# Progress in Trace Gas Detection Methods

Judy Lloyd
SUNY / Old Westbury

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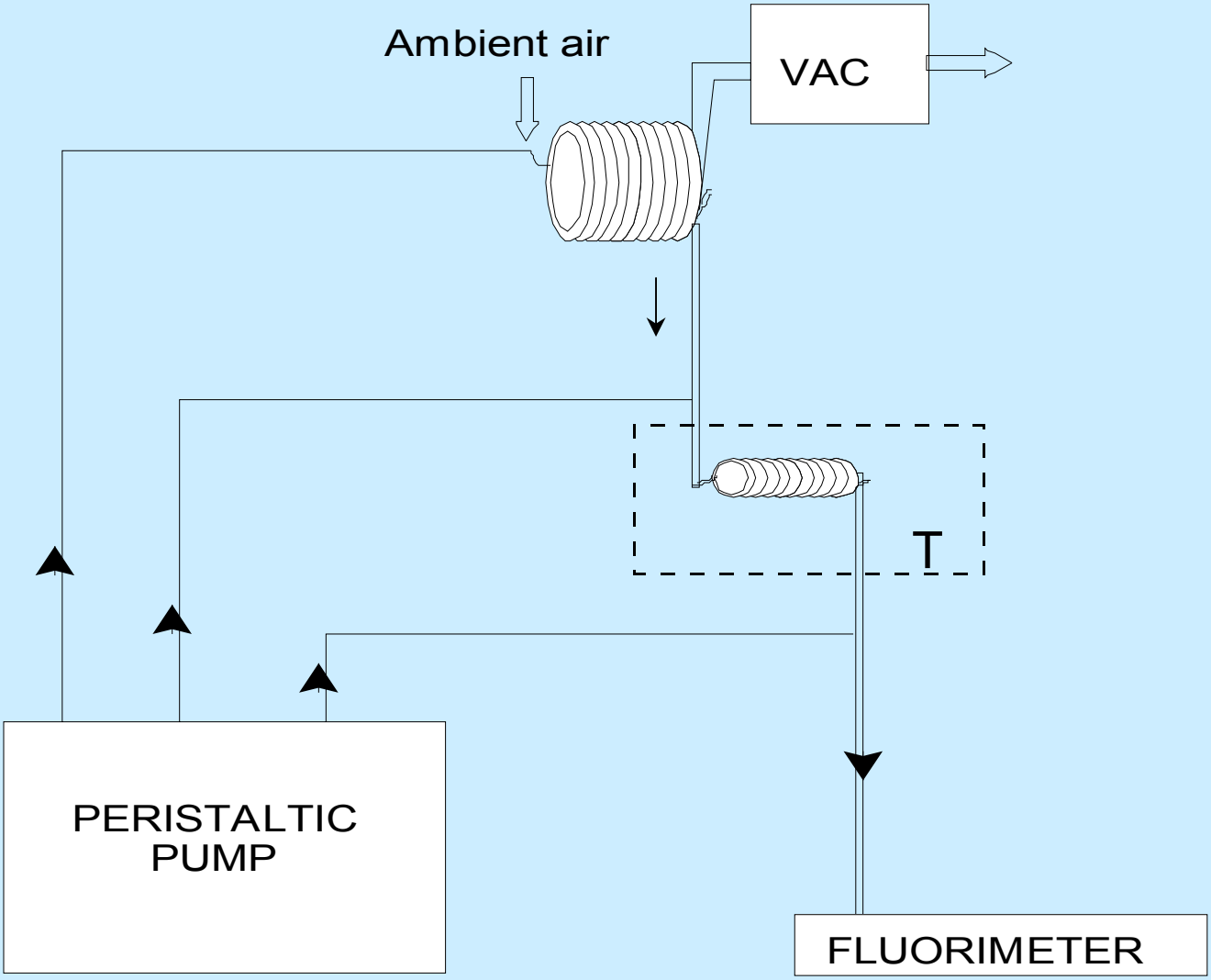
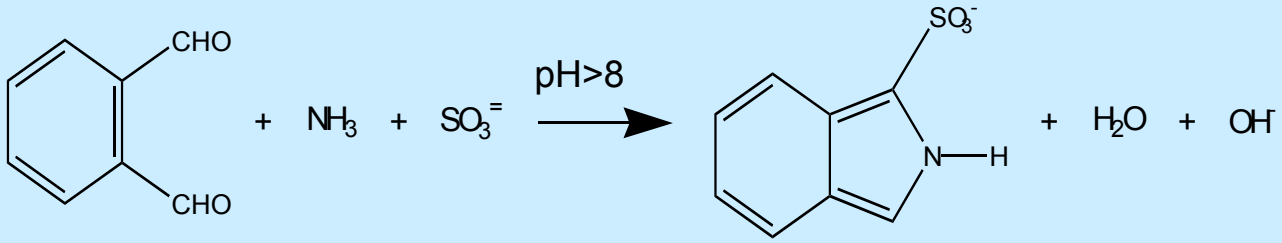
# Method Development

