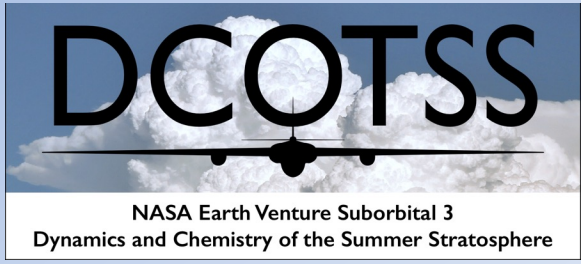
2021 Open Data Workshop
(December 7th)



Dynamics and Chemistry of the Summer Stratosphere

DCOTSS

Mission Overview, Data, and Archival

DCOTSS Mission

DCOTSS

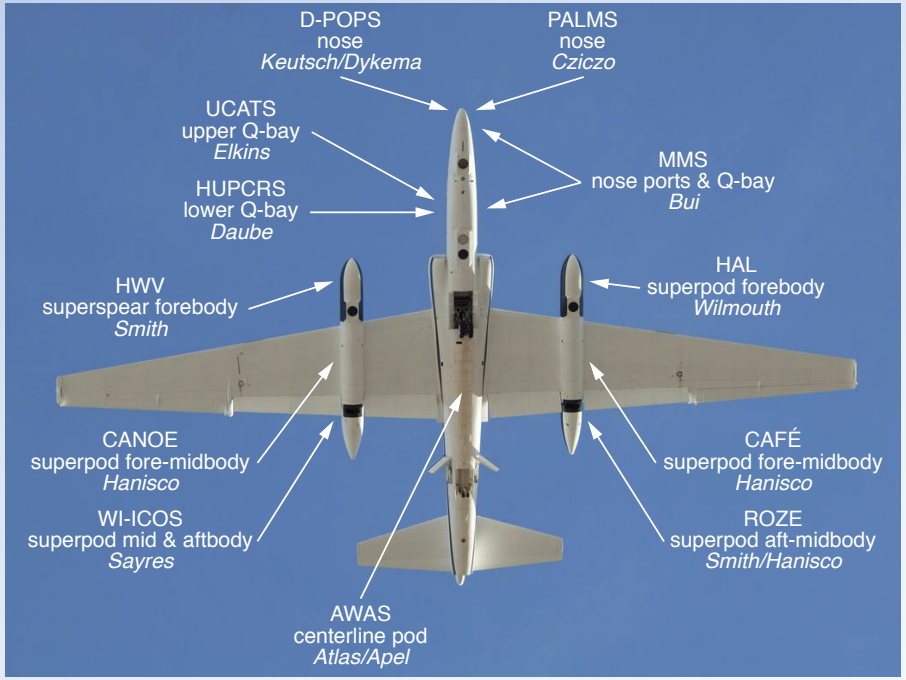
NASA Earth Venture Suborbital 3
Dynamics and Chemistry of the Summer Stratosphere

- The DCOTSS mission investigates the role of
  1. Tropopause-overshooting convection
  2. North American Monsoon Anticyclone (NAMA)

  in controlling summertime lower stratosphere composition
- Mission platform is the NASA ER-2
- Two multi-week deployments:

  July-August 2021 (11 research flights completed)

  May-June 2022 (12-18 flights anticipated)



