Pacific Northwest
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Aerosol and gas chemistry in the Eastern North Atlantic during ACE-ENA

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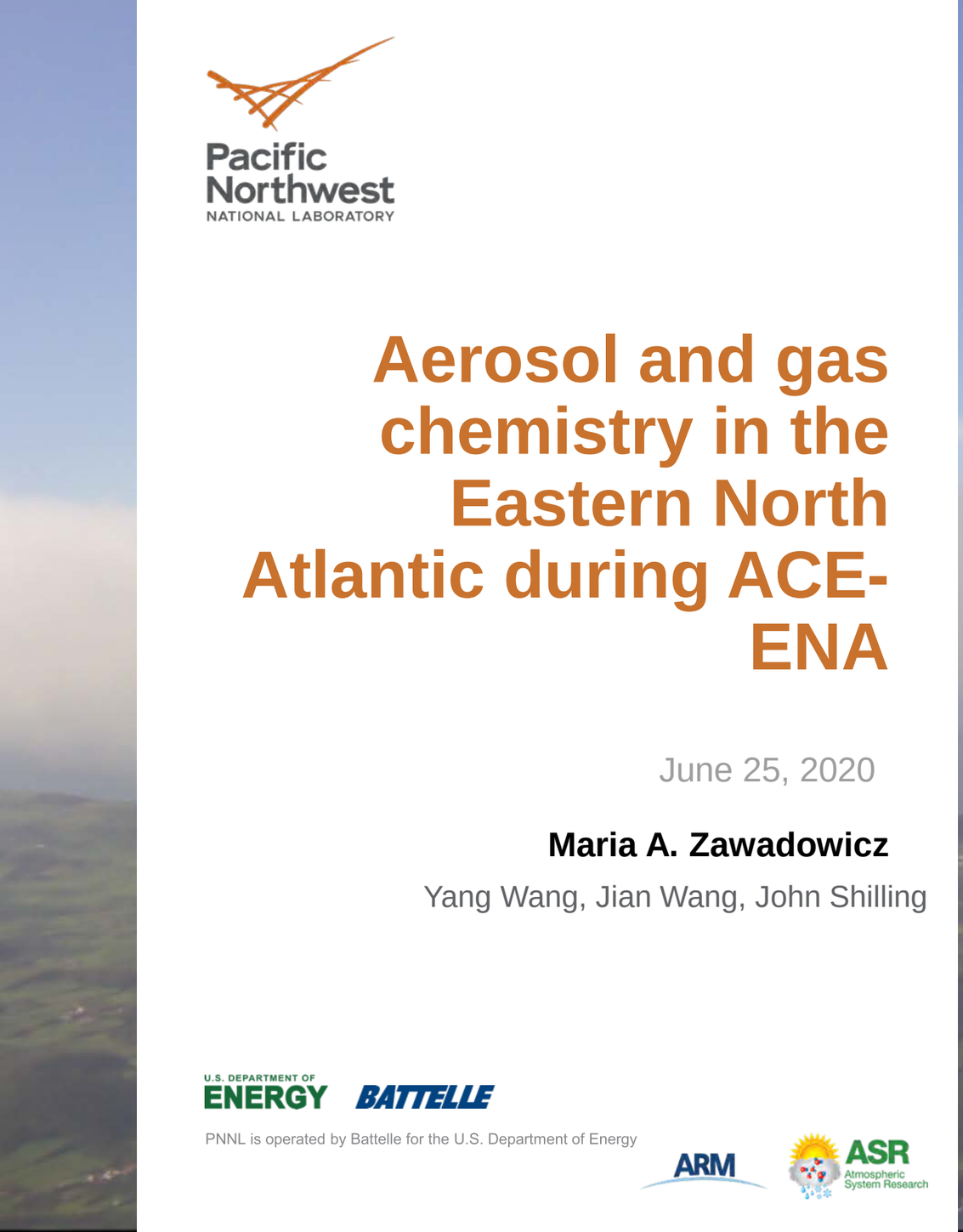
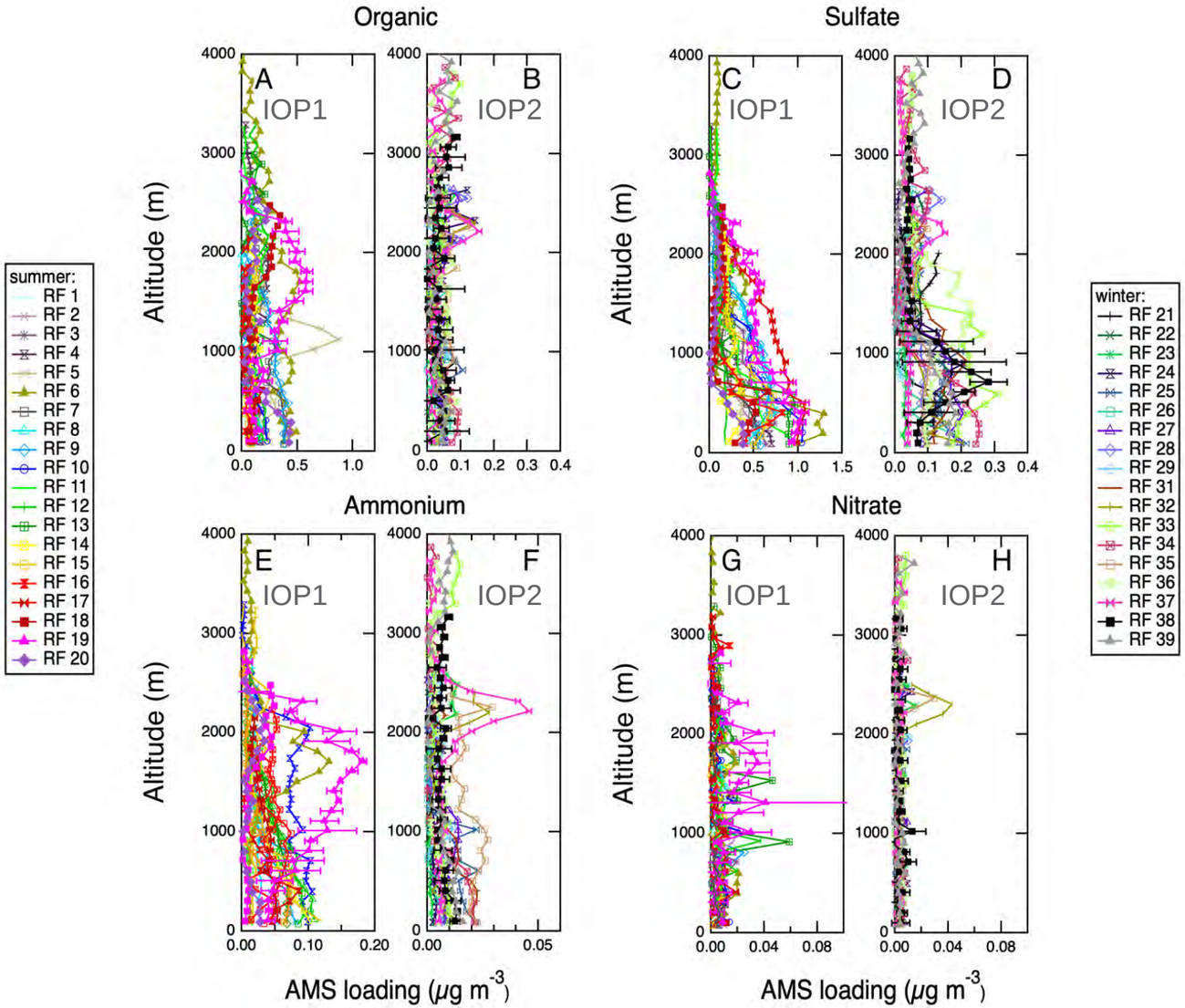