- $SO_2$
- $NH_3$
- Hydroperoxides

# Coil scrubber



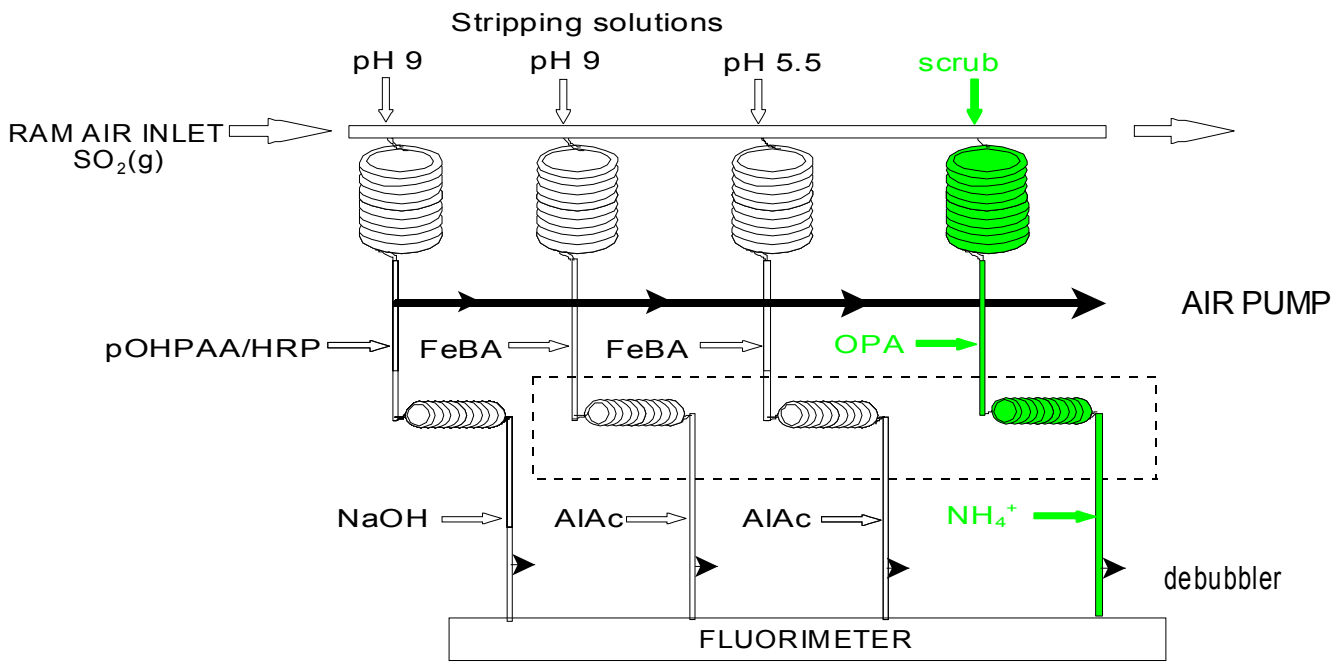
# OPA derivatization technique for $SO_2$(g) analysis



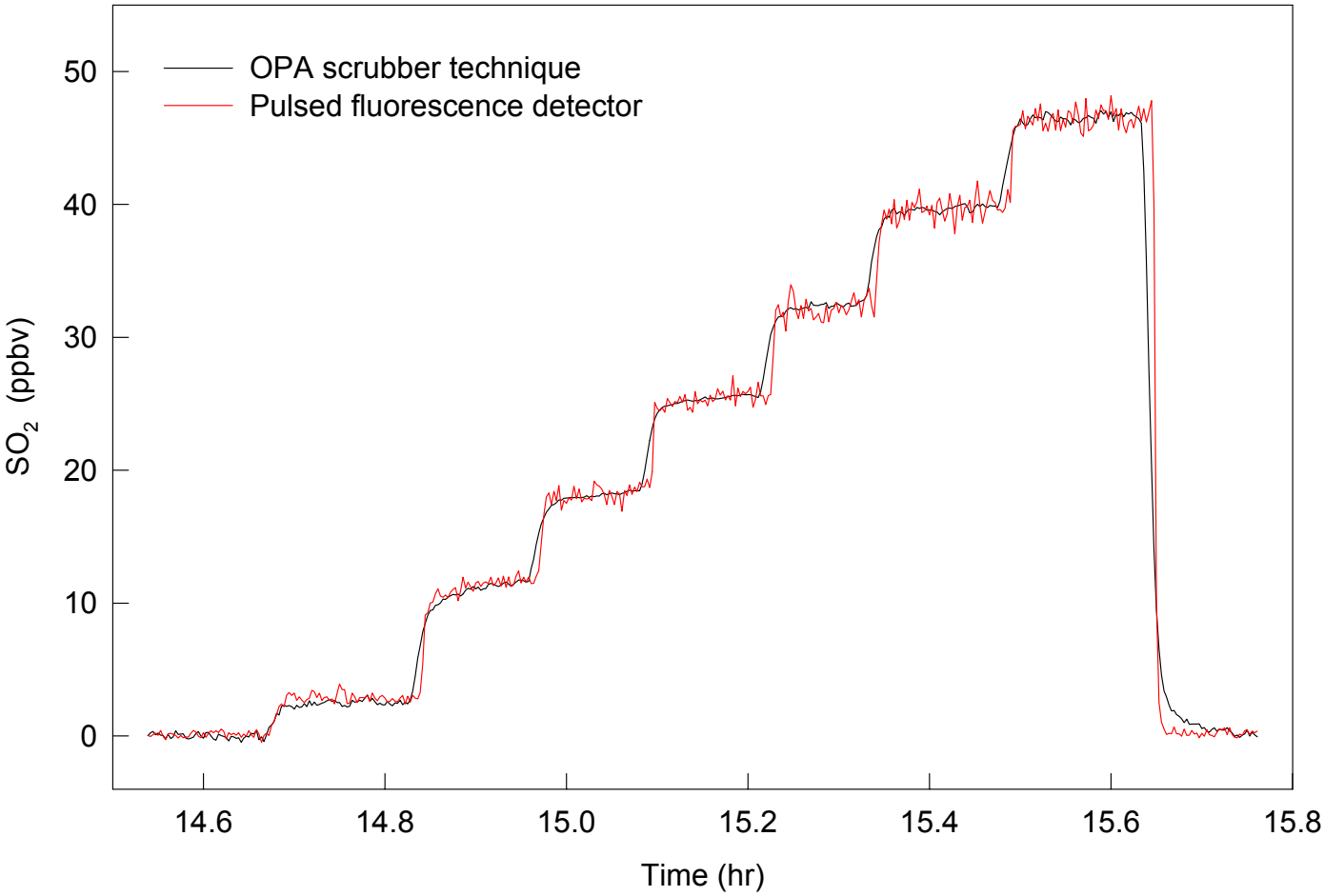

o-phthalaldehyde (OPA)

