Measurements of PANs, OVOC, and Nitriles During INTEX-A

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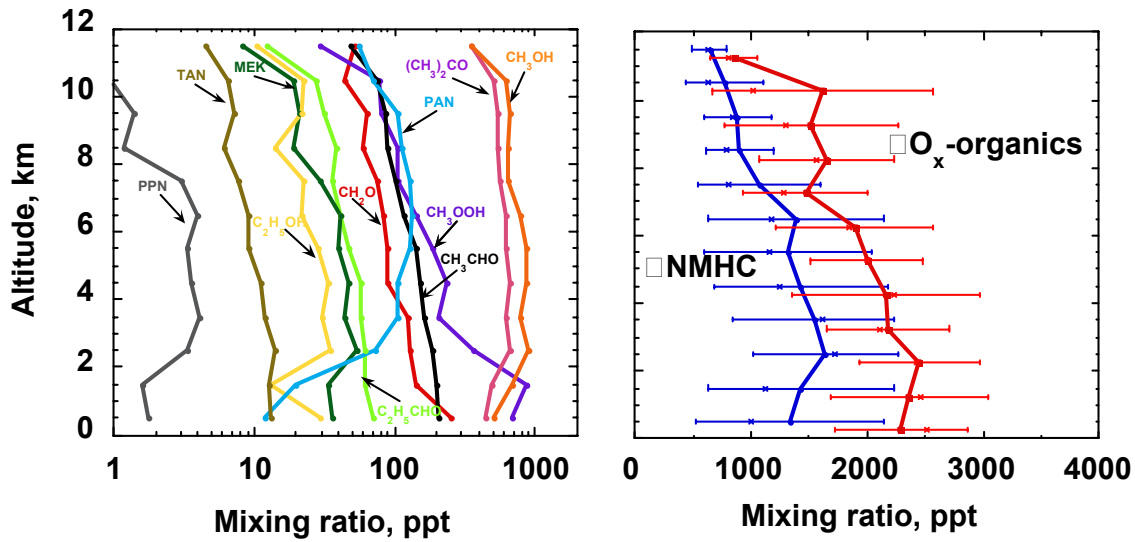
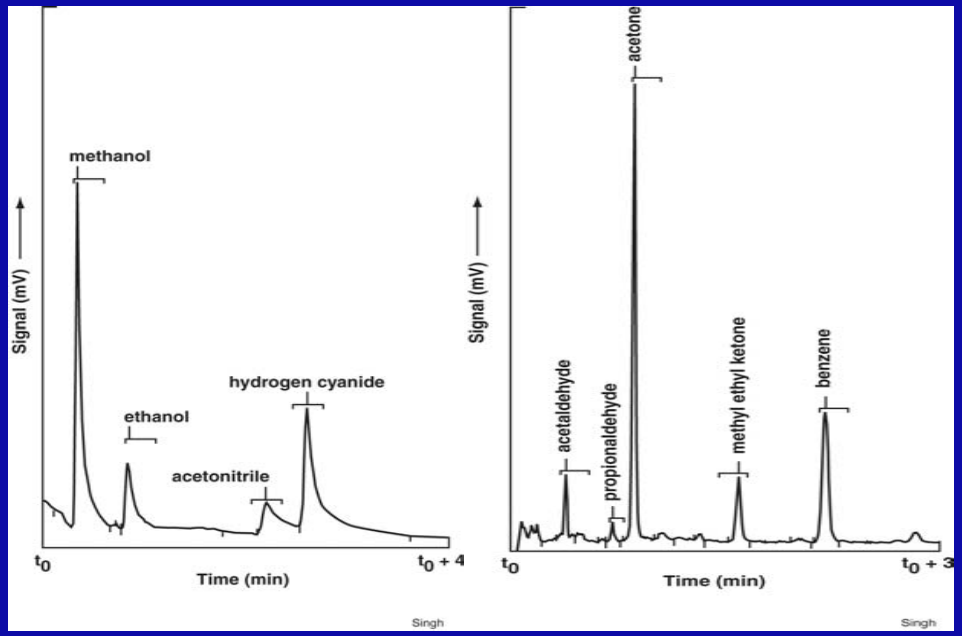


- Globally abundant
- Photochemically active
- Large poorly known sources
- Measurement uncertainties