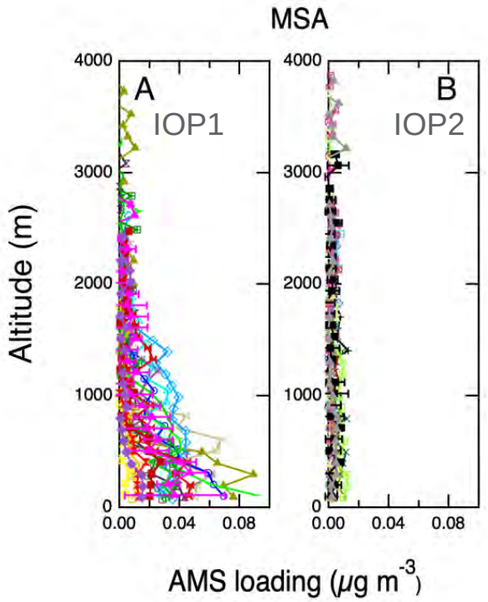
U.S. DEPARTMENT OF ENERGY BATTELLE

PNNL is operated by Battelle for the U.S. Department of Energy

ARM ASR Atmospheric System Research

In our previous work, aerosol chemistry vertical profiles revealed local and continental sources





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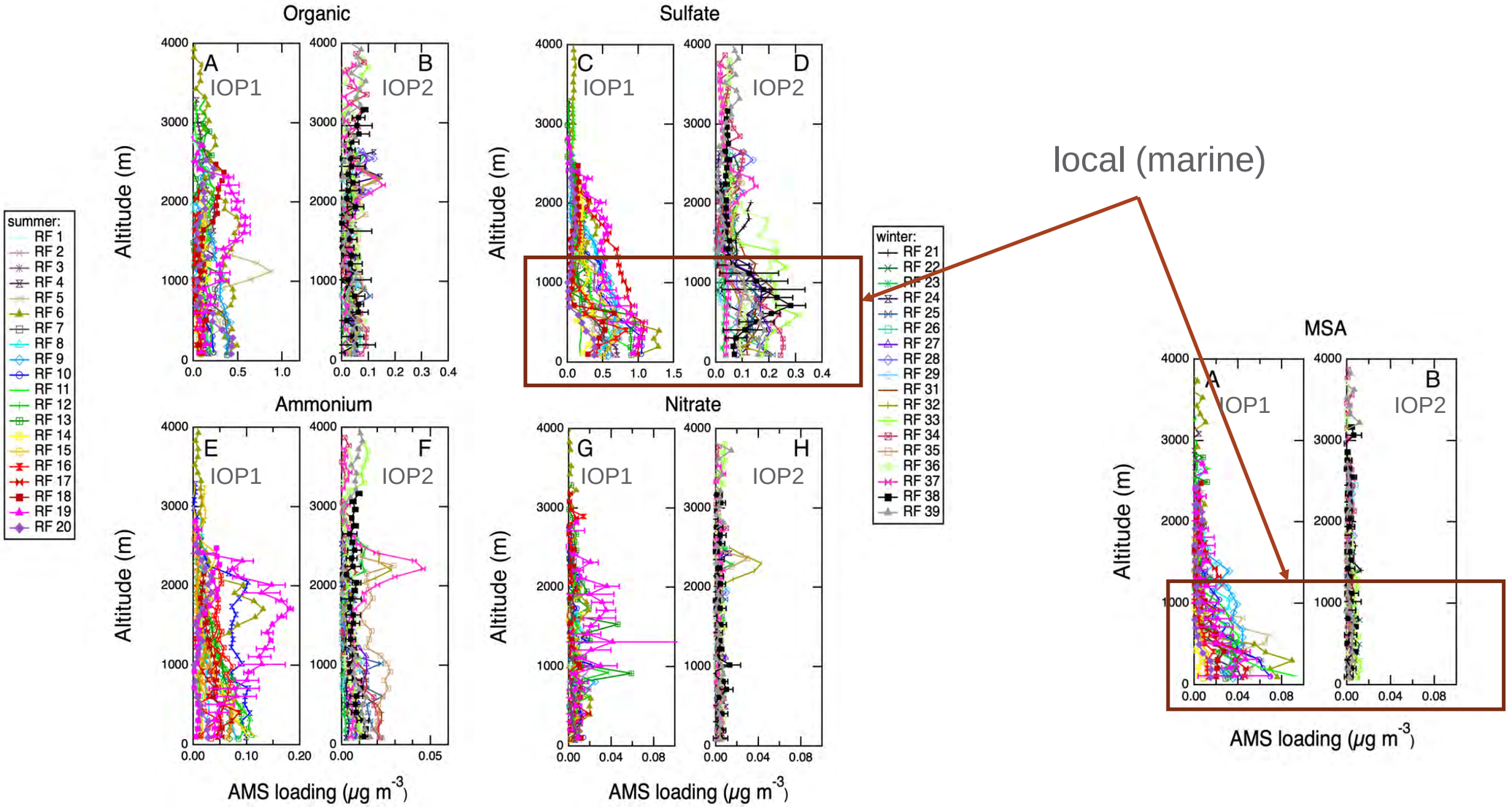