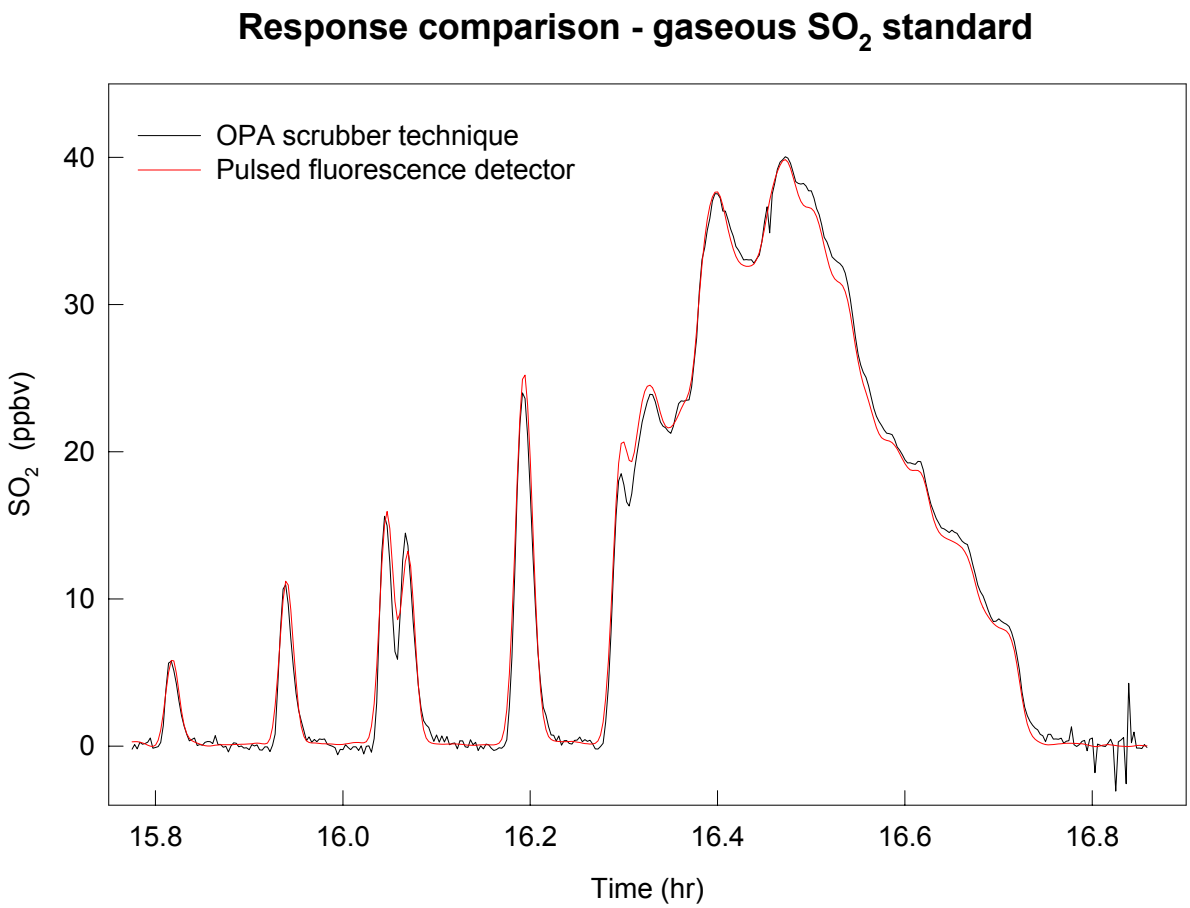
isoindole sulfonate

# $SO_2$(g) Analysis

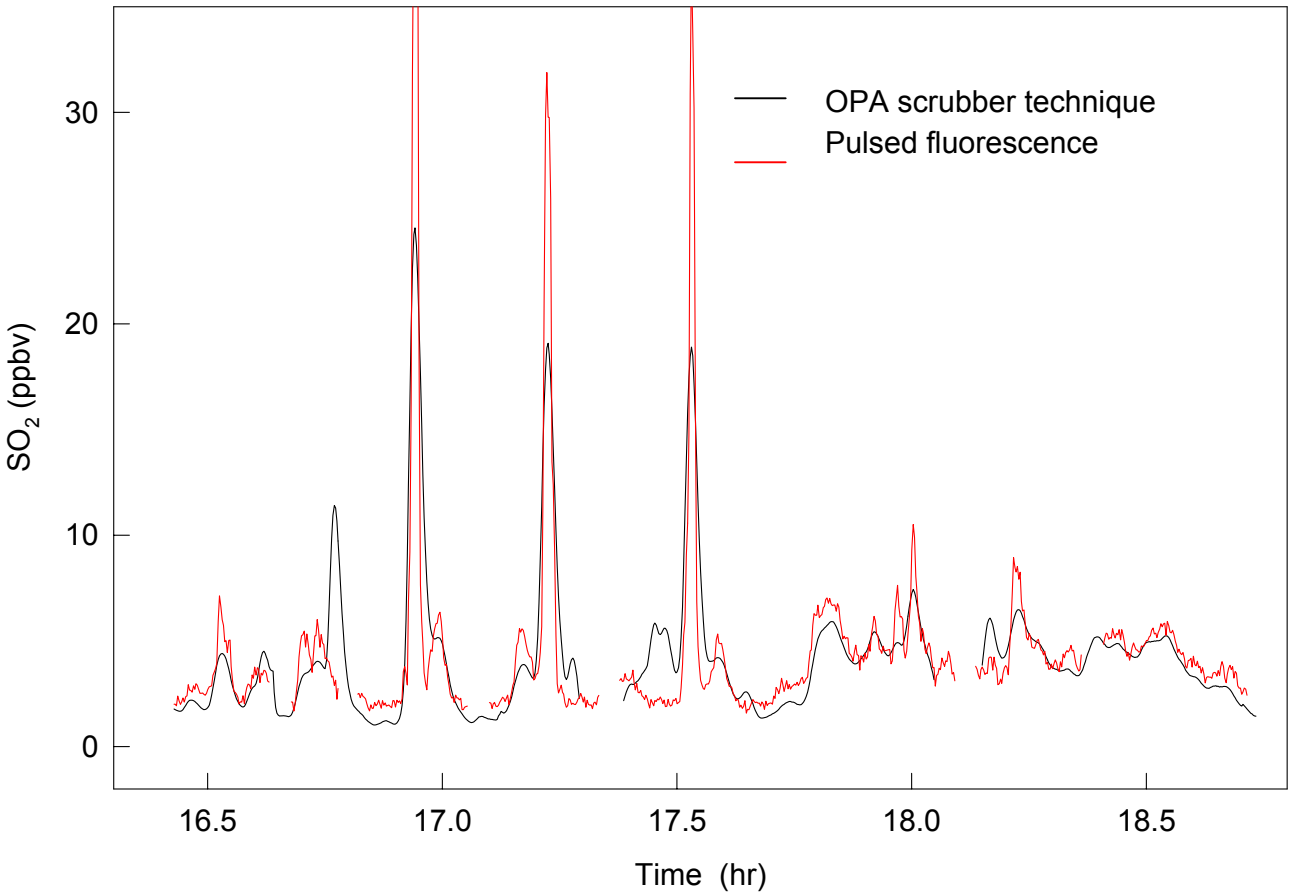


# Response comparison $SO_2$ (g) standard

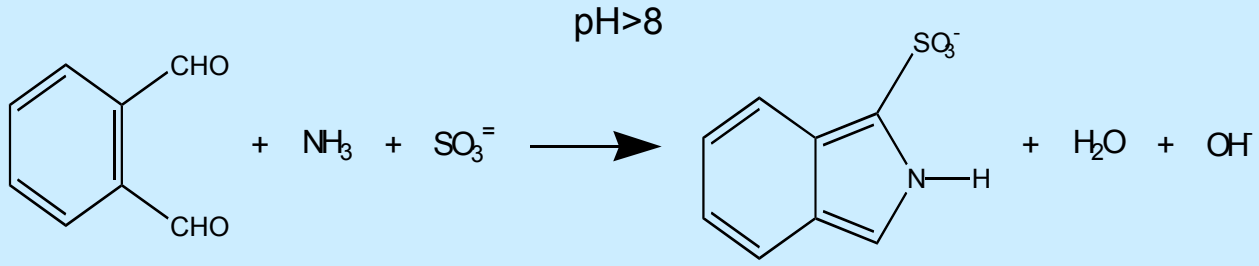



Response comparison - gaseous SO2 standard
OPA scrubber technique
Pulsed fluorescence detector