Data Obtained/Produced

DCOTSS

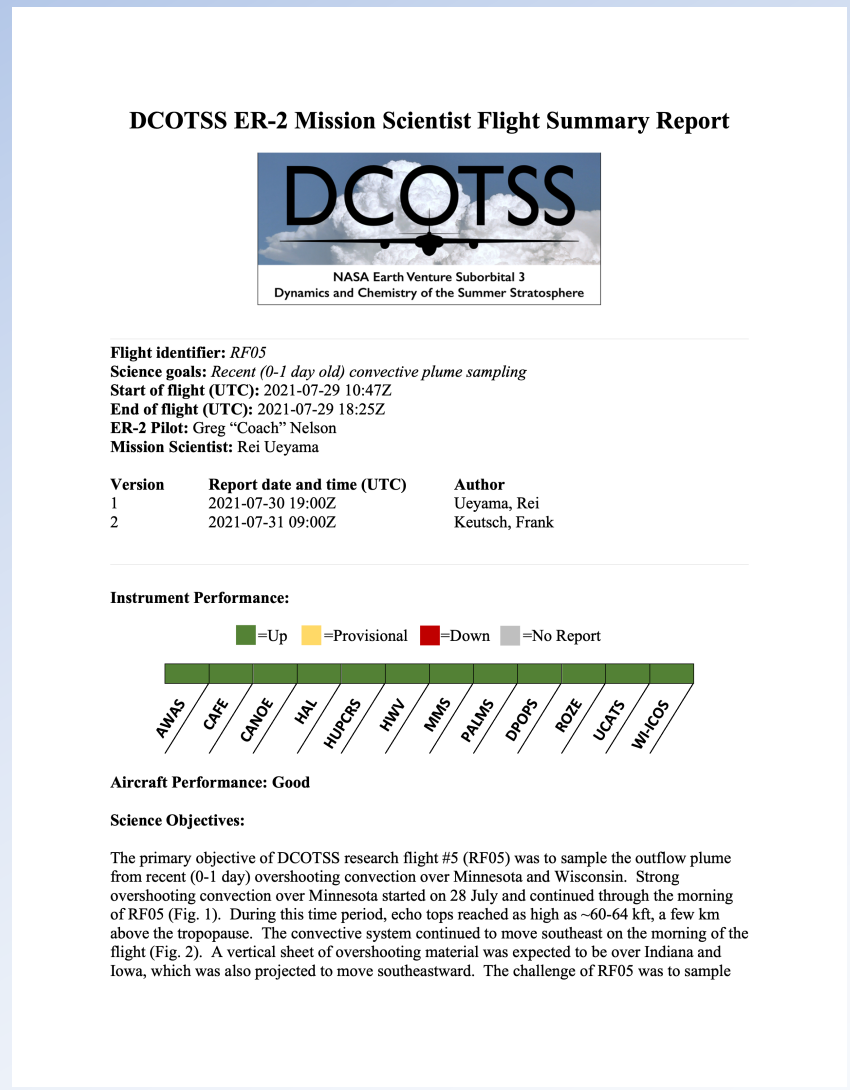
NASA Earth Venture Suborbital 3
Dynamics and Chemistry of the Summer Stratosphere

- ER-2 instrument data (see table)
- Balloon observations of ozone and water vapor
- ERA5 reanalysis & back trajectories along flight track
- Radar and satellite observations of tropopause-overshooting convection
- Chemistry model output along flight track
- Convection-allowing model (CAM) output for select flights

Instrument	Measurements
Advanced Whole Air Sampler (AWAS)	>20 contituents with varying lifetimes
Compact Airborne Formaldehyde Experiment (CAFE)	Formaldehyde
Compact Airborne Nitrogen diOxide Experiment (CANOE)	Nitrogen Dioxide
Harvard Halogens (HAL)	Chlorine Monoxide, Chlorine Nitrate
Rapid OZone Experiment (ROZE)	Ozone
Harvard University Picarro Cavity Ringdown Spectrometer (HUPCRS)	Carbon Monoxide, Carbon Dioxide, Methane
Harvard Water Vapor (HWV)	Water Vapor
Meteorological Measurement Systems (MMS)	Pressure, Temperature, Horizontal and Vertical Wind
Particle Analysis by Laser Mass Spectrometry (PALMS)	Aerosol Composition
DCOTSS Printed Optical Particle Spectrometer (DPOPS)	Aerosol Size Distribution
UAS Chromatograph for Atmospheric Trace Species (UCATS)	Ozone, Water Vapor, Nitrous Oxide, Sulfur Hexafloride, CFC-11/12/113, Halon 1211/2402
Water Isotopologues – Integrated Cavity Output Spectrometer (WI–ICOS)	Water Vapor, Dueterated Water, Total Water (vapor + ice)

Data Cont. - Mission Reports

- Short mission scientist reports, summarizing the planning and completion of each flight will be archived
- Slides from in-field forecasting and flight planning discussions also archived



DCOTSS ER-2 Mission Scientist Flight Summary Report

DCOTSS
NASA Earth Venture Suborbital 3
Dynamics and Chemistry of the Summer Stratosphere

Flight identifier: *RF05*
Science goals: *Recent (0-1 day old) convective plume sampling*
Start of flight (UTC): 2021-07-29 10:47Z
End of flight (UTC): 2021-07-29 18:25Z
ER-2 Pilot: Greg "Coach" Nelson
Mission Scientist: Rei Ueyama

Version	Report date and time (UTC)	Author
1	2021-07-30 19:00Z	Ueyama, Rei
2	2021-07-31 09:00Z	Keutsch, Frank

Instrument Performance:

=Up =Provisional =Down =No Report

AWAS CAFE CANOE HAL HUPCRS HWV MMS PALMS DPOPS ROZE UCATS WI-ICOS

Aircraft Performance: Good

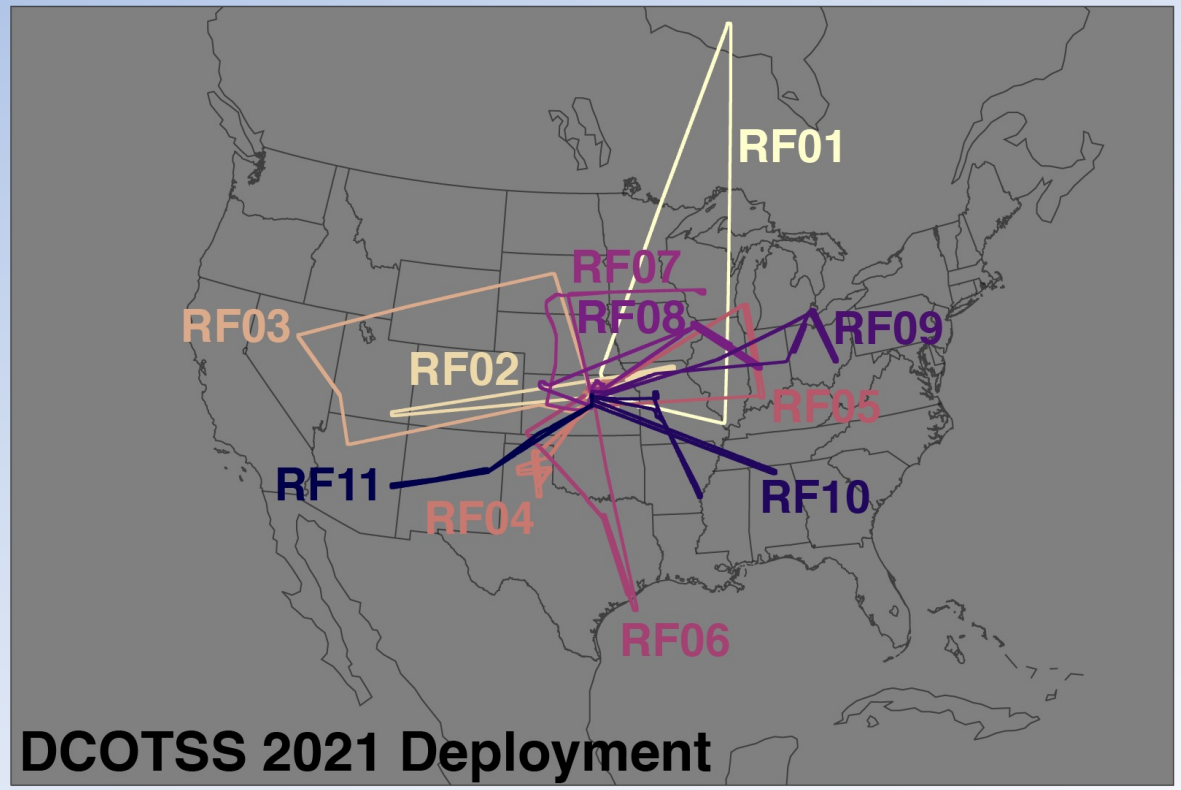
Science Objectives:

The primary objective of DCOTSS research flight #5 (RF05) was to sample the outflow plume from recent (0-1 day) overshooting convection over Minnesota and Wisconsin. Strong overshooting convection over Minnesota started on 28 July and continued through the morning of RF05 (Fig. 1). During this time period, echo tops reached as high as ~60-64 kft, a few km above the tropopause. The convective system continued to move southeast on the morning of the flight (Fig. 2). A vertical sheet of overshooting material was expected to be over Indiana and Iowa, which was also projected to move southeastward. The challenge of RF05 was to sample

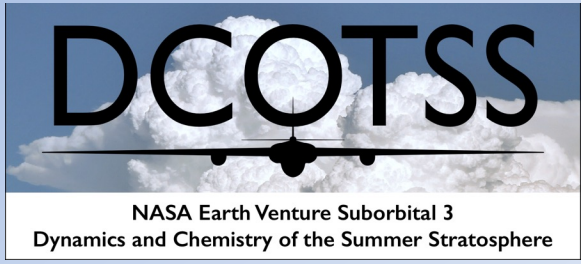
2021 Deployment Summary

DCOTSS
NASA Earth Venture Suborbital 3
Dynamics and Chemistry of the Summer Stratosphere

- DCOTSS is based out of Salina, Kansas
- Preliminary estimates from 2021 missions:
  - ➢7 flights sampled outflow from recent convection (within ~1 day)
  - ➢6 flights sampled outflow from aged convection (~2-3 days)
  - ➢2 flights sampled outflow from recent pyroconvection
  - ➢All flights sampling stratospheric background, with many characterizing the NAMA circulation