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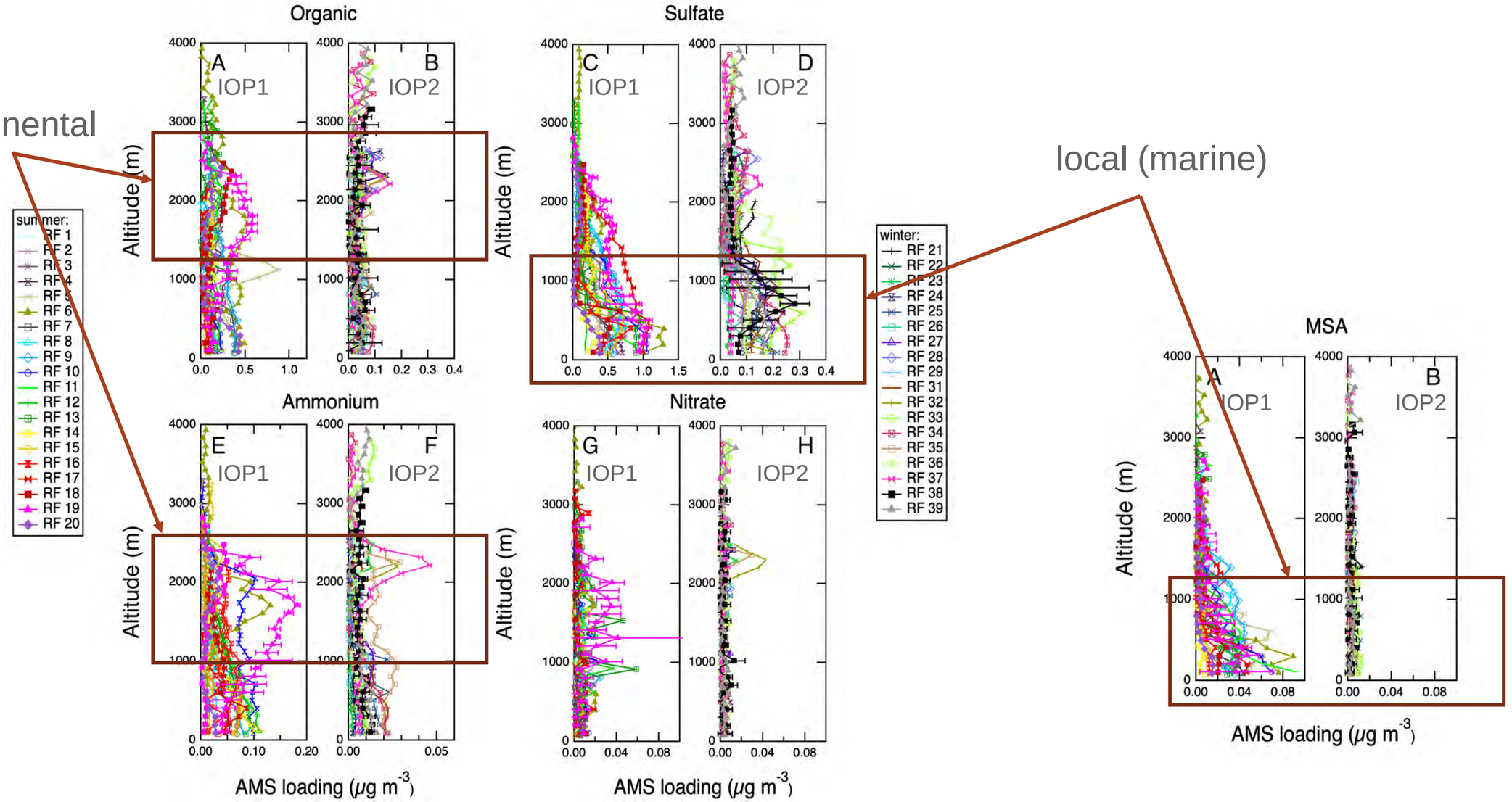
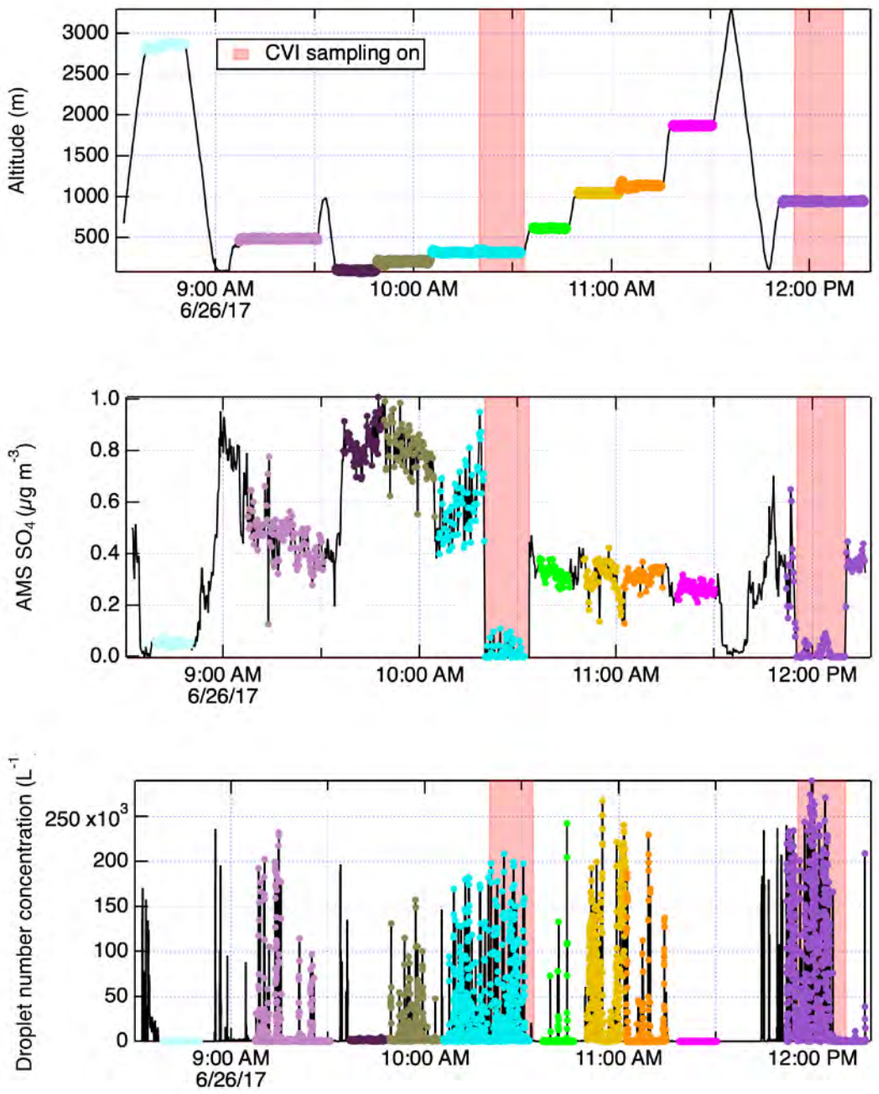
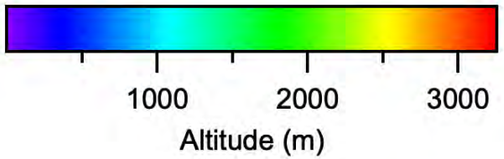
continental