SO2 (ppbv)
40
30
20
10
0
15.8
16.0
16.2
16.4
16.6
16.8
Time (hr)

# Ambient $SO_2$


OPA scrubber technique
Pulsed fluorescence
30
20
10
0
SO2 (ppbv)
16.5
17.0
17.5
18.0
18.5
Time (hr)

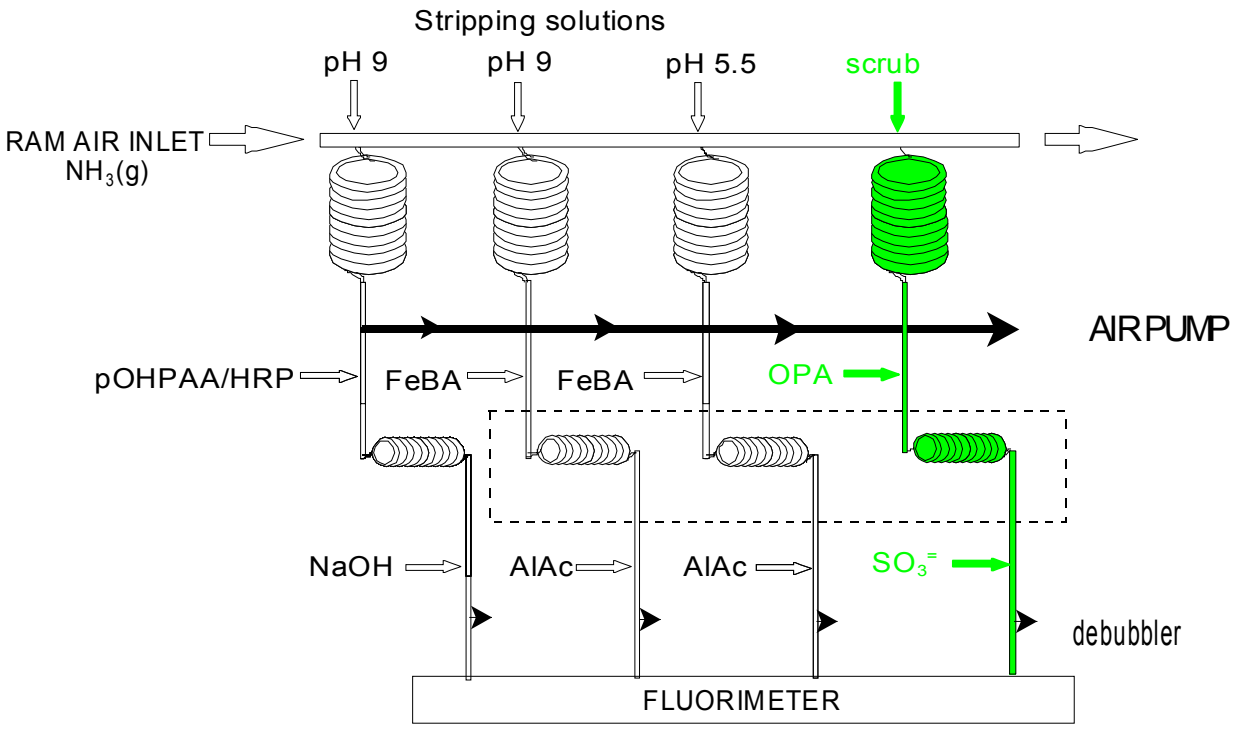
# OPA derivatization technique for $NH_3(g)$ analysis