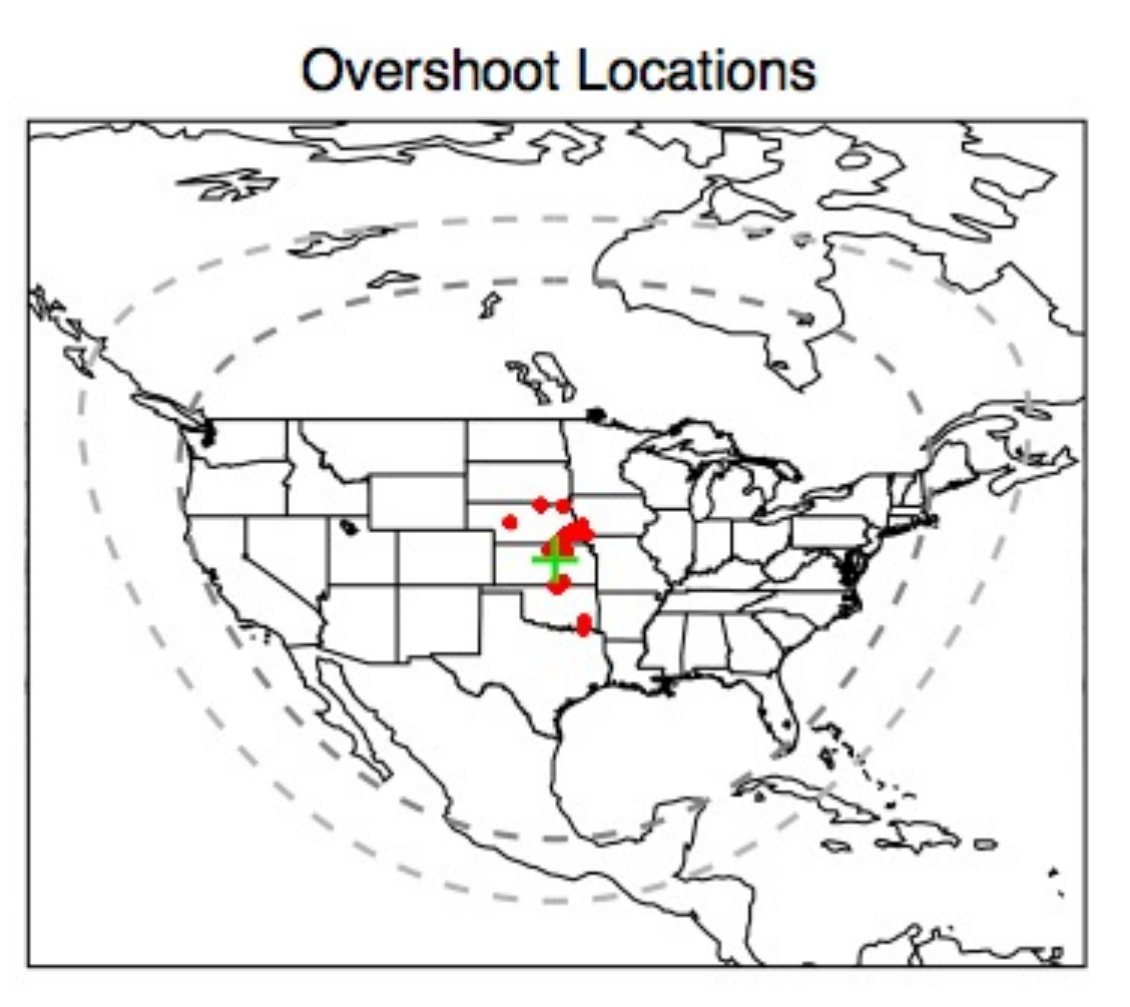
DCOTSS Flight Strategy

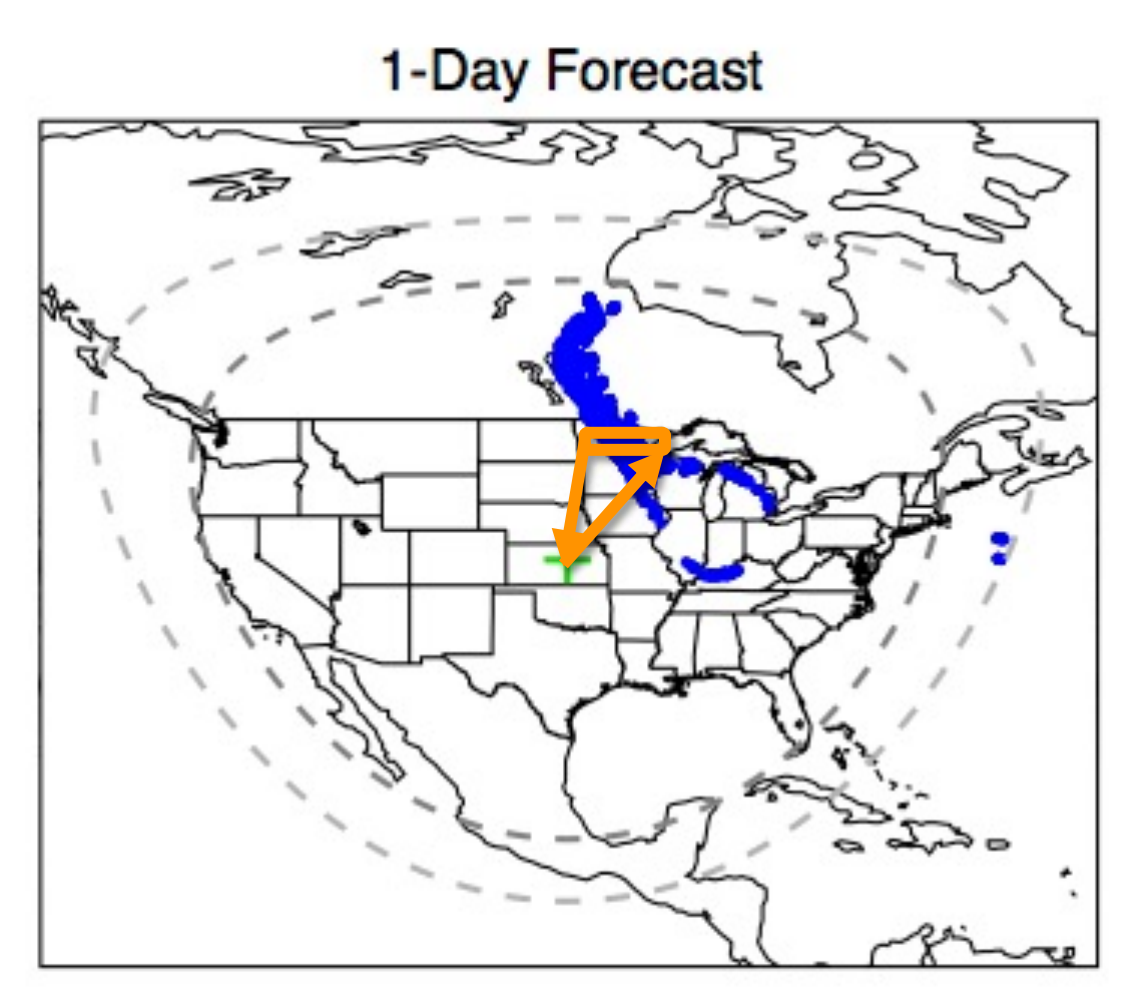


- Targeting overshoot air was a 3-step process:
  1. Near-real-time radar + satellite overshoot identification
  2. Trajectory forecasts of overshoot air positions, driven by NCEP GFS winds
  3. Flight planning to sample overshoot air perpendicular to prevailing flow, with level legs at altitudes near the tropopause up to the highest altitude expected

DCOTSS Flight Strategy

DCOTSS
NASA Earth Venture Suborbital 3
Dynamics and Chemistry of the Summer Stratosphere





NASA ASDC Distributed Active Archive Center (DAAC)

Earth Venture Sub-Orbital Support Team

Kasey Phillips; Kasey.E.Phillips@nasa.gov

DCOTSS Open Data Workshop

Distributed Active Archive Center (DAAC):

• NASA's Earth Observing System Data and Information System (EOSDIS)

ASDC Role:

