

**Sources, properties, aging, and anthropogenic influences on OA and SOA over the Southeast US and the Amazon during SOAS, DC3, SEAC4RS, and GoAmazon.**

***Invited Talk for SAS session***

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The SE US and the Amazon have large sources of biogenic VOCs, varying anthropogenic pollution impacts, and often poor organic aerosol (OA) model performance. Recent results on the sources, properties, aging, and impact of anthropogenic pollution on OA and secondary OA (SOA) over these regions will be presented. SOA from IEPOX accounts for 14-17% of the OA on average over the SE US. Higher IEPOX-SOA correlates with air masses of high isoprene, IEPOX, sulfate, acidity, and lower NO. The IEPOX organosulfate accounts for ~20% of IEPOX-SOA over the SE US. The AMS ion  $C_5H_6O^+$  is shown to be a good marker of IEPOX-SOA, while total  $m/z$  82 (as in ACSM) suffers larger interferences. The sinks of IEPOX-SOA via both OH oxidation and evaporation are slow. The low-volatility of IEPOX-SOA contrasts with the small semivolatile molecules that have so far been identified as its components, suggesting the importance of oligomerization. Urban SOA is estimated to account for 25% of the OA in the SE US using two methods based on the GEOS-Chem model and the measured  $\Delta^{14}C$ , using recent results that urban SOA is 30% non-fossil, mainly due to cooking emissions.

An oxidation flow reactor (OFR) is used to investigate SOA formation by OH, O<sub>3</sub>, and NO<sub>3</sub> *in-situ*. Largest SOA formation is always observed at night when monoterpene concentrations (MT) are largest, and is underpredicted by SOA models that use MT as precursors but ignore partially-oxidized products. Closure results from models (VBS and GECKO-A) that account for the whole oxidation chain will be presented.

The partitioning of organic acids is found to proceed rapidly in response to temperature changes, in contrast with recent reports of very slow equilibration. The agreement with absorptive partitioning theory is reasonable for most species, except small acids that may be formed by thermal decomposition during analysis. Partitioning data from four instruments is compared, with reasonable agreement in many cases, including the rapid response to temperature changes. Partitioning to aerosol water is minor for most of the measured species.

Low volatility products of isoprene oxidation were measured during FIXCIT, forming via several pathways and depositing quickly to chamber walls and aerosol seeds. Their presence in ambient air during SOAS and the ability of GECKO-A to predict their formation are explored.