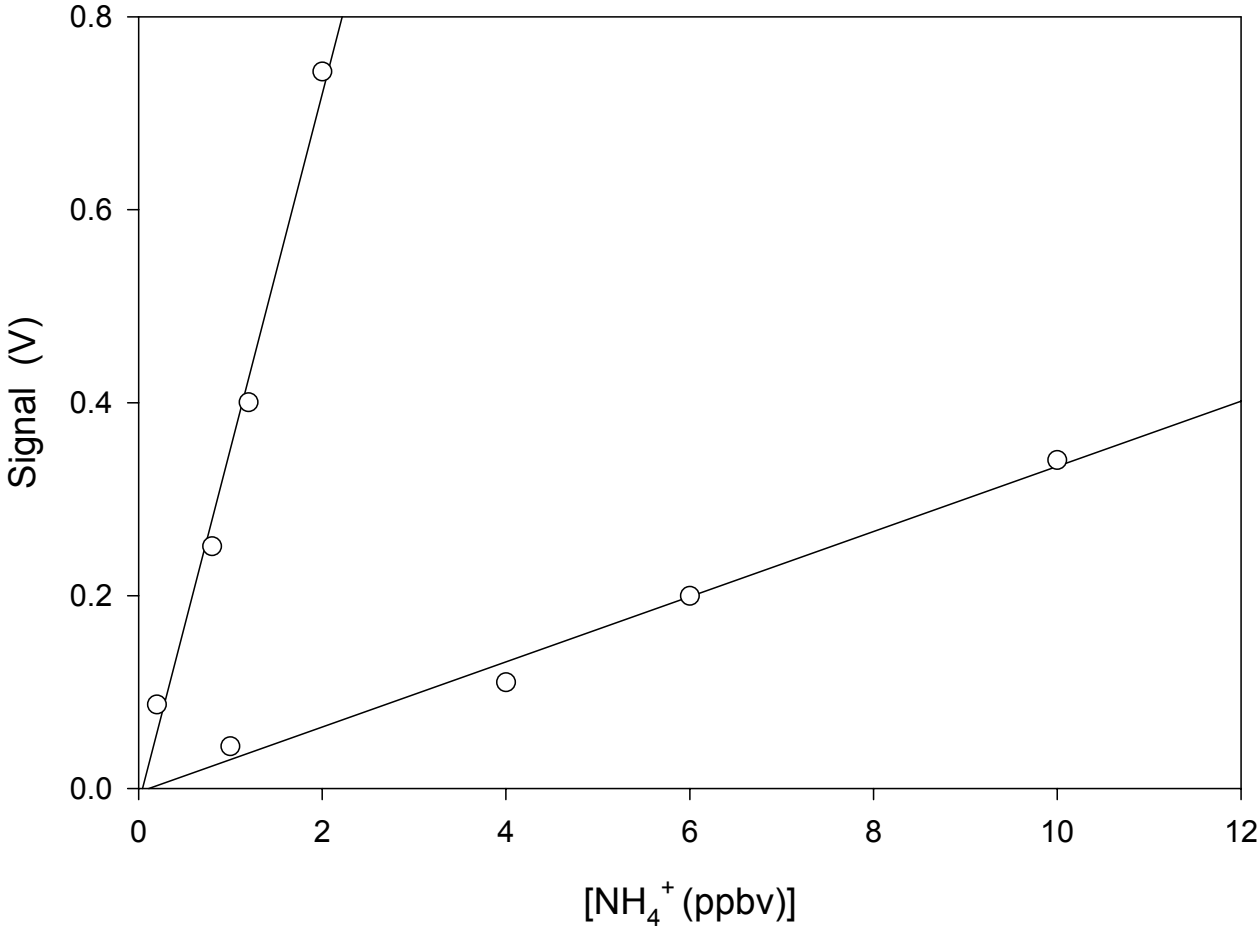

o-phthalaldehyde (OPA)