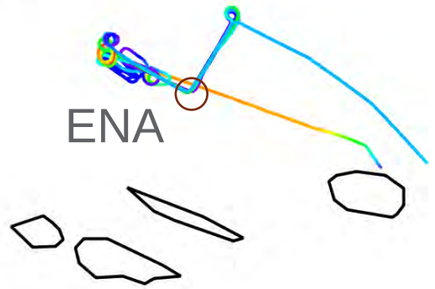
local (marine)



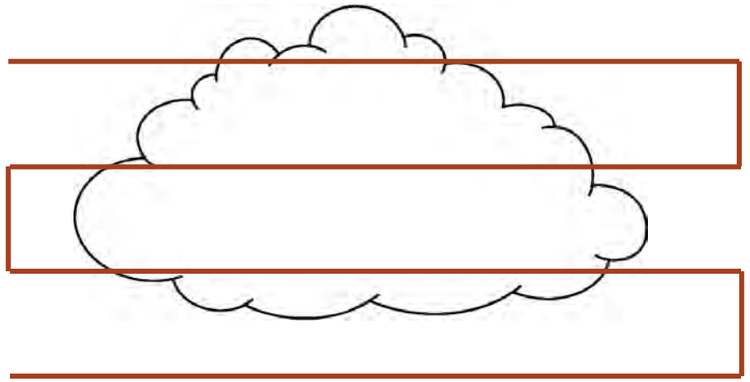
Sampling strategy: in-cloud legs at different altitudes, on and off CVI



