(1) Connecting OA Composition to Climate Relevant Properties and (2) Aerosol Sources and Processing during GVAX

Objective: **Field and laboratory measurements of OA and precursor composition for source apportionment (e.g., biogenic *vs.* anthropogenic) and mechanistic descriptions of mass formation and optical properties.**

Climate Relevant SOA Property(s) Investigated: **N, rp, light absorption (UV-VIS)**

Lead personnel: **PI Thornton and PI Worsnop (Co-PI Thornton)**

Collaborators: **A. Kubatova (UND), J. Kroll (MIT), D. Cziczo (MIT), T. Mentel (FJZ), M. Ehn, T. Petäjä (U. Helsinki); ARI, Dubey (LLNL), J. Allen (U. Manchester), Prevot (PSI), J. Jimenez (CU Boulder), J. Surratt (UNC)**

Summary of progress:

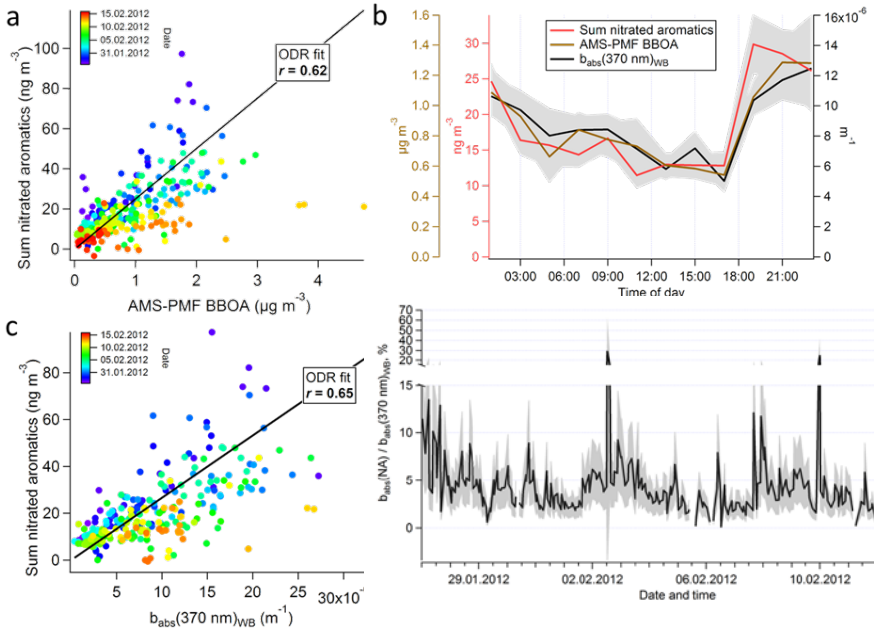
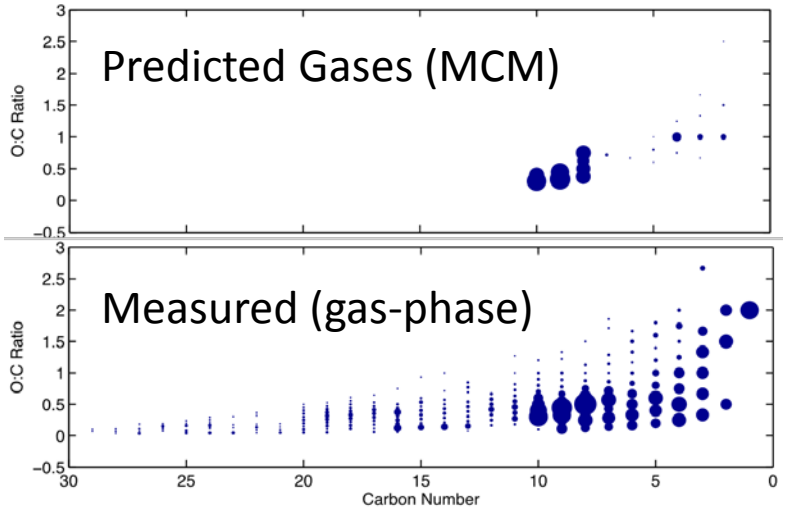
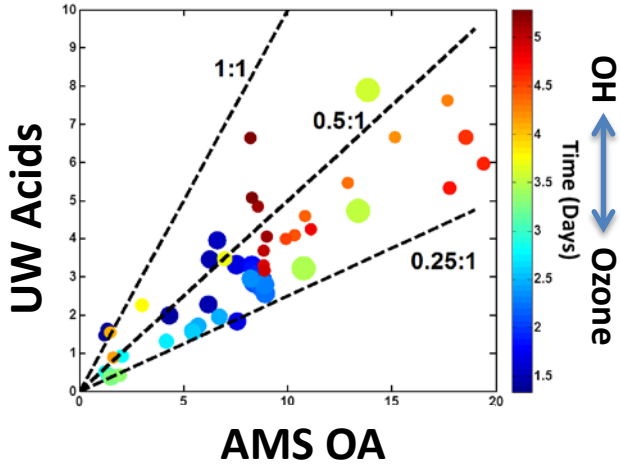
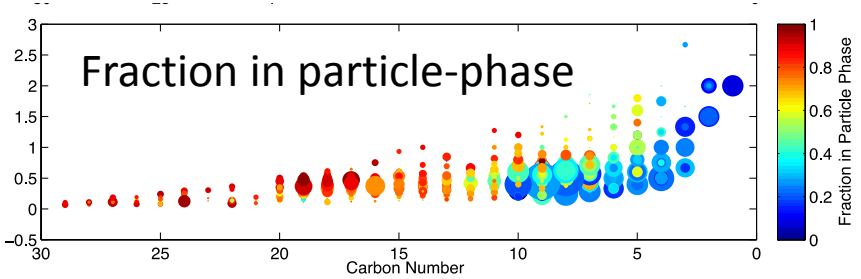
- **Completed the ClearfLo field campaign; Published manuscript linking composition to light absorption (Mohr et a. ES&T 2013). Analysis continues.**
- **Completed series of chamber experiments to study SOA formation from monoterpenes. Two manuscripts in review, one in preparation: discoveries of new or missing acid formation pathways,**
- **Developed new methodology for simultaneously coupling SOA volatility (evaporation) and composition, online, for field and chamber measurements; can utilize filter samples from past or future campaigns.**
- **Analyzing CARES Hi-Vol filter samples from A. Kubatova. Plan to combine results from above to assess monoterpene and isoprene sources of SOA, and identify components that correlate with light absorption.**

Challenges or needed resources/collaborators:

We have data to constrain process models of new particle formation, SOA formation/properties – modelers?

Campaign with location/time period where monoterpene are dominant BVOC would be useful (to separate from isoprene)

Studies of isoprene SOA composition using online methods would benefit source apportionment (CARES)

Results

- ~10% of light absorption at 370 nm by *measured* nitrated phenolic compounds and showed the source to be biomass burning (Mohr et al, ES&T 2013);
  - derive emission factors for "Brown Carbon" components
- Monoterpene oxidation produces significantly more, low volatility carboxylic acids than current mechanisms (e.g. Lopez-Hilfiker, AMTD 2013)
  - implications for minimum SOA yield and NPF
  - similar distribution observed in ambient SOA