isoindole sulfonate

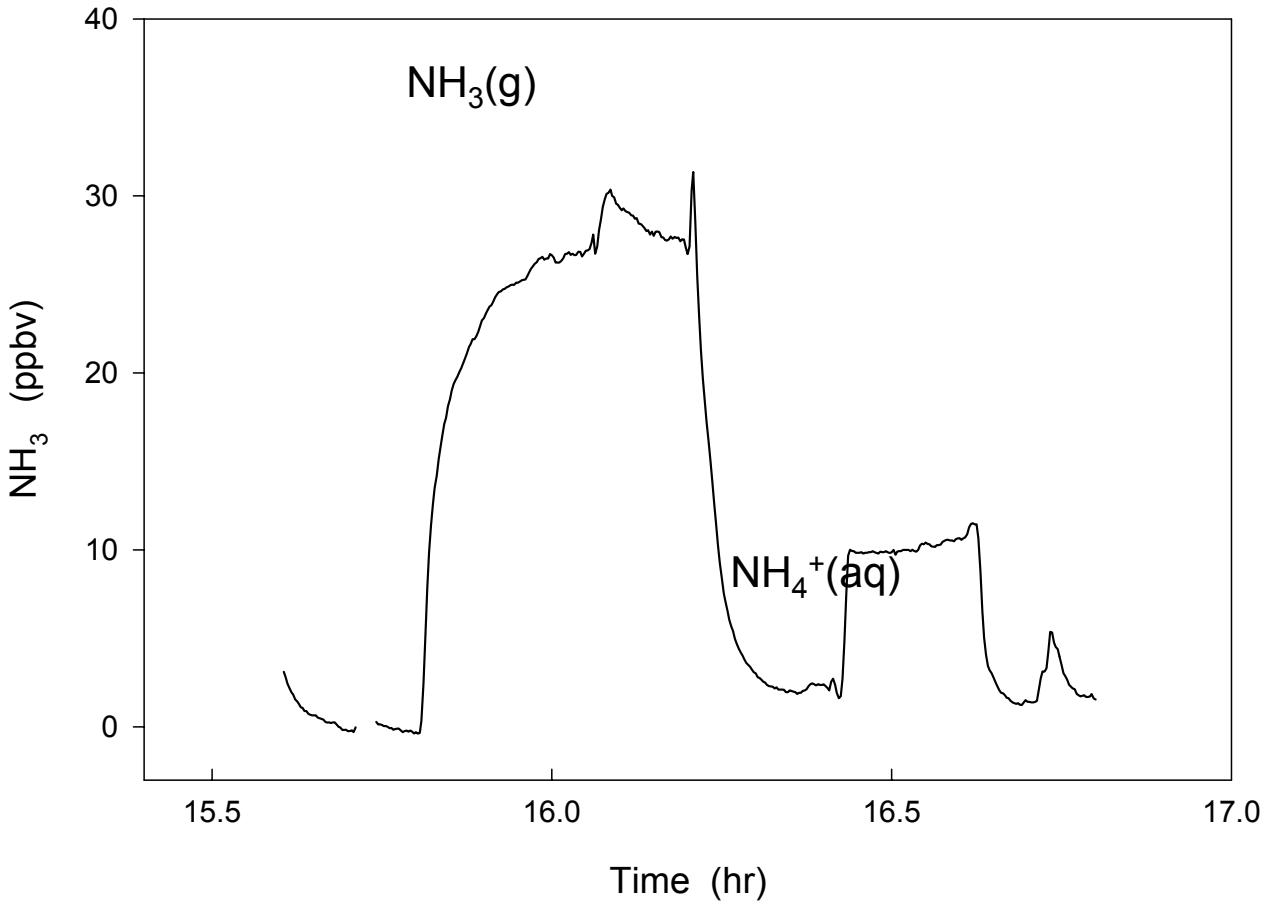
# $NH_3(g)$ Analysis



# OPA calibration – aqueous standards



# OPA response to standards: $NH_3(g)$ and $NH_4^+(aq)$




Flow Rate pump = 30
$\lambda_{em}$ = 425 lens
Volts = 625V
$[NH_4^+]$ = 2E=6M
Range = 0.3

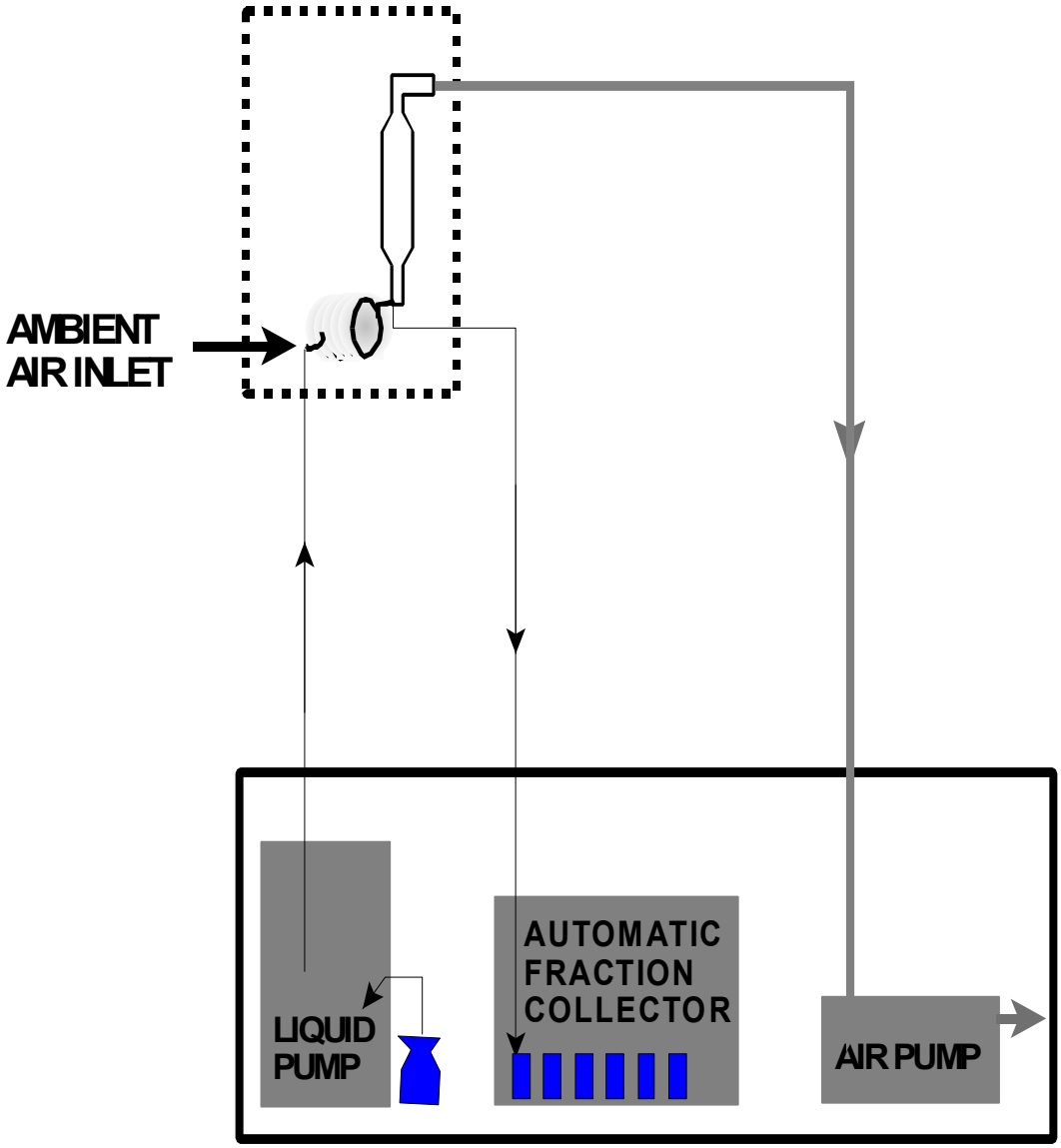
Slit = 2
$\lambda_{ex}$ = 330 nm
Temp = 60C
Sample = 1E-3M
Flow Rate of Gas =