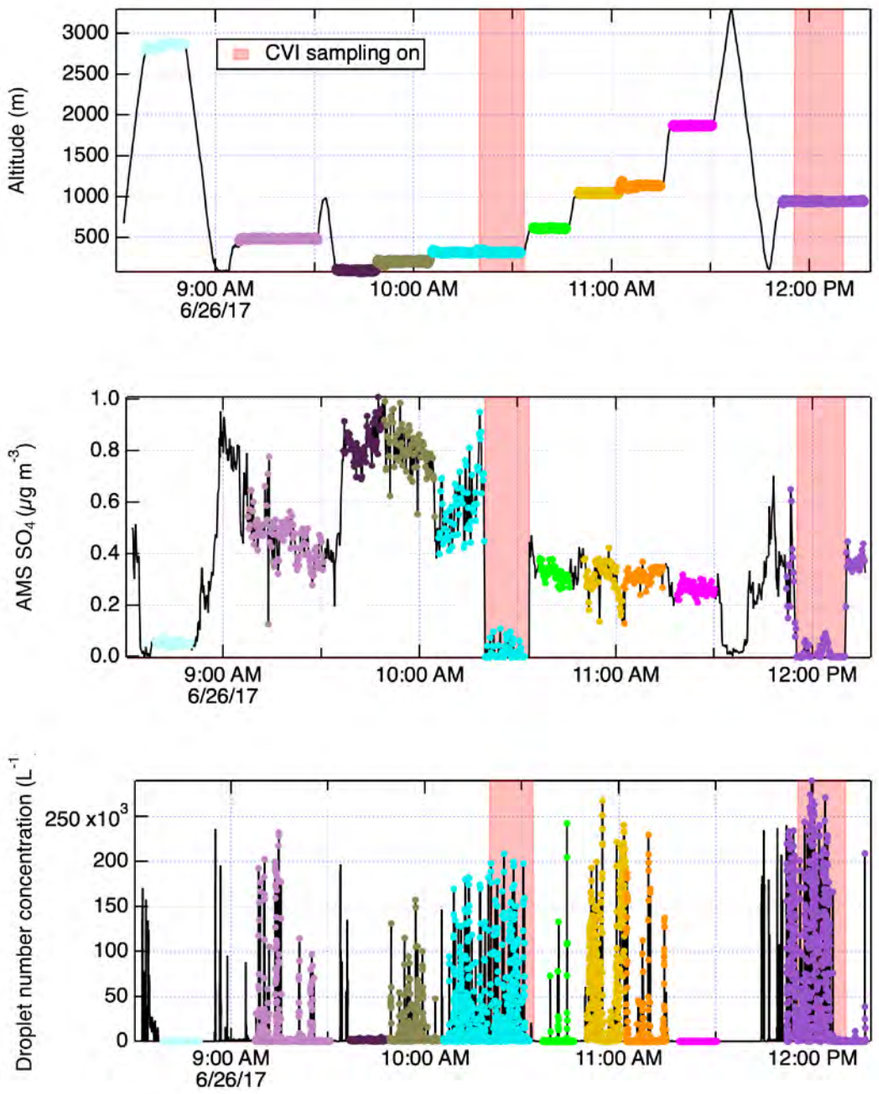


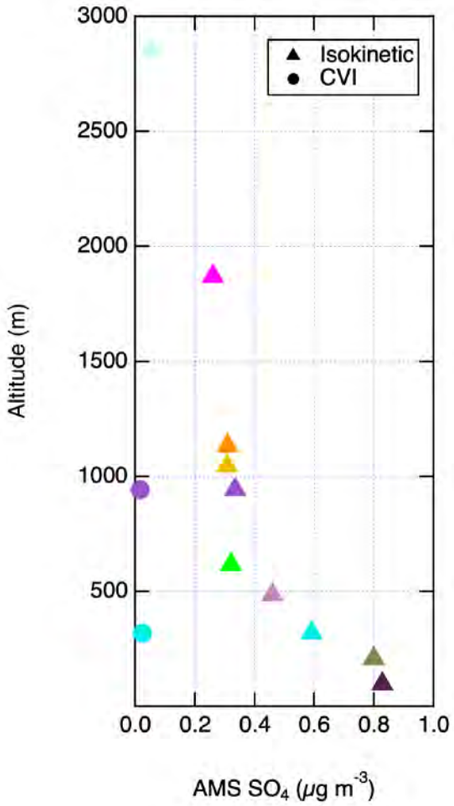


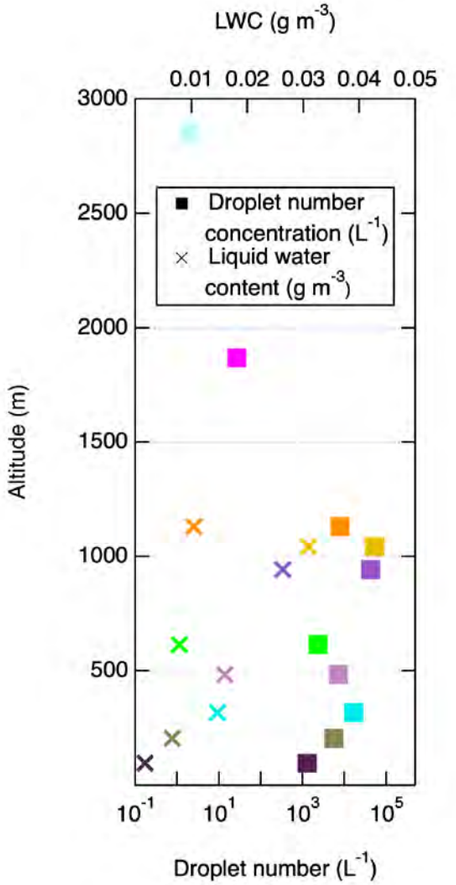
- A counter-flow virtual impactor (CVI) was used during ACE-ENA to sample cloud droplet residuals