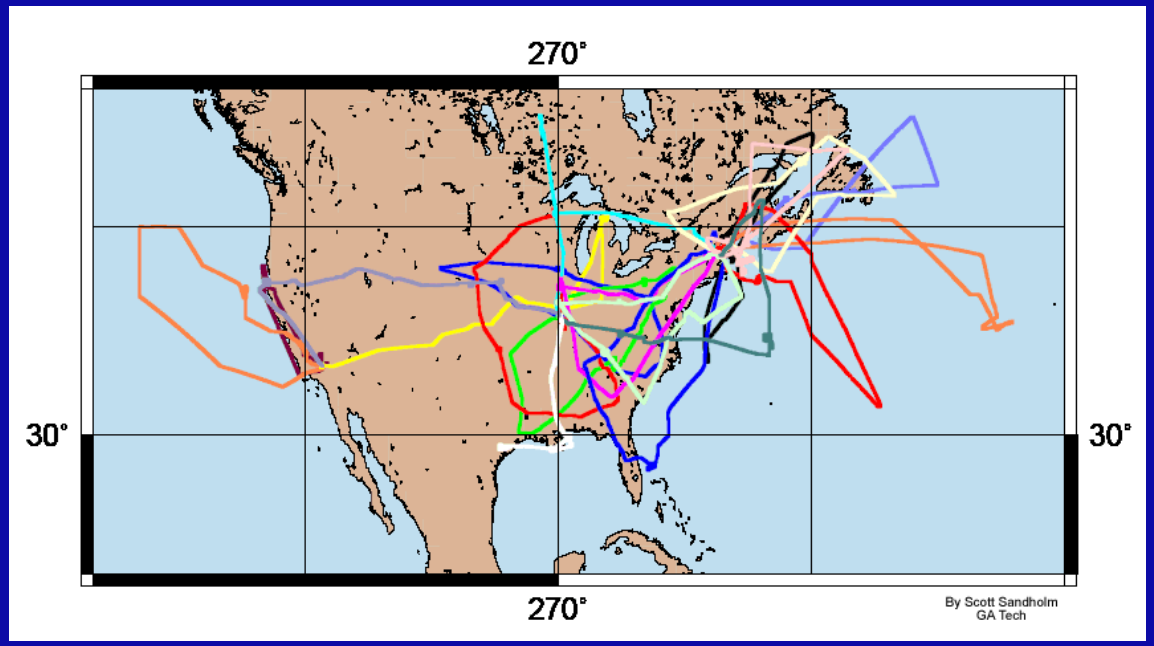
PANAK & Chemicals

- 3 Channel capillary GC/ECD-PID-RGD
  - Chs 1 & 2/ECD: PANs
  - Ch 3/PID-RGD: OVOC/Nitriles/HCs
- 200 ml cryo sampling/2-min; heated probe
- Sensitivity (ppt): PANs-1; OVOC- 5 to 20; HCN- 30
- PAN every 2.5 min; OVOC every 5 min



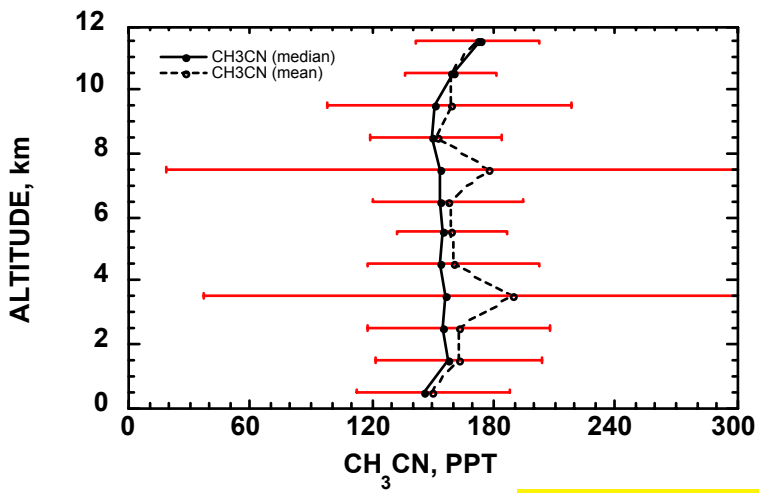
- $(CH_3)_2CO$
- $CH_3COC_2H_5$
- CH_3OH
- C_2H_5OH
- CH_3CHO
- PAN
- PPN
- $RONO_2$
- C_2Cl_4
- HCN
- CH_3CN
- C_6H_6