# PROPHET
## **P**rogram for **R**esearch on **O**xidants: **Ph**otochemistry, **E**missions, and **T**ransport

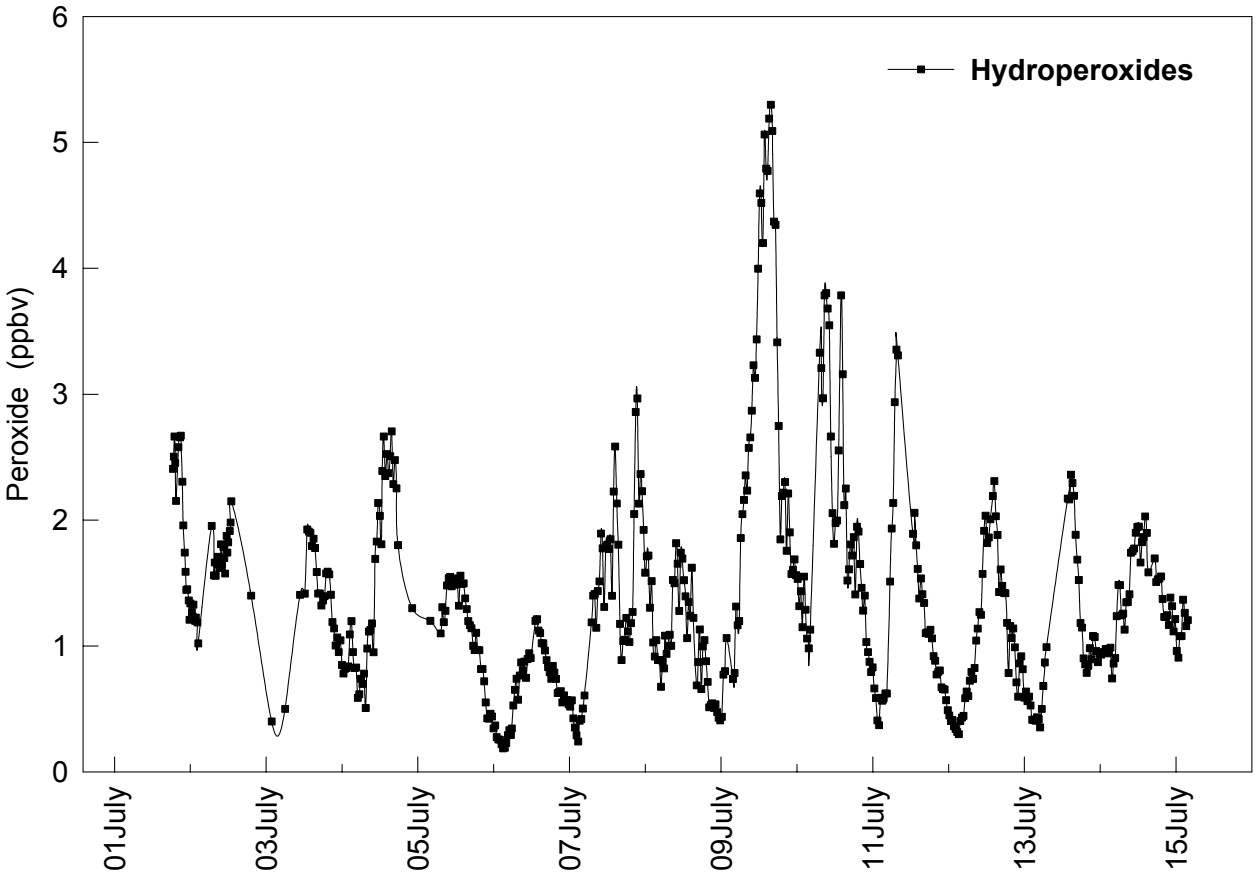
- University of Michigan Biological Station, Pellston, MI (Carroll, Shepson, Bertman)
- Measurements from 1996 - present
- High biogenic hydrocarbons
- Multiple flow regimes
- Nighttime $HO_x$ ?