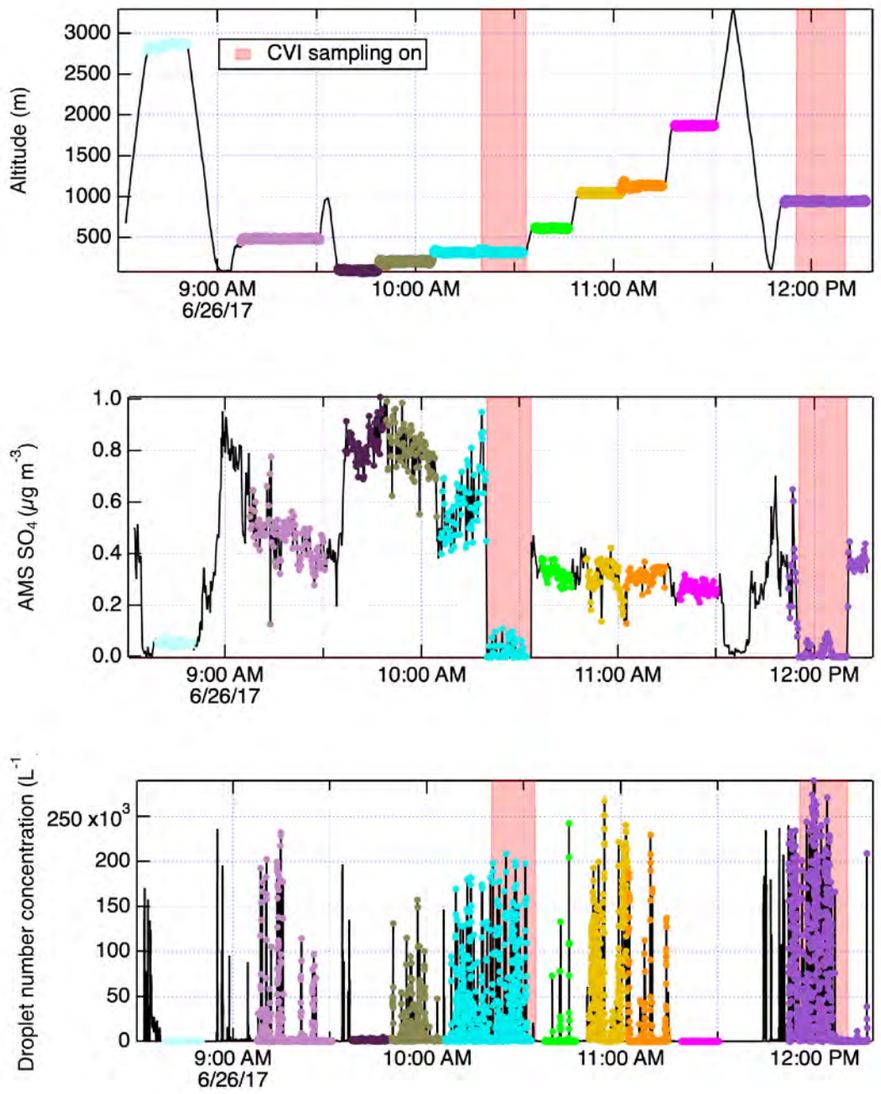
We compare AMS SO_4 concentrations on- and off-CVI at similar altitudes