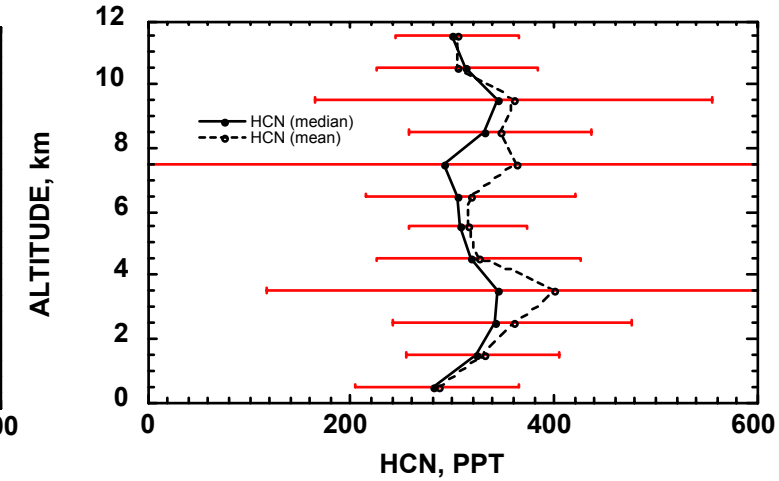
DC-8 PANAK Data Status

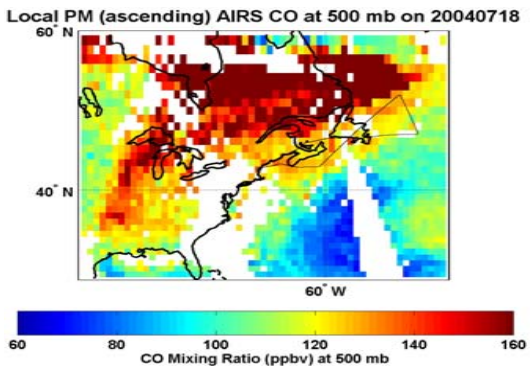


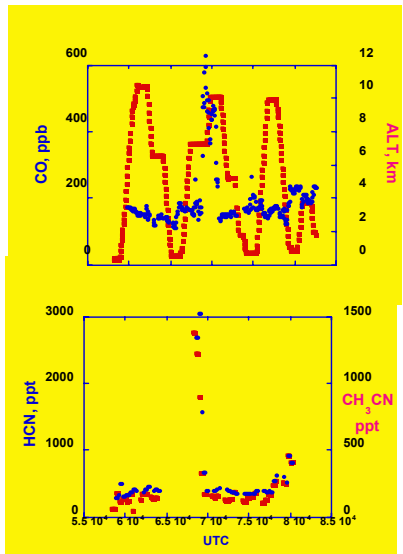
- Data collected on all missions
  - No RGD channel data on Mission 11
  - Acetaldehyde data are only for Trop (O3<100 ppb)
  - Date above 35 K ft are less precise