•Ingest, archive, distribution, metrics, outreach and user support

•Experienced in caring for data from ingest to preservation

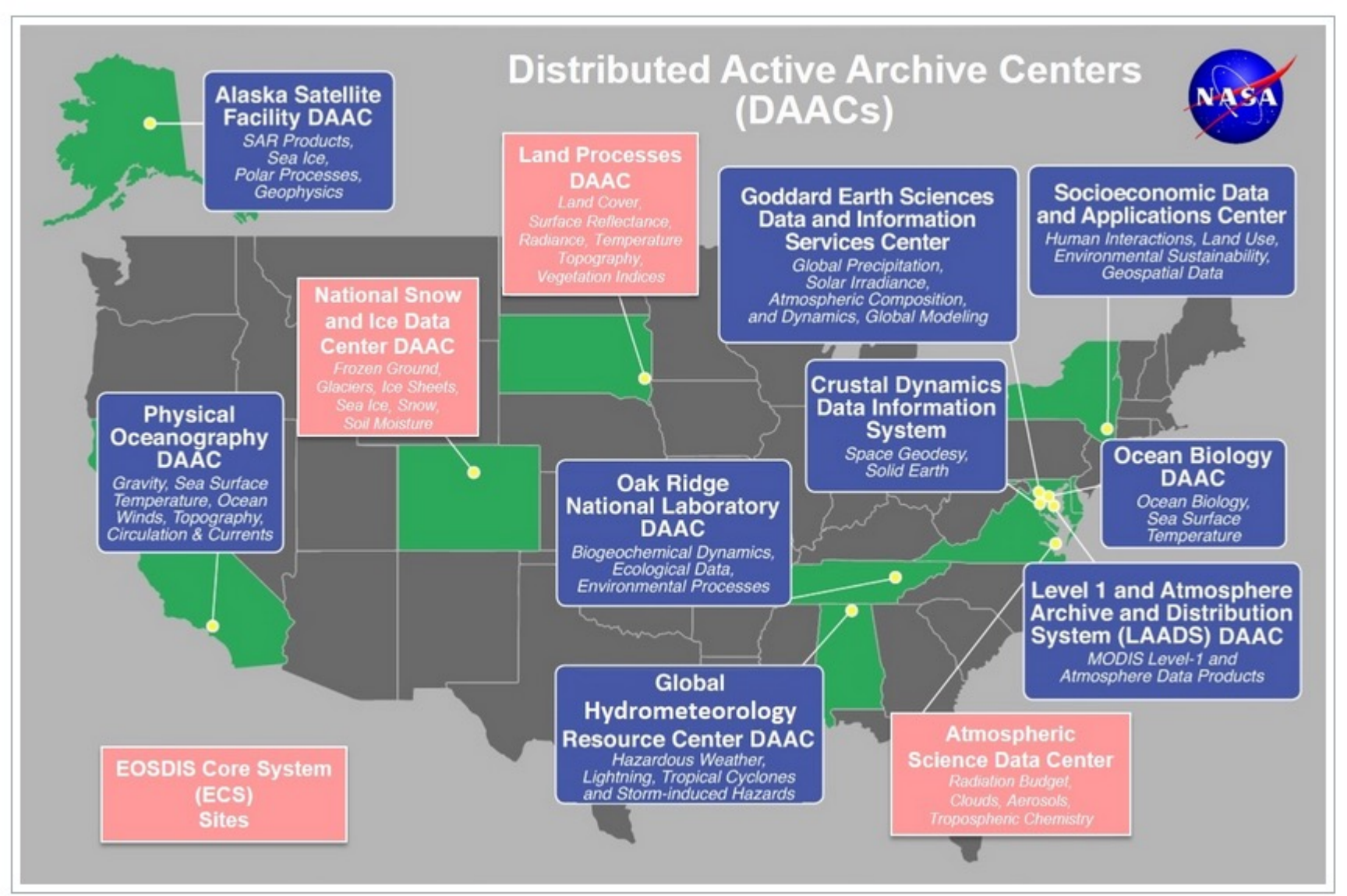
•NASA's EOSDIS DAAC for satellite missions and sub-orbital campaigns for:

•Aerosols

•Clouds

•Radiation Budget

•Tropospheric Composition



ASDC's Role in DCOTSS

- Collaborative effort between DCOTSS ST and ASDC
  - We are a part of your team
- Long term preservation and distribution of data products. “Caretakers” of the data into the future
  - Active stewardship
  - High public visibility to broad user communities
  - User support- Liaison between data end user and the science team (Earthdata Forum)
- DCOTSS data holdings
  - Archive the latest versions of publication quality data, including observational, derived, and value-added data products
  - Contextual information to facilitate data use by research community at large
  - Documentation to maintain reprocessing capability and openness
- Assign DOIs to data products tailored to support manuscript and presentation development. DOI providers for the DCOTSS data (needed for your publications)

Data Organization and DOIs

- ASDC uses collections/data groupings to organize the DCOTSS data files
  - Will work with the data manager to determine the best organization for the groupings (i.e., platform, deployment, etc.)
- DOIs are assigned at the project-level and collection-level

When will a DOI be registered?

