vs. HR-ToF-AMS

Same Inlet
Default RIEs except ammonium

ACSM vs. HR-ToF-AMS

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ACSM vs. HR-ToF-AMS

**NO₃**

- $R^2 = 0.99$
- Slope = 1.24

**NH₄**

- $R^2 = 0.99$
- Slope = 1.2

**Chl**

- $R^2 = 0.97$
- Slope = 0.61

**Total**

- $R^2 = 0.99$
- Slope = 0.99
AMS vs. ACSM: Mass Spectra

Large overestimation of m/z 44 during clean periods

OA Factors: ACSM vs. HR-ToF-AMS
OA Factors: ACSM vs. HR-ToF-AMS

ACSM: Filament 2

R² = 0.97 (ACSM vs. AMS)
Conclusions

- ACSM NO$_3$ vs. SO$_4$
- ACSM f44$\rightarrow$triangle plot$\rightarrow$O/C
- ACSM f60
- PMF ACSM OA: Split of POA factors
- ME2: AMS spectra as constrains
Field characterization of the PM$_{2.5}$ Aerosol Chemical Speciation Monitor: insights into the composition, sources and processes of fine particles in Eastern China

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PM$_{1}$ ACSM vs. PM$_{2.5}$ ACSM