CH_3CN & HCN



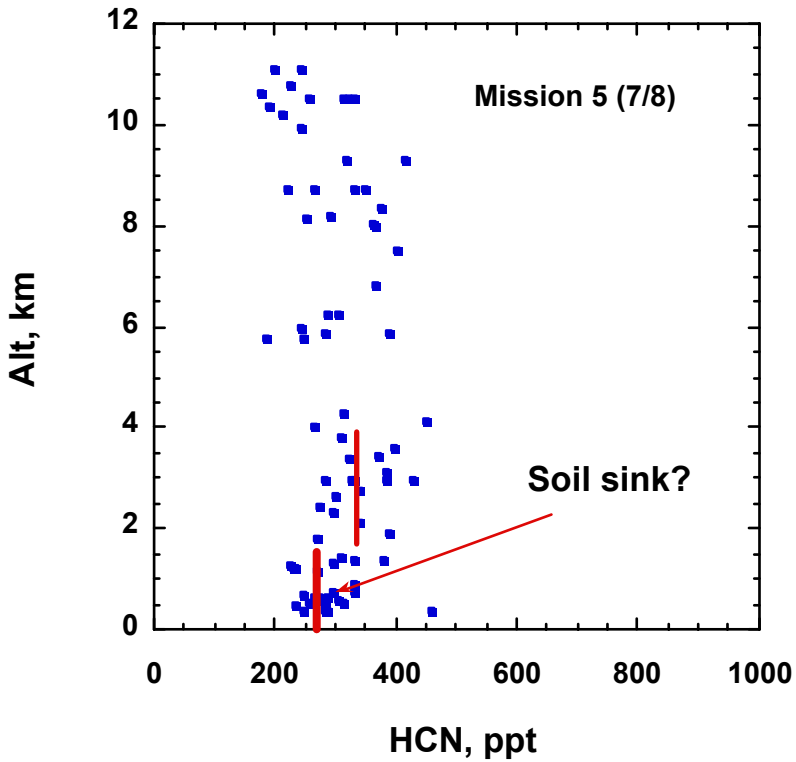


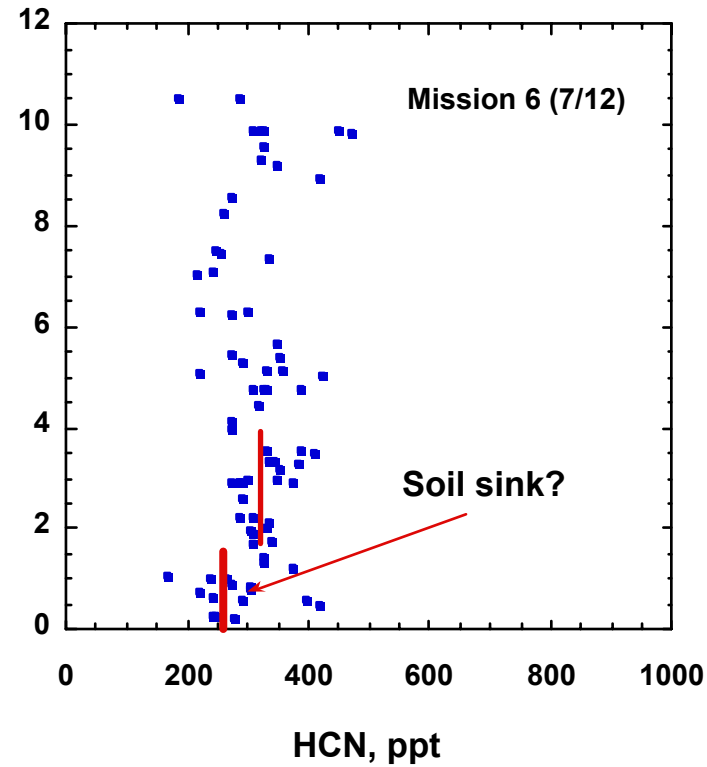




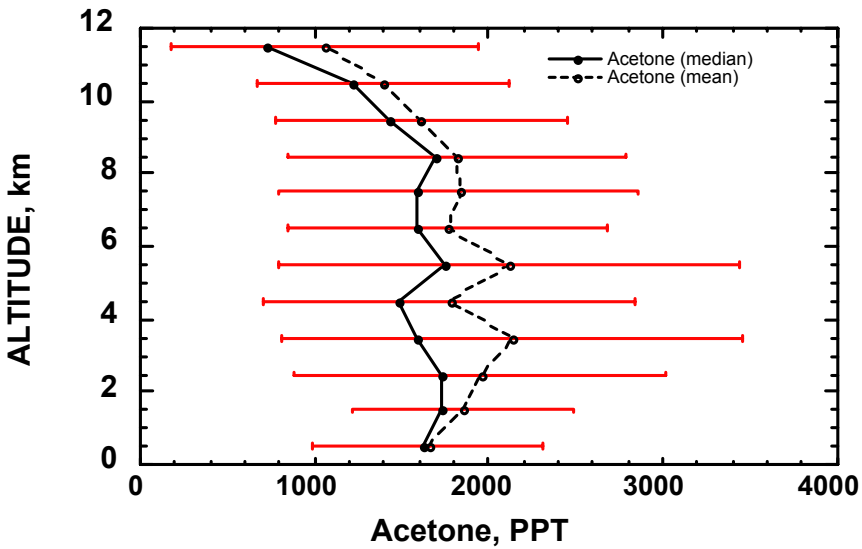
HCN column
$= 5 \times 10^{15}$ molec cm^{-2}

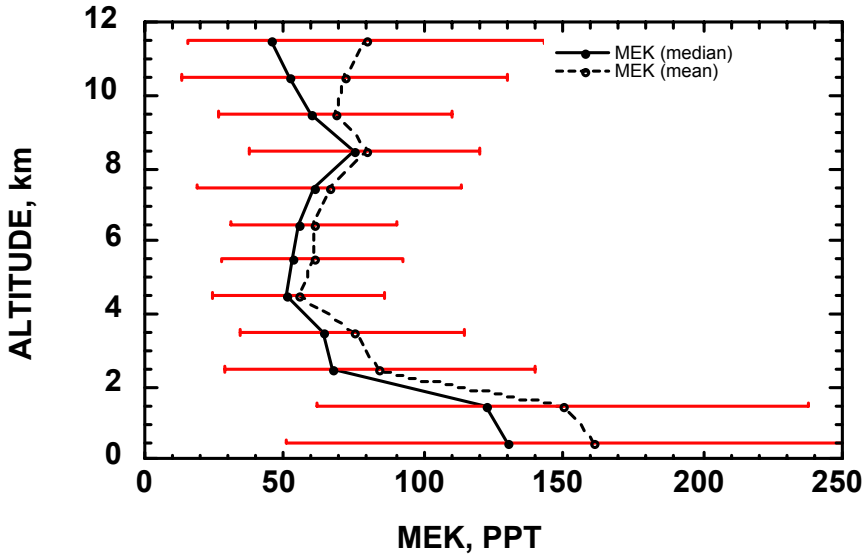
HCN Soil Sink?