# Air sampling manifold

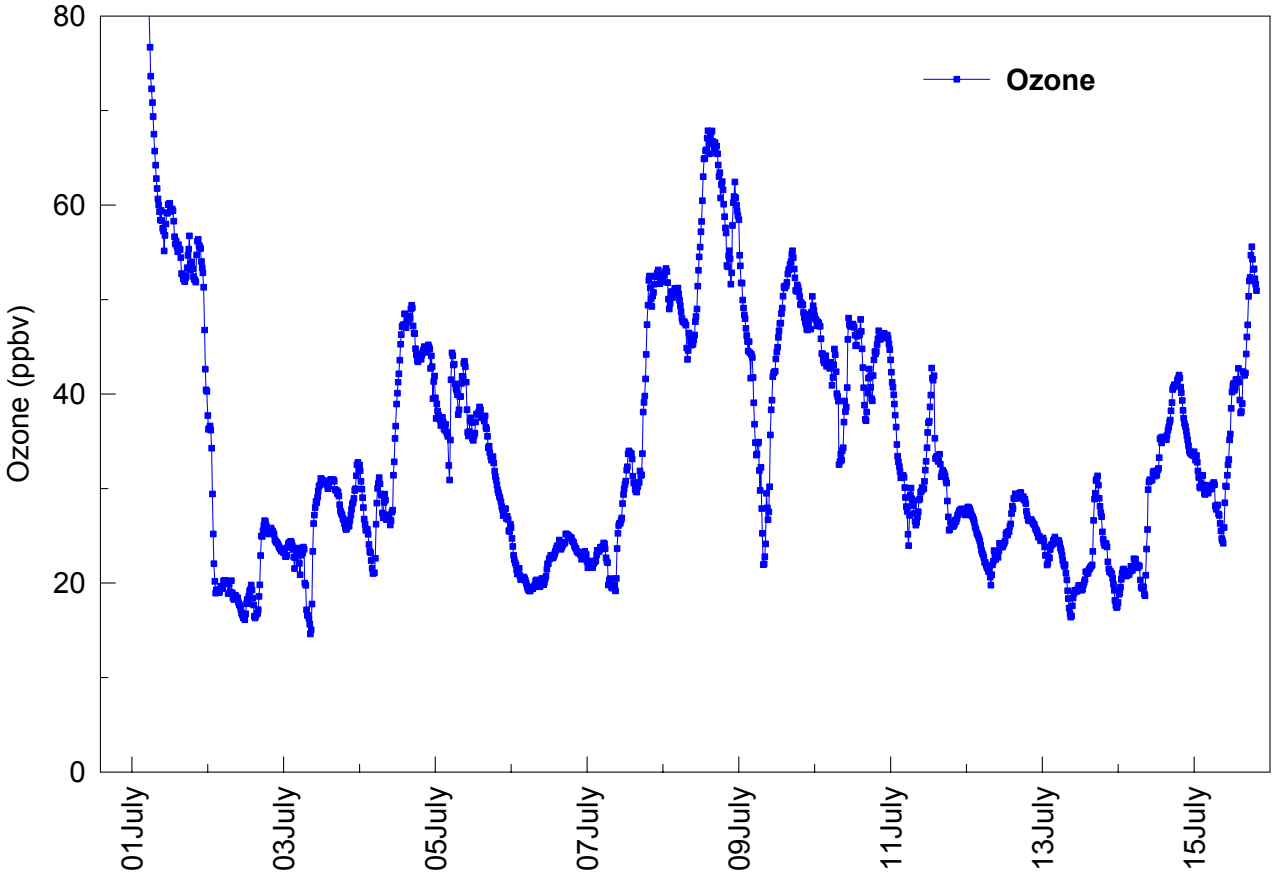
# Peroxide Sampler
# Pellston



# Pellston 2001



# Pellston 2001



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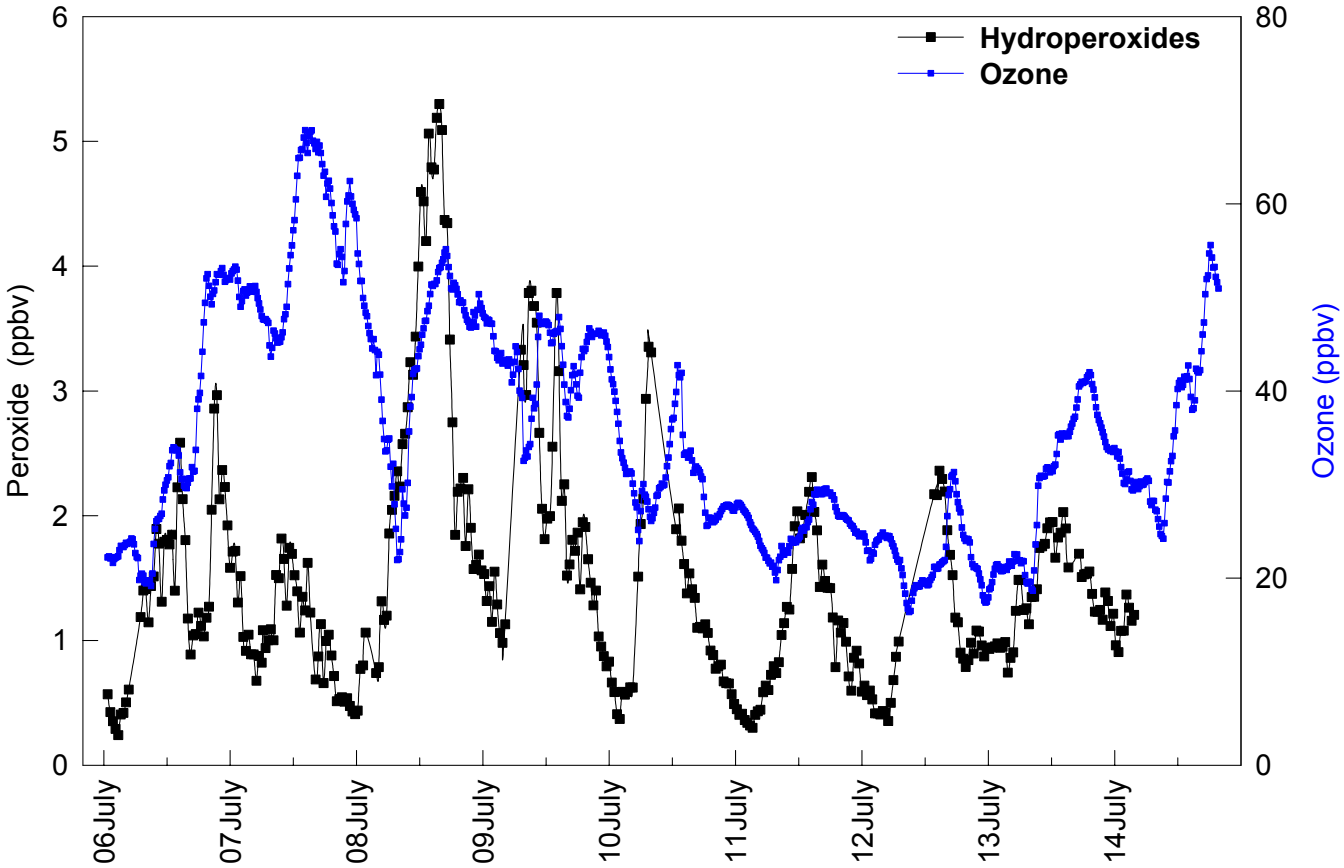

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