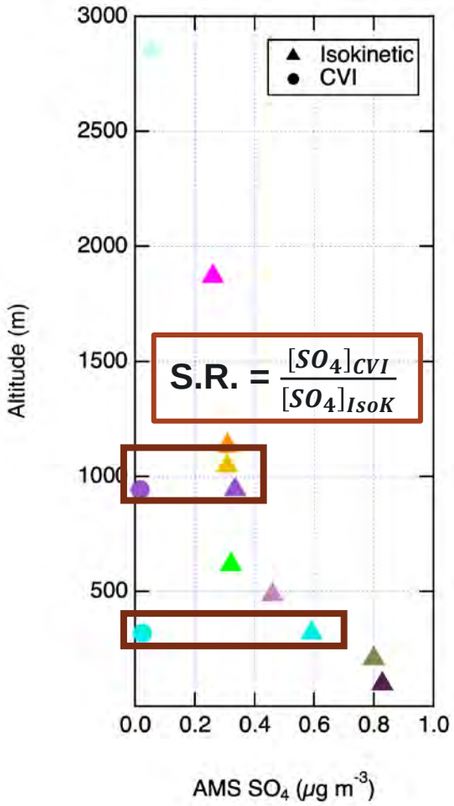


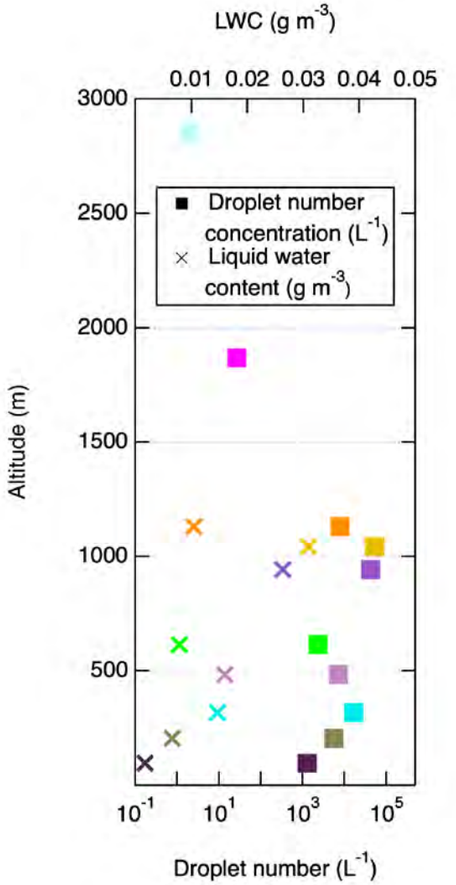




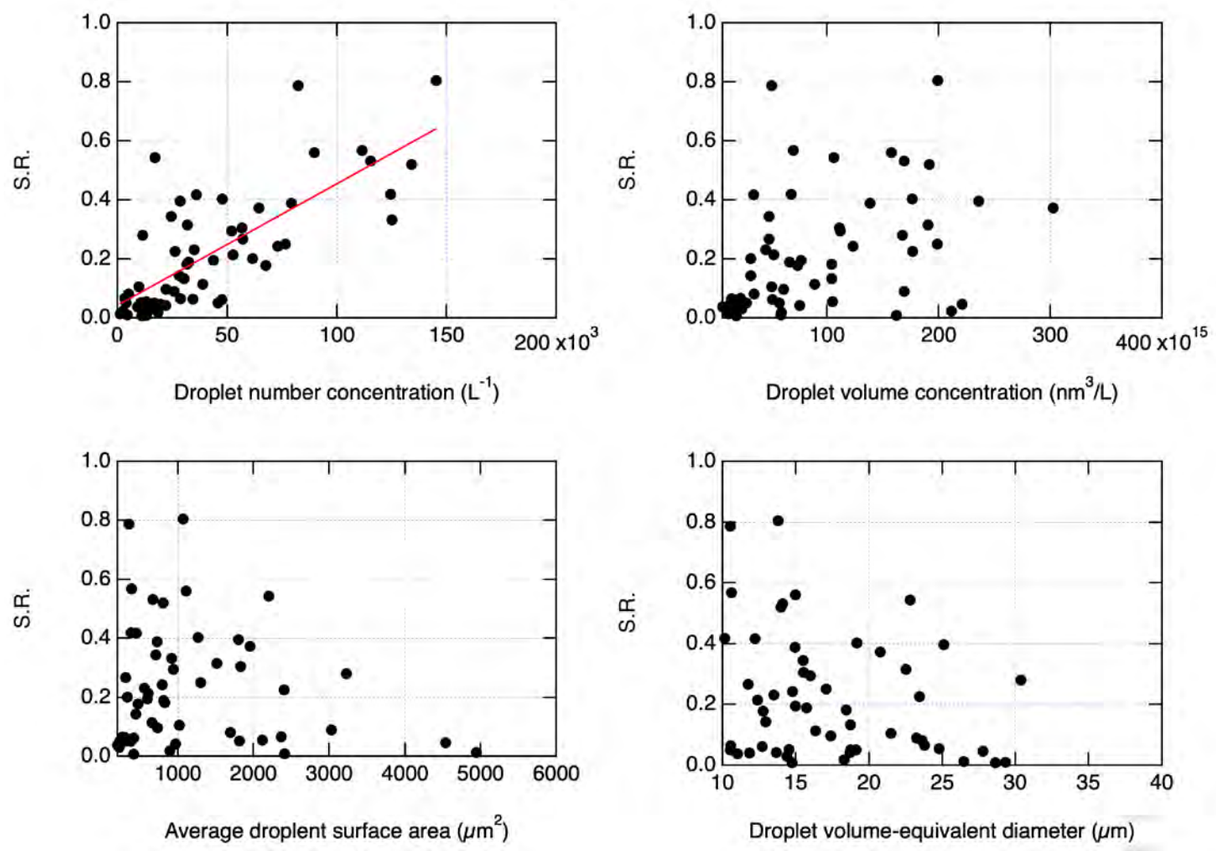
We use this to calculate the scavenging ratio (S.R.)







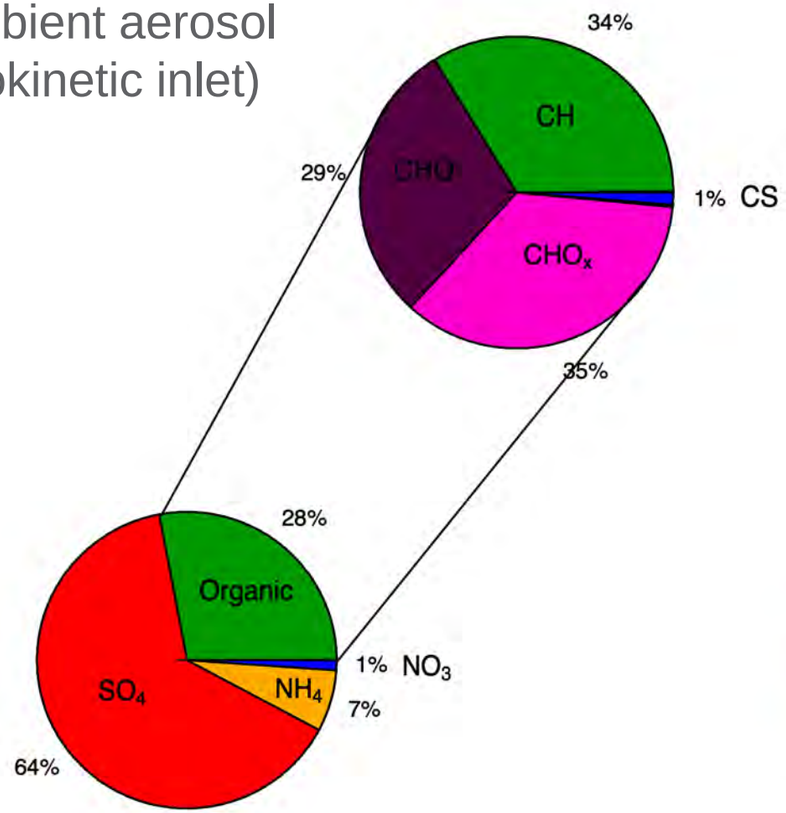
Correlations between S.R. and cloud droplet concentration and size