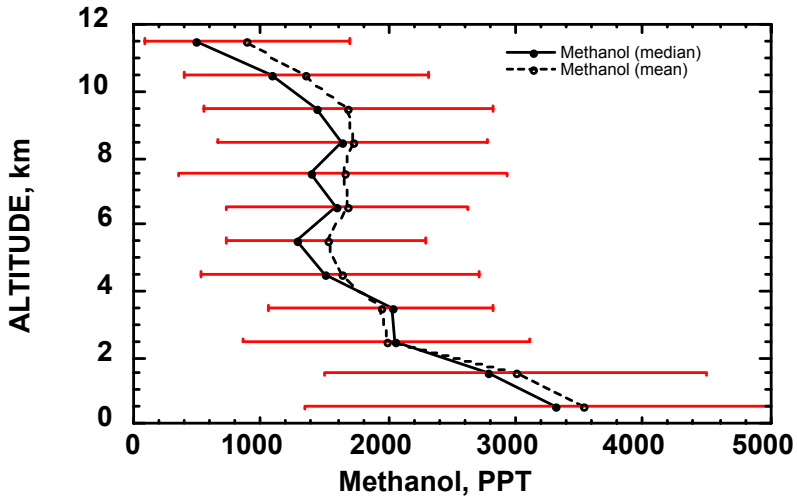


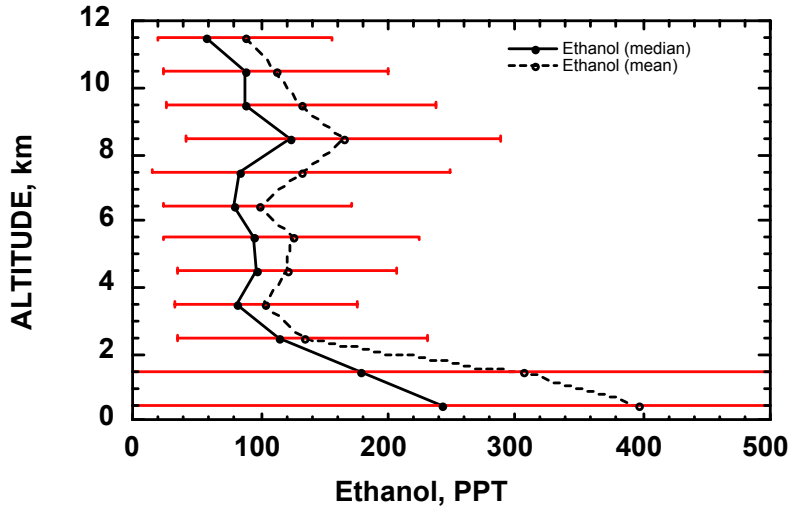
Acetone & MEK


Acetone (median)
Acetone (mean)
ALTITUDE, km
Acetone, PPT
0
2
4
6
8
10
12
0
1000
2000
3000
4000

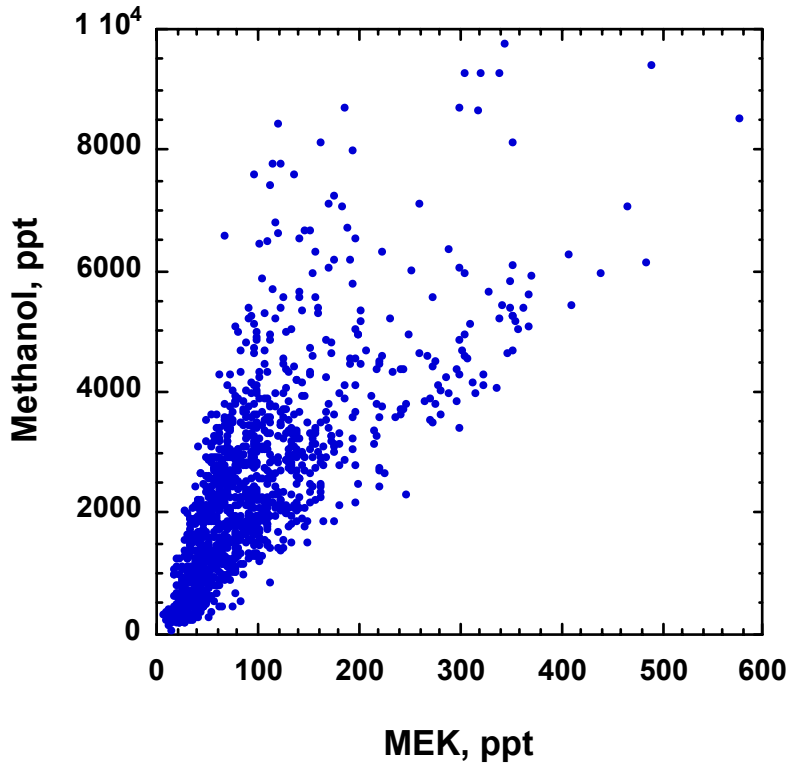

MEK (median)
MEK (mean)
ALTITUDE, km
MEK, PPT
0
2
4
6
8
10
12
0
50
100
150
200
250