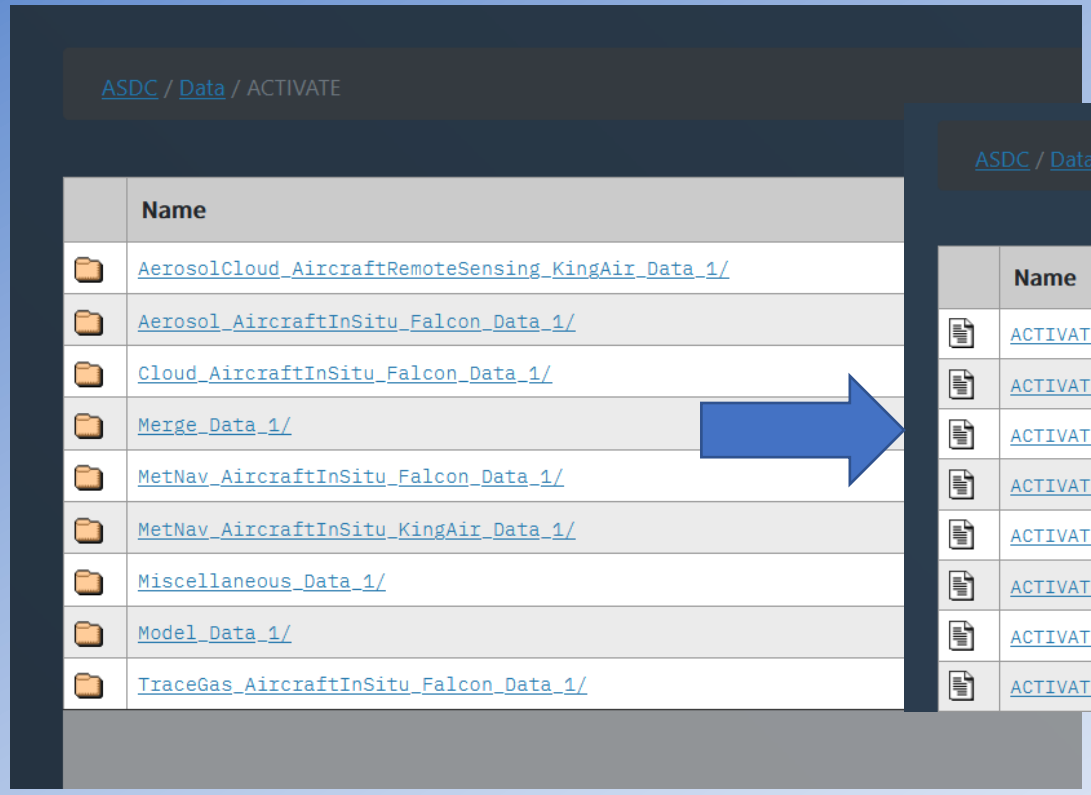
When will I get a DOI for my data product?

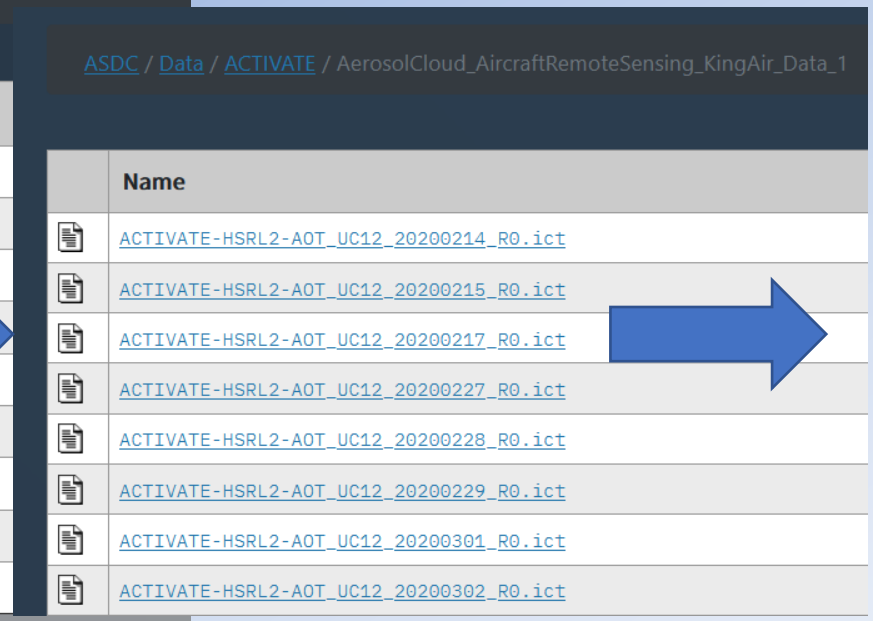
- DOI reservation occurs during data ingest preparation (collaboration between science team and ASDC)
- DOI registration occurs at time of data distribution (landing pages are available and products are public)

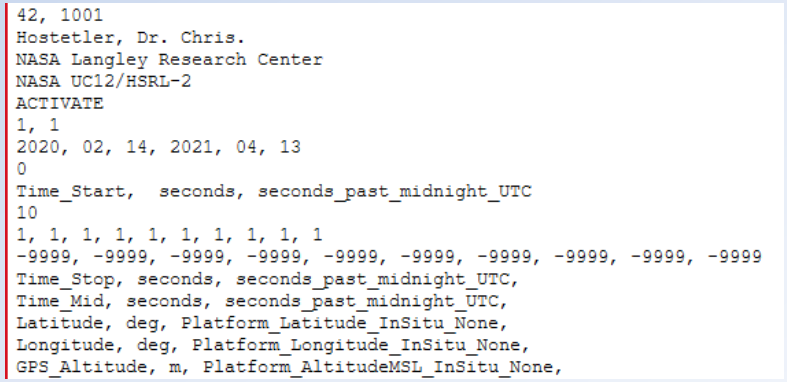
Important notes to consider:

- Contact the ASDC if DOI needs do not coincide with a specific timeline/event
- If you need help or have questions about data ingest/archival, please reach out to us.

