



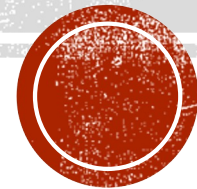
MY NASA AIRBORNE DATA EXPERIENCE AND HOW MIGHT DATA BE MORE HELPFUL FOR OUR RESEARCH?

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WHO AM I?

- An atmospheric chemistry modeler at NASA Goddard who uses primarily 3-D chemistry climate models
- About 15+ years of experience with NASA/NOAA/NSF airborne, as well as ground-based, measurements for my scientific research
- **Datasets**
 - i) **Airborne:** PEM-Tropics, INTEX (A, B), TC⁴, SEAC⁴RS, ARCTAS, ATom, KORUS-AQ, DC3, DISCOVER-AQ, ...
 - ii) **Ground-based datasets:** NASA AGAGE, NOAA GML, NDACC
- How do I access the data?
 - **The Langley mission data archive**
 - **ASDC DAC**
 - **EarthData**

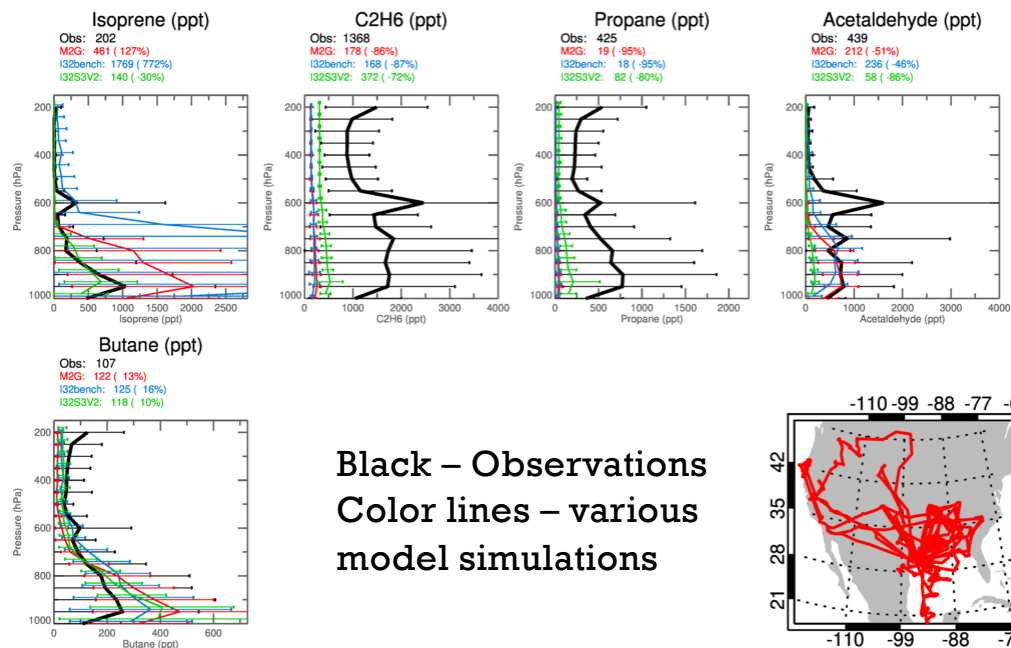


HOW DO I USE THESE DATA?

