

Modeling mixing state effects on optical properties and CCN activation

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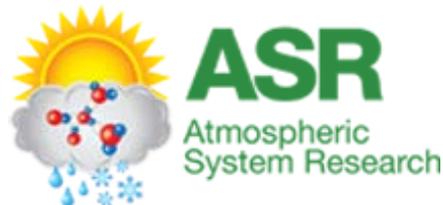
Pacific Northwest National Laboratory

Aerosol Mixing State Breakout Session

March 21, 2013

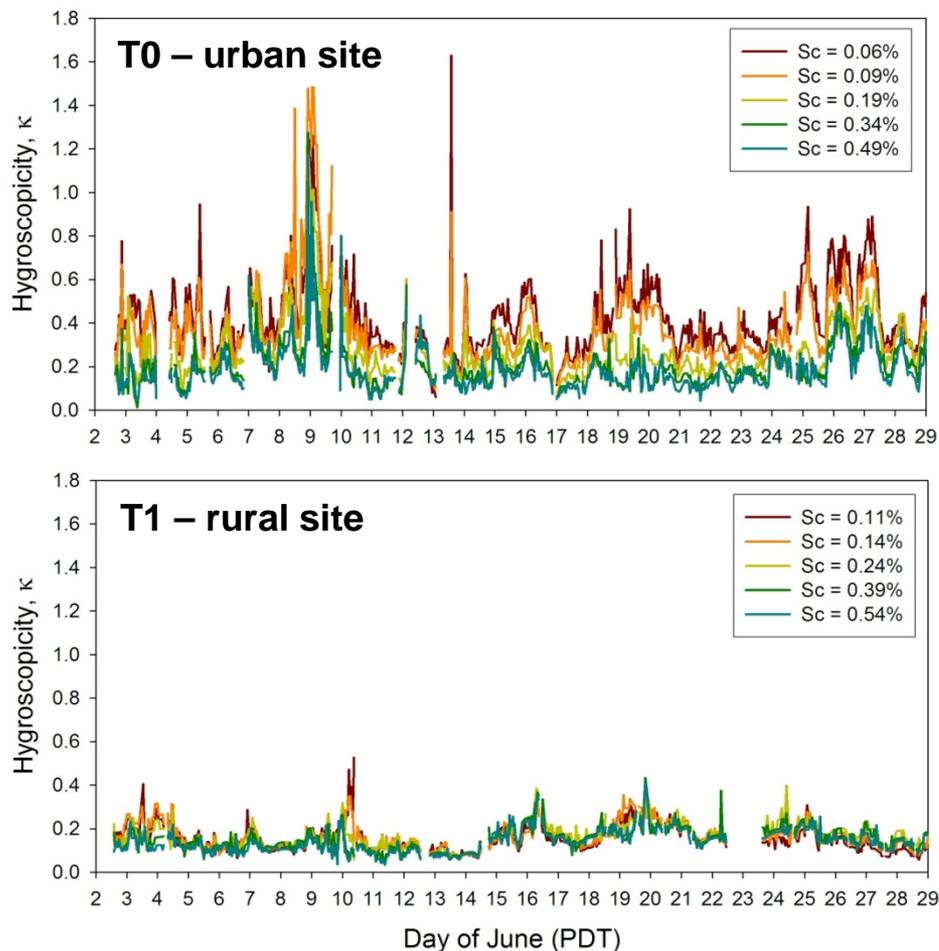
ASR Science Team Meeting

Bolger Center, Potomac, MD



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Impact of mixing state on CCN activation during CARES



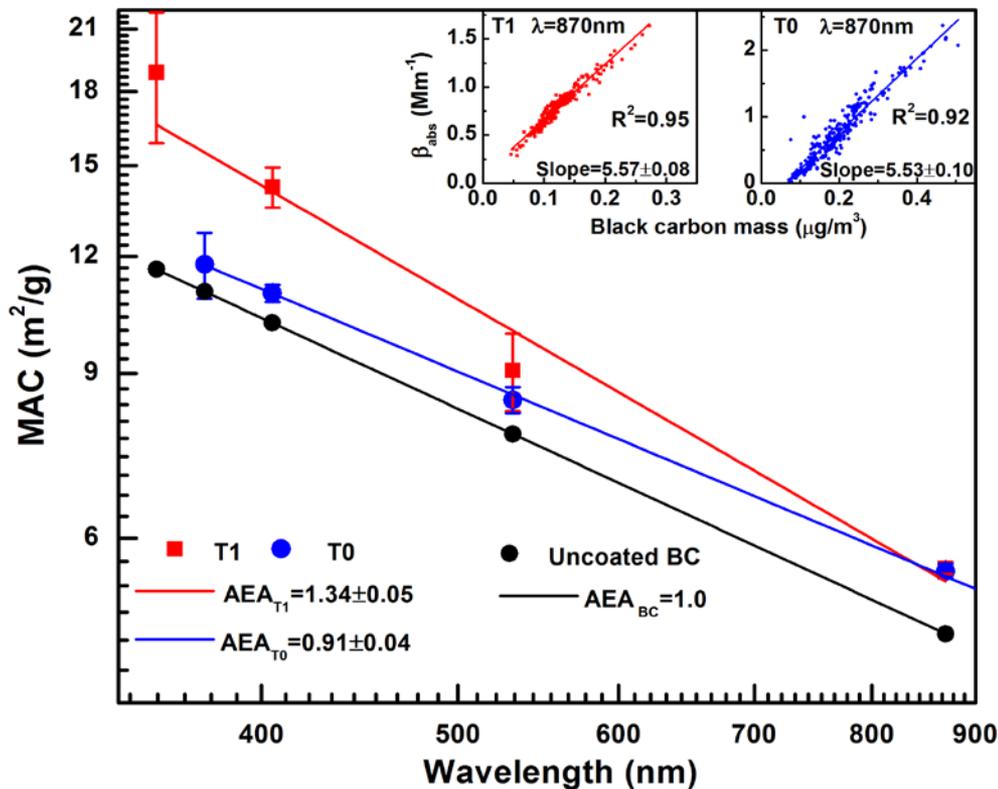
Aerosols at the T0 urban site showed appreciable day-to-day variability in hygroscopicity (κ), with large differences in values at different supersaturations.

The aged aerosols at T1 rural site, dominated by SOA, displayed much lower and similar κ values at different supersaturations, with much less day-to-day variability.

Hiranuma, N. et al., CCN activity of anthropogenically and biogenically influenced aerosol particles during the 2010 CARES campaign, *ACPD*, 2013, to be submitted.



Evidence of Brown Carbon in Aged Airmass



Lack of absorption enhancement due to lensing effect, but some browning occurs from T0 to T1

Gyawali, M. et al., Evolution of multispectral aerosol optical properties in a biogenically-influenced urban environment during the CARES campaign, *ACPD*, 2013.



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Modeling Plans

- ▶ Perform local closure of optical properties and CCN for CARES T0 and T1 sites.
- ▶ Perform PartMC-MOSAIC Lagrangian simulations of BC mixing state evolution for selected T0→T1 transport episodes – examine the relative roles of condensation and coagulation for BC mixing state evolution.



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