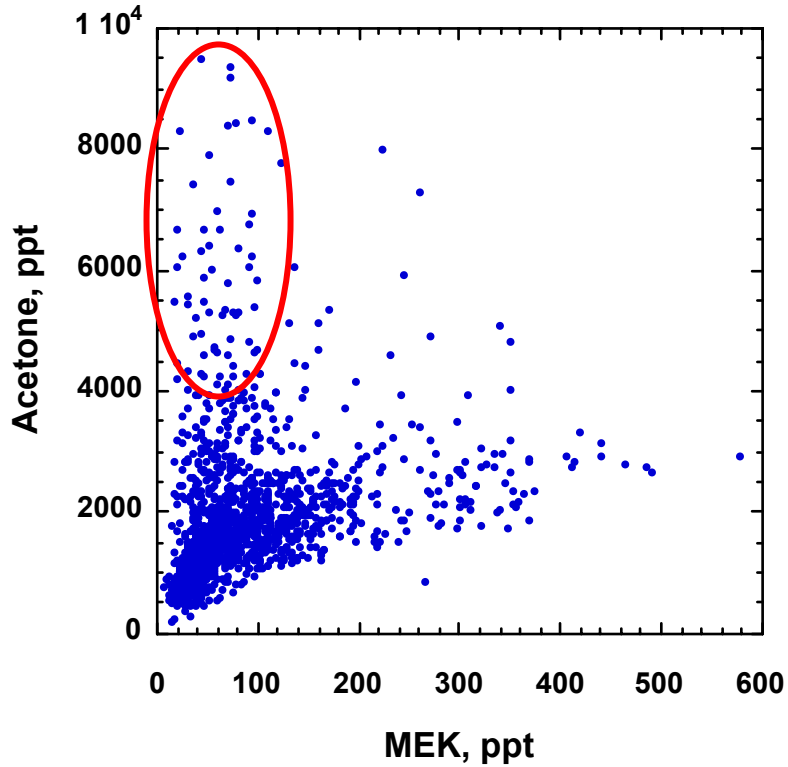
Methanol & Ethanol



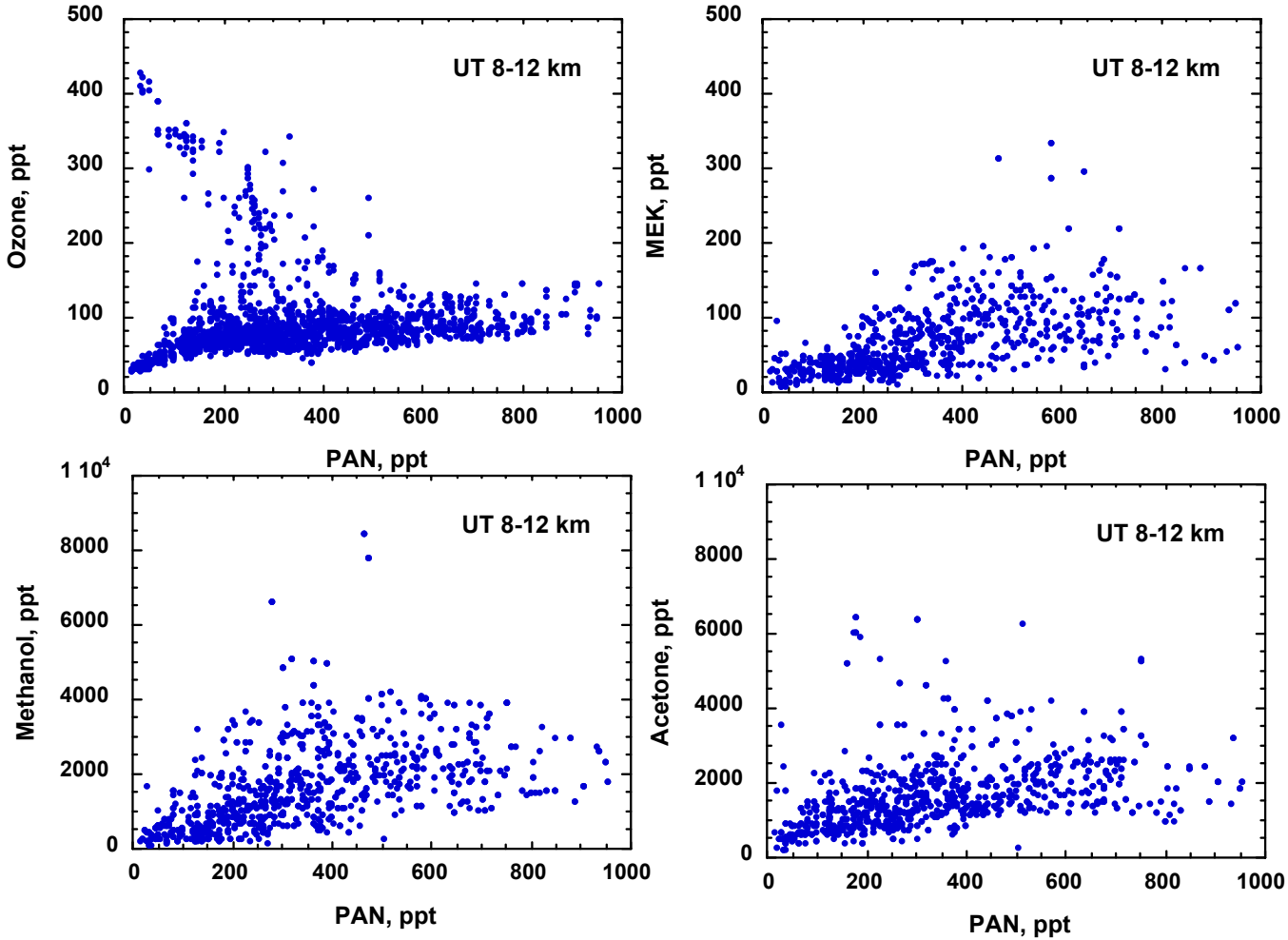


Biogenic Sources?

