Airbeam correction in a varying-N_2 atmosphere

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AMS user meeting

Background

- Chamber experiment
- Begin with air
- Flush the bag with Ar until Ar is about 10%
- Run an experiment
- After 18 h begin flushing with air

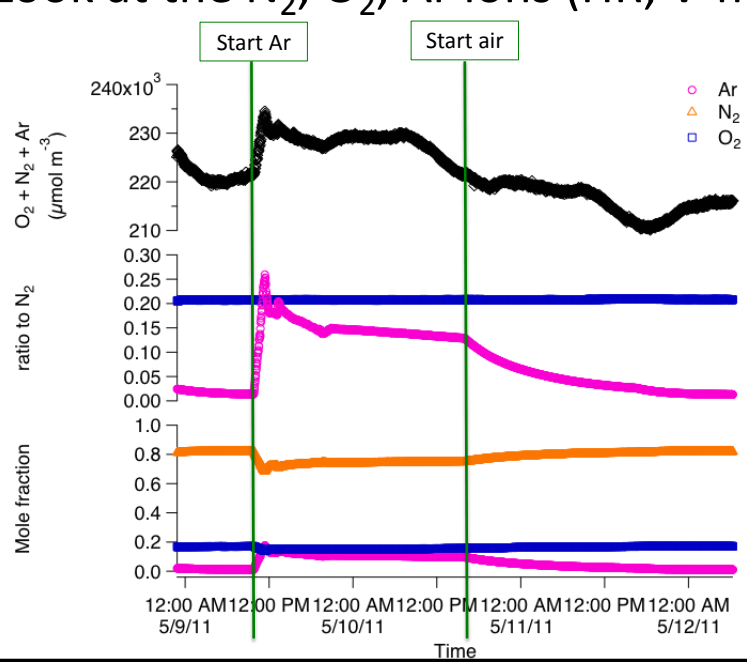
If we had mass balance…

- Assume air in the chamber is ideal

$$\frac{n}{V} = \frac{P}{RT}$$

- 2 sinks of N_2: filament and dilution
- $mol_{Ar}+mol_{N2}+mol_{O2}$ = const. (from ref. period)
  - mol_{O2}/mol_{N2} = 0.268 (ratio for air)
  - $mol_{Ar}/mol_{N2} = r_{ArN2}$ (measured)
- Substitute into mass balance eqn. to eliminate Ar and O_2, and predict the amount of N_2 expected with dilution
  - $N_{2,pred}$ = const./(r_{ArN2}+1.268)
- We could compare this with the observed N_2 to determine the effect of the filament

Look at the N_2, O_2, Ar ions (HR; V-mode)



