ASR Project Title

Objective: to identify the dominant isoprene oxidation product contributing to isoprene SOA

Climate Relevant SOA Property(s) Investigated: mass concentration, chemical composition

Lead personnel: Scot T. Martin (Harvard)

Collaborators:

Summary of progress:

Isoprene SOA formation was investigated using full-range online mass spectrometry for both gas phase and particle phase.

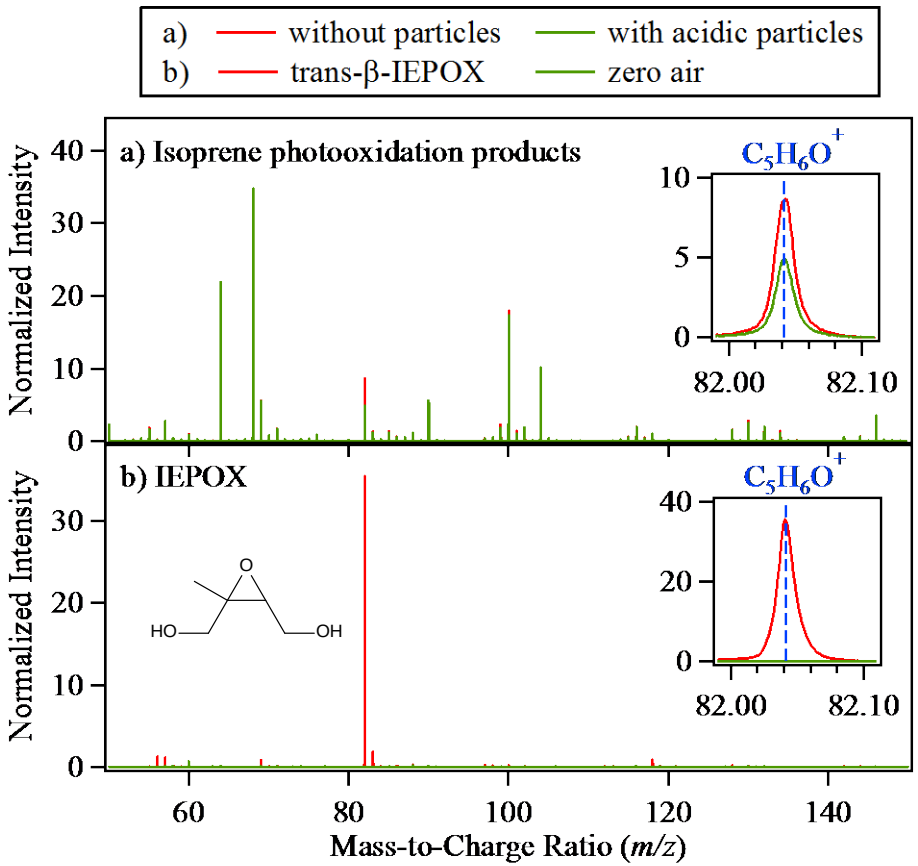
In gas-phase mass spectra, The ions of isoprene epoxydiols (IEPOX) showed most significant signal drop in the presence of acidic seed particles (64% - 75%).

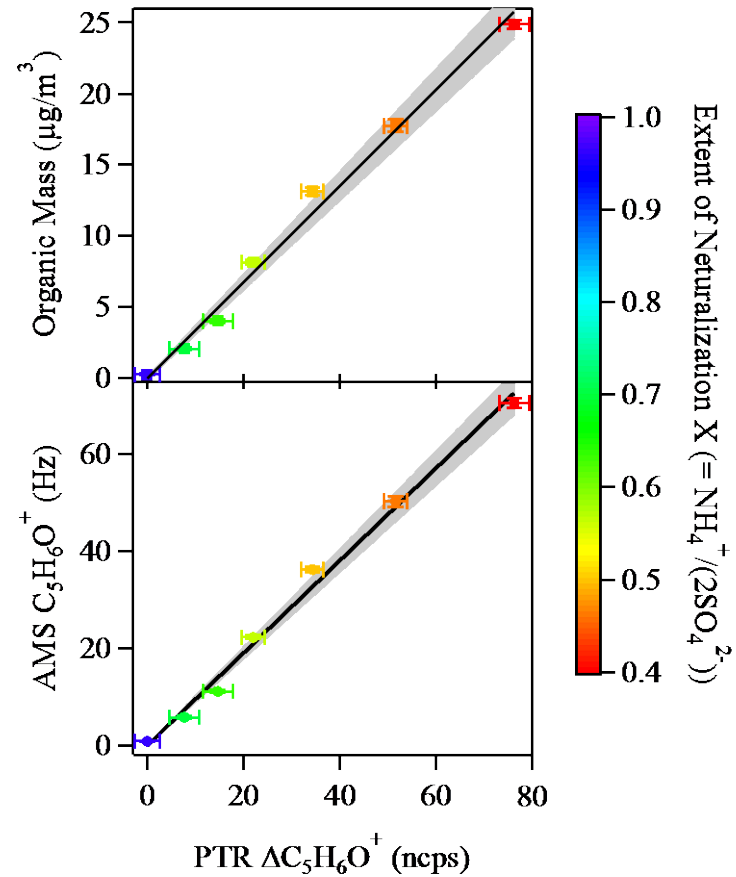
The signal drop of IEPOX correlates very well with isoprene SOM mass concentration for a wide range of seed particle acidity.

Taken together, these evidence suggests that reactive uptake of IEPOX is the dominant contributor to isoprene SOA.

Challenges or needed resources/collaborators: Investigation of isoprene SOA formation at higher RH (<5% for this study); parameterization of reactive uptake of IEPOX into atmospheric models.

Results


a) without particles
b) trans-β-IEPOX
with acidic particles
zero air
a) Isoprene photooxidation products
b) IEPOX
$C_5H_6O^+$
Normalized Intensity
Mass-to-Charge Ratio (m/z)
HO
OH
O


Organic Mass (μg/m^3)
AMS $C_5H_6O^+$ (Hz)
PTR $\Delta C_5H_6O^+$ (ncps)
Extent of Neturalization X (= $NH_4^+/(2SO_4^{2-})$)