Evaluation of model performance, e.g. transport, chemistry, emission biases

→ Use multiple trace gases from one mission

SEAC4RS: 2013 Aug, Sep

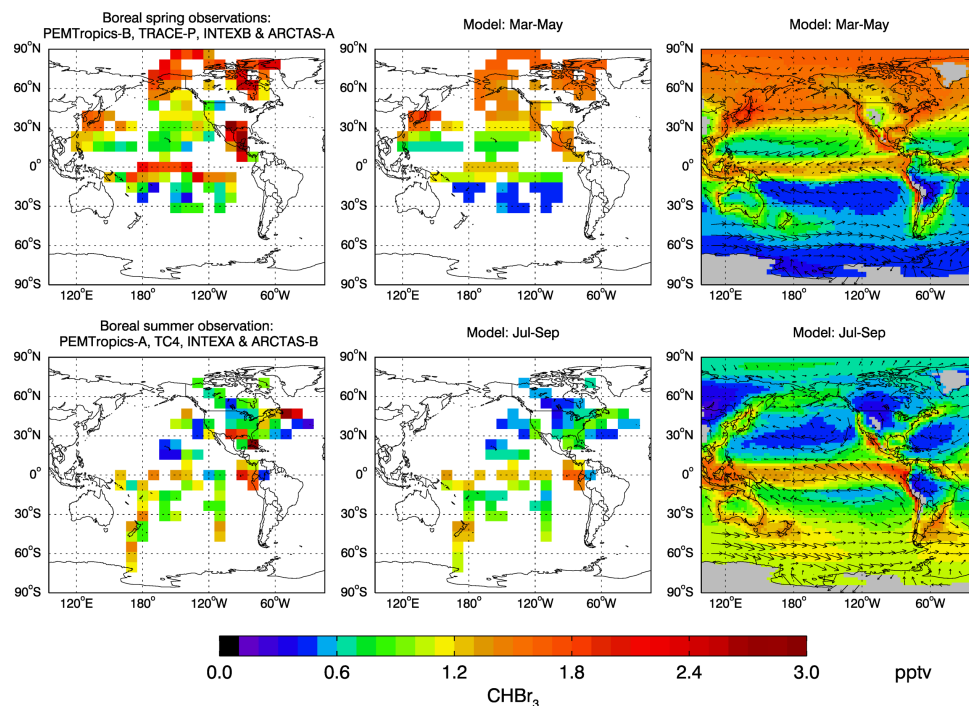


HOW DO I USE THESE DATA?

Top-down estimate of emissions & scientific analysis (e.g. trend analysis for chemical composition)

→ Use of a single trace gas from multiple missions

Liang et al. (2010) – Oceanic emission estimates of bromoform using 8 NASA aircraft missions data





WHAT WORKS WELL?

- **Data format**

- Uniform ICARTT file format that is compatible with the reader program I got about 20 years ago!
- Standardized naming conventions: variable name, unit, etc.
- Merged files with uniform spatial and temporal resolutions for all variables collected on each flight
 - 1-min merged file works extremely well for modelers!! (contains multiple variables and smaller number of data points for model-observation intercomparison)

- **Data access**

- Legacy Langley data archive works really well for science team members
- The previous data slicing tool TAD developed by ASDC was great – user friendly and had very useful capabilities





WHAT PAIN POINTS DO YOU FIND WITH DATA ACCESS OR DATA USE?

- Airborne data not located in the same place (DAC, archive, etc.)
- Data from old missions were very difficult and time consuming to use





WHAT DO YOU WISH YOU COULD DO BUT CAN'T? SUGGESTIONS FOR IMPROVEMENT?

- **More airborne data sets that are accessible via Earthdata; One gateway entrance for all datasets (user doesn't have to know where data locates physically)**

Currently there are only a small subset of these compared to what available from the old Langley archive or ASDC SOOT)

- **A way to find all available airborne data of one or more targeted compounds through Earthdata**
For example, by searching "Airborne CH₂O" it would give all CH₂O datasets from past missions

- **Old airborne mission data in (a) merged format (with lat/lon/time info) and (b) available from Earthdata search**

We are moving into the era of doing more analysis of chemical composition changes, a.k.a. trends, due to climate change and human impact; hence aged datasets are of great value as well!

- **An overview landing page that list all available airborne missions**

Probably halfway there, but it can use some improvement for a more comprehensive list and make people be aware of the additional missions that can be used for their scientific research.





HAVE YOU TRIED TO USE DATA IN THE CLOUD?

No.

Getting/Using airborne data in the cloud is likely of very low priority to me, and possibly many mid-career and senior scientists for several reasons:

- Small data size to handle locally
- Long learning curve to use cloud (a stretchy request for many mid-career and senior scientists)
- Until model output is also in the cloud, the likelihood of using cloud for airborne data analysis is low