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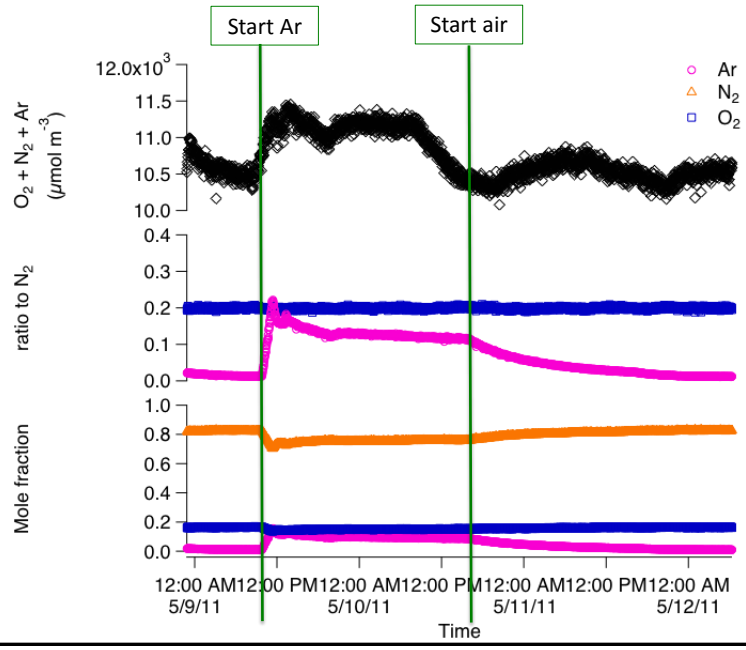
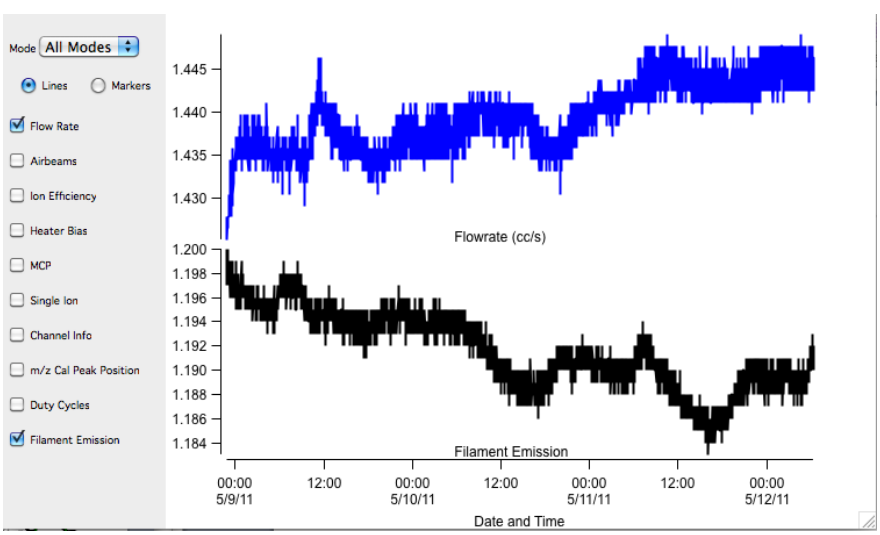
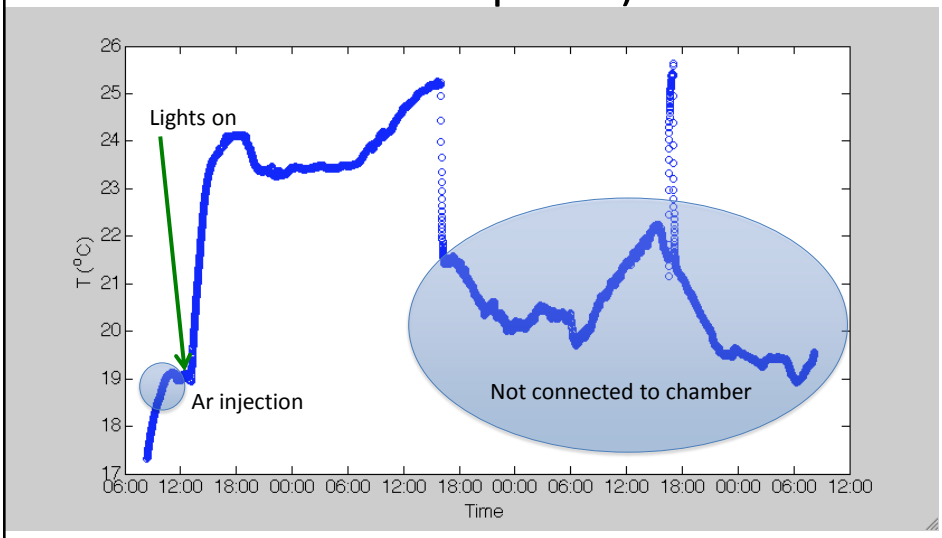


Diagnostics



Chamber temperature (measured by a Vaisala probe)



But, as T increases, n/V decreases.

Comments about the air signals

- O_2/N_2 varies by about 5% throughout the experiment (0.208±0.001 V; 0.199±0.003 W) regardless of how much Ar is added
- Normal air: 78.084% N_2, 20.946% O_2, 0.934% Ar
- Ratio of O_2/N_2 for normal air is 0.268.
- Is there a reason why the AMS is low?
- Another problem: N_2+O_2+Ar is not constant (or always decreasing)
- Maybe these are linked?
- Is there another sink of N_2?