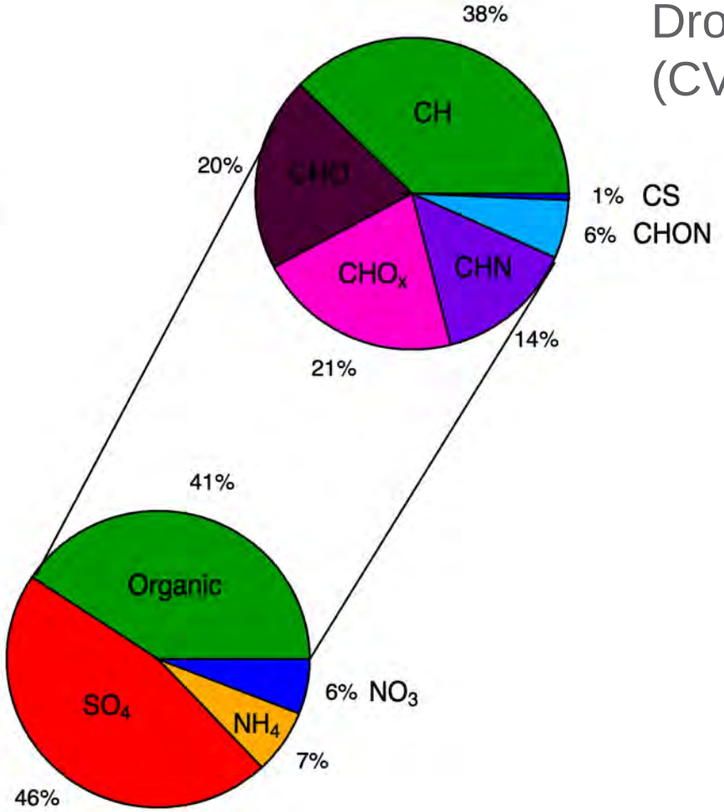
- Scavenging ratio was found to correlate with the cloud droplet number concentration (R^2 = 0.6)
- No correlation with volume concentration or average surface area or volume-equivalent dimeter of droplets.

Chemistry of the cloud droplet residuals is different from aerosols

Ambient aerosol (isokinetic inlet)

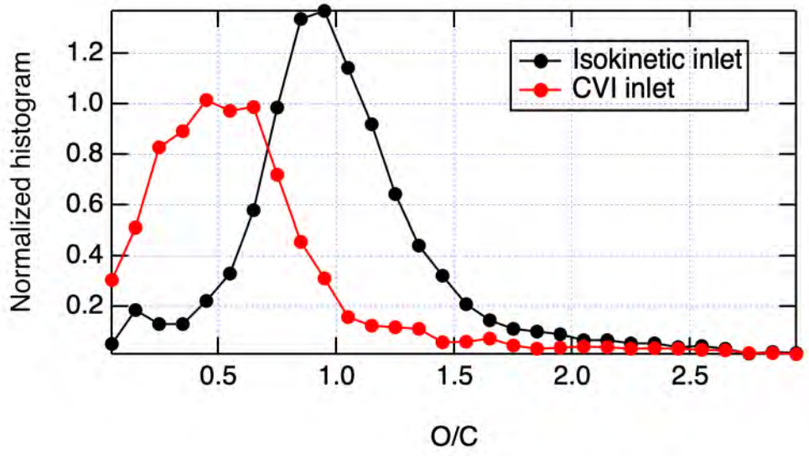


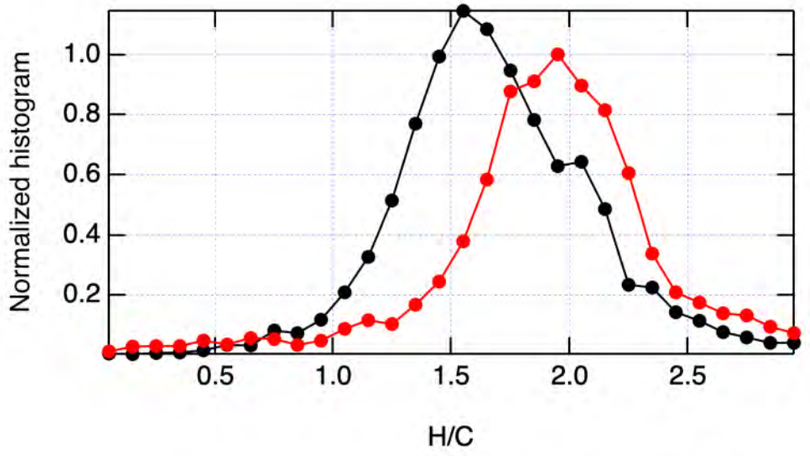
Droplet residuals (CVI inlet)



- Droplet residuals were found to be relatively enriched in nitrate and amines

Chemistry of the cloud droplet residuals is different from aerosols





- Droplet residuals are less oxidized than ambient aerosol at ACE-ENA.

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Thank you