TAbMEP concept

- Tropospheric Airborne Measurement Evaluation Panel
- generate unified data products for model assessment and validation
- unbiased assessment of the measurement uncertainties
- systematic approaches for combining airborne data sets from multiple instruments/techniques and aircraft platforms

We will make you agree

- In several cases, there are significant differences between measurements which can’t be reconciled with our current understanding of the instruments or their calibration procedures.
- These measurements will be unified by increasing systematic uncertainties so that 95% of the measurements will be encompassed within 2-σ total uncertainty limits.
Extent of NASA intercomparisons

All this for only 9 of 24 flights during ARCTAS

Flight 22, 9th July, Thule local

Cold start ➔ warm-up period until 13z
Most stable operation of entire mission
Appear to read a little high of MC

MSE 6
Read high relative to the MC
ARCTAS-1 Collection Efficiency?

Example TAbMEP intercomparison

Recommendation of the panel:
More stringent time overlap in merge and time degradation (Cubison/Chen)
ARCTAS-A

Degrading the time-response of the Univ. Colorado HR-ToF-AMS for intercomparison purposes

Mike Cubison
July 2009

AMS v. MC: discrepancy in time-response

- Sharp sulphate plume during research flight #7
- Use as proxy for differentiating between AMS- and MC- time-response to fluctuations in concentration
Double-exponential fit

Assumptions:
1) Change in sulphate concentration is a step-function; residual in the MC is the time-decay resulting from this change
2) The consistent “baseline” measured by the AMS after the step change is the “zero” for the time-decay
3) A double-exponential fit is appropriate for the MC decay

• Preliminary analysis: only longer time constant (8 min) may be meaningful, shorter one (1 min) may be an artifact of how the fit was set up here
• Much shorter than John Crounse’s HNO3 time constants (15 and 90 mins)

Test decay on artificial step function
Degrade AMS F7 using double-exp

AMS vs. MC for Flights 3->10 incl.