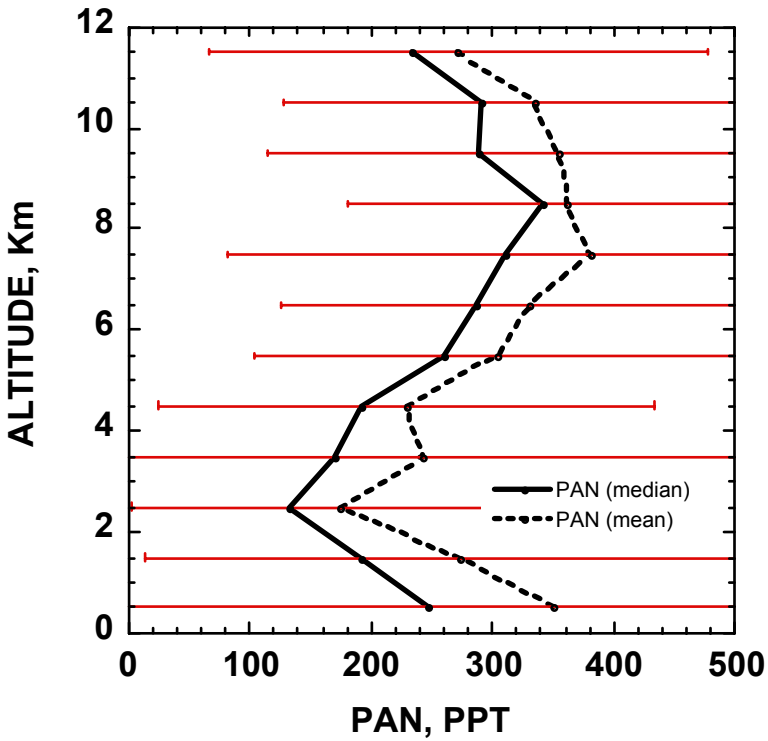


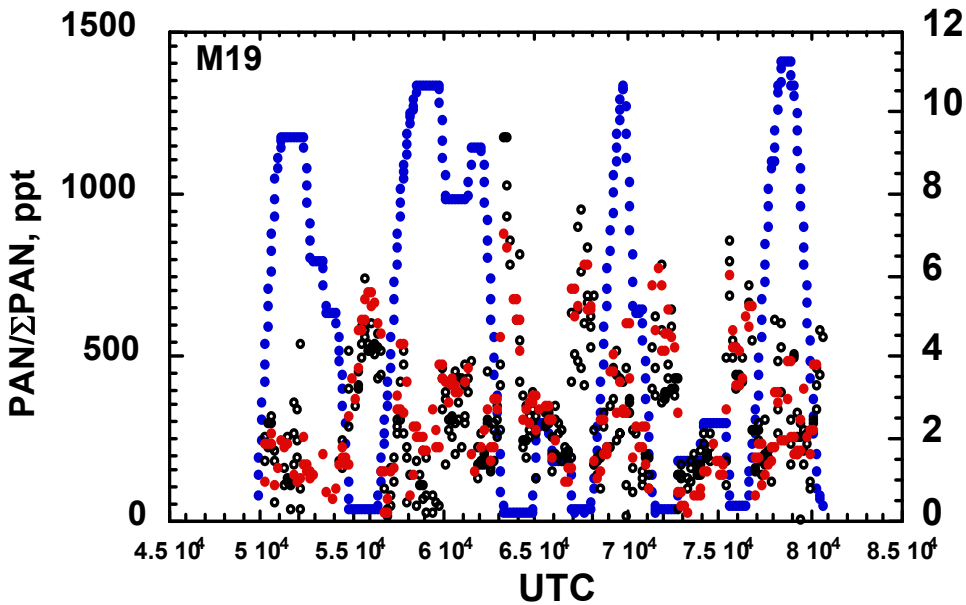


Upper Tropospheric Influences

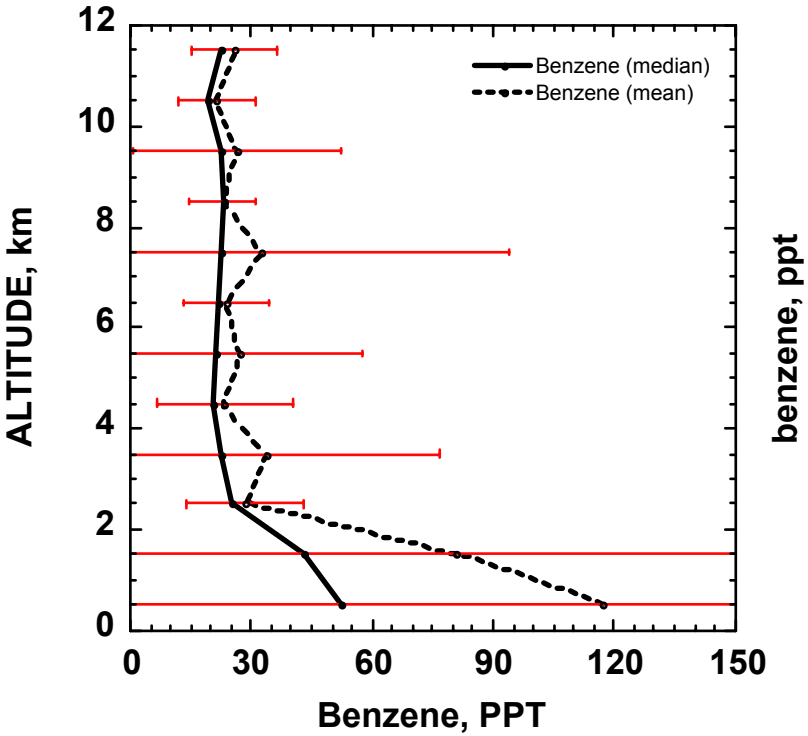


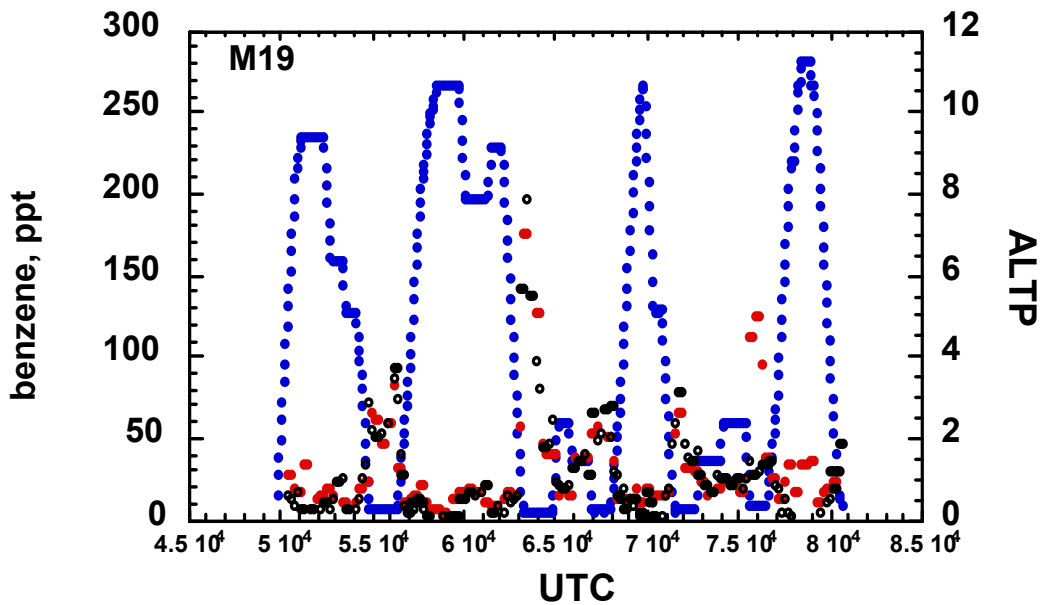
PAN & ΣPAN


ALTITUDE, Km
PAN, PPT
PAN (median)
PAN (mean)
0
2
4
6
8
10
12
0
100
200
300
400
500

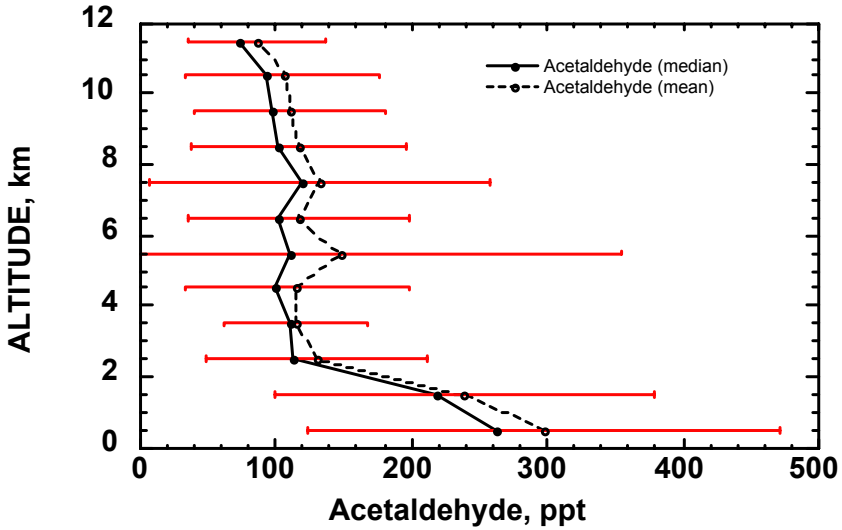

M19
PAN/ΣPAN, ppt
UTC
0
500
1000
1500
0
2
4
6
8
10
12
4.5 10^4
5 10^4
5.5 10^4
6 10^4
6.5 10^4
7 10^4
7.5 10^4
8 10^4
8.5 10^4

Benzene/PID

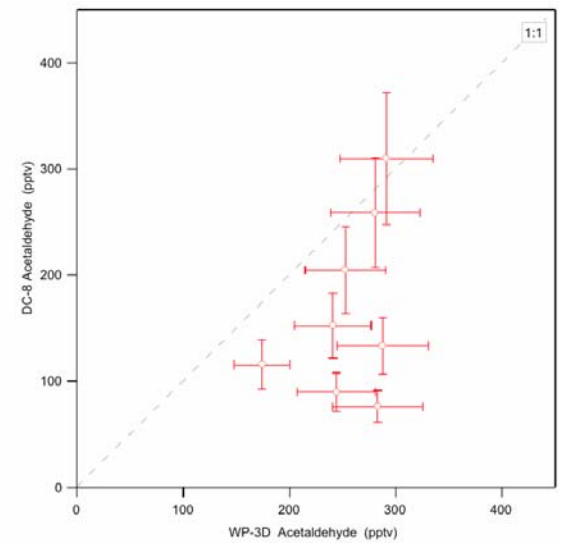

Benzene (median)
Benzene (mean)
ALTITUDE, km
Benzene, PPT
0
2
4
6
8
10
12
0
30
60
90
120
150


M19
benzene, ppt
ALTP
UTC
0
50
100
150
200
250
300
0
2
4
6
8
10
12
4.5 10^4
5 10^4
5.5 10^4
6 10^4
6.5 10^4
7 10^4
7.5 10^4
8 10^4
8.5 10^4

Acetaldehyde



DC-8



P-3

Ongoing Focus

- Biogenic/anthropogenic emission sources of OVOC
- Sources/sinks of HCN/CH_3CN
- Input from models
- Further data and trajectory analysis
- Reconciliation of measurements?
- Manuscripts
  - Overview paper
  - Sources/sinks of OVOC/PAN/HCN
  - Role of OVOC in HO_x/NO_x chemistry