Suborbital Science Data for Atmospheric Composition

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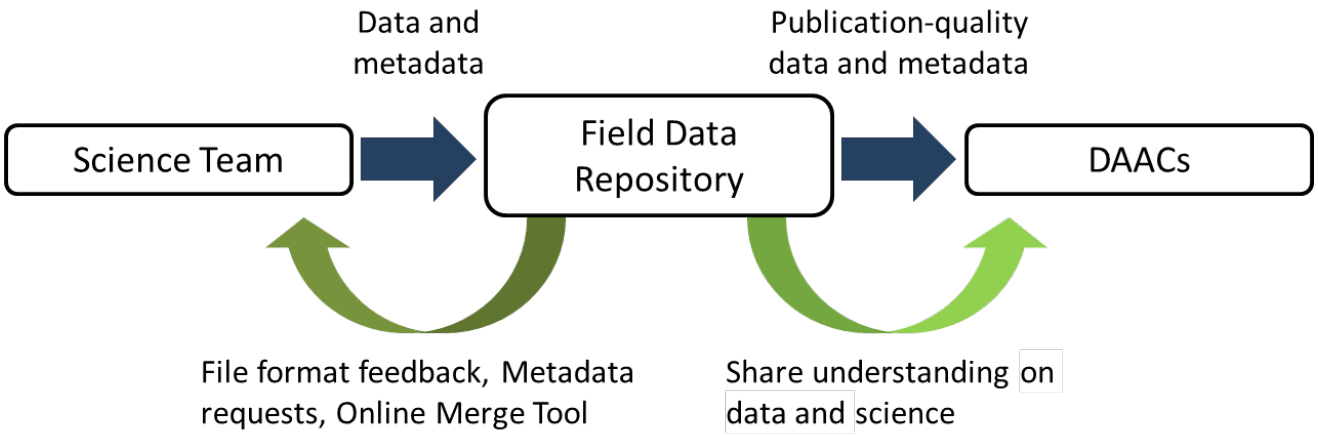

Experience

- Participated in 15+ NASA airborne field study deployments
- Interpretive analysis of trace gas and aerosol in-situ measurements
- Management of field data repository
- Data product and tool development
- Extensive experience in measurement comparison analysis and uncertainty assessment (member of WMO ET-ACMQ)
- Metadata standard development (member of WMO ET-metadata)
- In-situ trace gas and aerosol measurements

Working with DAACs (ASDC, ORNL, and GHRC)

Open and effective communication to enable synergistic and creative solutions

Joint presentations at STMs

Full access to field repository

Systematic and seamless process with flexibility in handling new data products and data revisions

Transition distribution to ASDC

Sharing expertise to ensure data product quality, data file integrity checking capability, online merge tool, netCDF conversion

DAAC effort tailored to support research activities, e.g., data DOIs, user guide, announcements, outreach

Future needs to support FAIR

leveraging partner efforts, e.g., WMO WIGOS, GEOMS, and ESIP recommendations

Measurement relevant metadata

- Sampling and sample treatment
- Measurement characteristics
- Data reporting
- Units (SI units and widely used units)

Data quality metadata

- Calibration: standards and procedures
- Uncertainty vocabulary and propagation method
- Measurement comparison results

Measurements of Aerosols, Clouds and their Interaction for Earth Systems Models(MACIE)

- Every agency is facing similar challenges in achieving, processing and applying their copious field observation collects to model development.
- As part of the OSTP (Office of Science and Technology Policy) Fast Track Action Committee on Earth System Predictability (FTAC) findings of the aerosol-cloud interactions stated:
  - ✓ "Existing observations are underutilized for providing constraints on both physical processes and phenomenology in ESMs."
  - ✓ "The quantities that are directly observed by in-situ and satellite observations do not always provide useful constraints on fundamental aerosol and cloud processes that are important to predictability"
  - ✓ "Programmatic roadblocks include the lack of a mechanism for the consolidation, synthesis, and mining of the diverse observations collected by different agencies."

Measurements of Aerosols, Clouds and their Interaction for Earth Systems Models(MACIE)

- The MACIE interagency interest group was formed with federal laboratories and their university partners to harmonize collection and data best practices as to expedite the application of airborne observations to ESMs.
- MACIE is distinct from other interagency efforts (WMO, ICAMS), in that it is populated with working scientists that are trying to align their efforts organically. Exposure of practices between practitioners prevents local decisions that "…seemed like a good idea at the time."
- And people are pitching in. We utilize good ideas where we can find them, while balancing what WMO is up to on CF compliance.
- Focus in the first year has been on format, archive, and distribution practices. NASA LaRC, NASA GSFC, and NRL working toward data harmonization through the creation of templates and advancing next gen ASCII and netCDF convections.

ATMOSPHERE

National Aeronautics and Space Administration

NASA

EARTH SYSTEM OBSERVATORY

Suborbital Data for AOS Algorithm Development

- A cloud based *Analytic Collaborative Environment* provides an effective device for implementing NASA's Open-source Science vision:
  - Early engagement of science & apps community
  - Fully leverages modeling and observations capabilities of Atmosphere Observing System (AOS)
  - Opportunities to explore synergy with other Dos (Designated Observables)
  - Provides path for continuous and smooth integration with the AOS *Science Data Systems*
- MACIE compliant files for key suborbital campaigns of relevance to AOS will be made available to the science team on AWS as early as Phase A.

https://aos.gsfc.nasa.gov

ATMOSPHERE

AOS Open-source Science Environment

EARTH SYSTEM OBSERVATORY