Data Distribution Options: ASDC Website/DDD







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Hostetler, Dr. Chris.
NASA Langley Research Center
NASA UC12/HSRL-2
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Direct Data Download (DDD) provides the ability to access and download all ASDC publicly available data collections via https

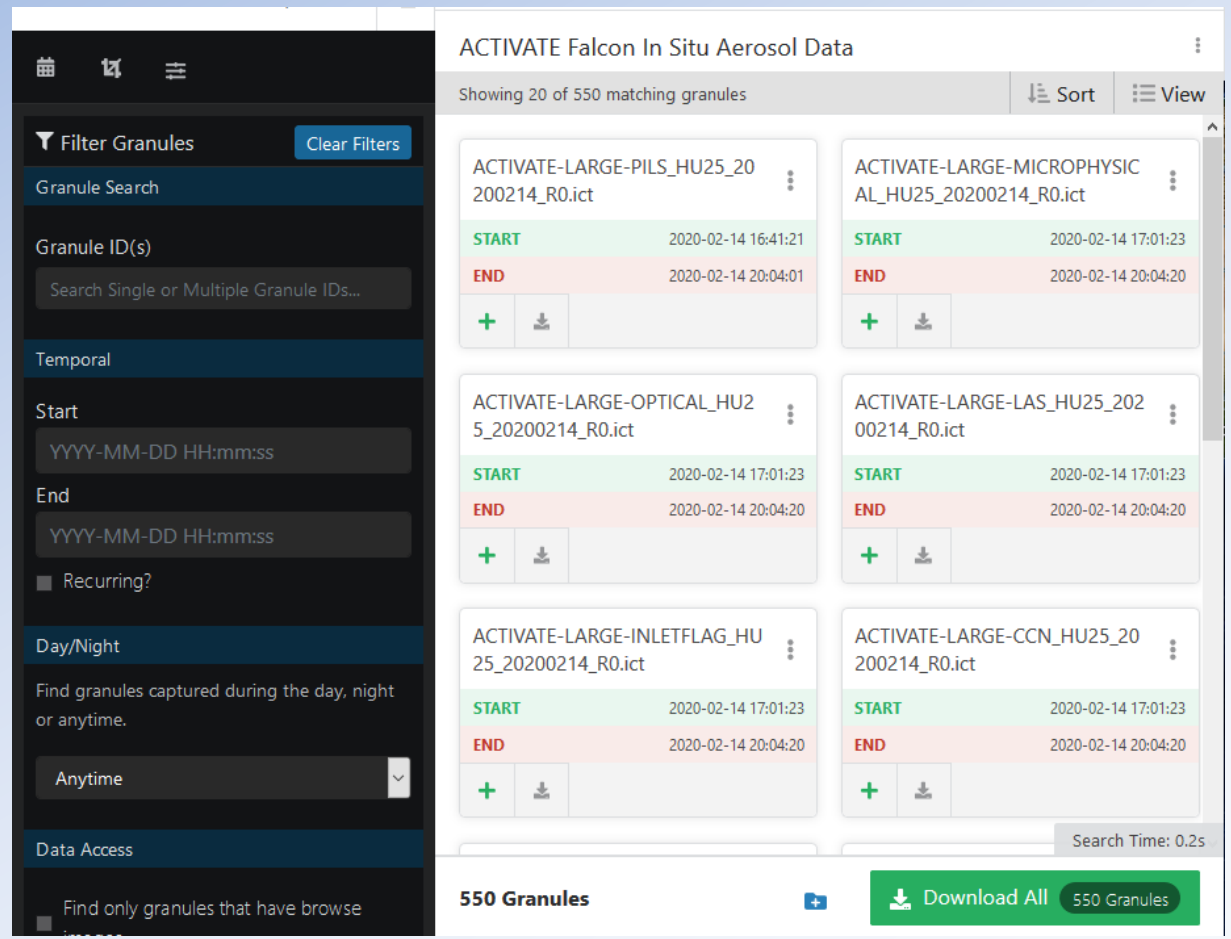
Data Distribution Options: Earthdata Search

DATA DISTRIBUTION

File Format(s): ICARTT

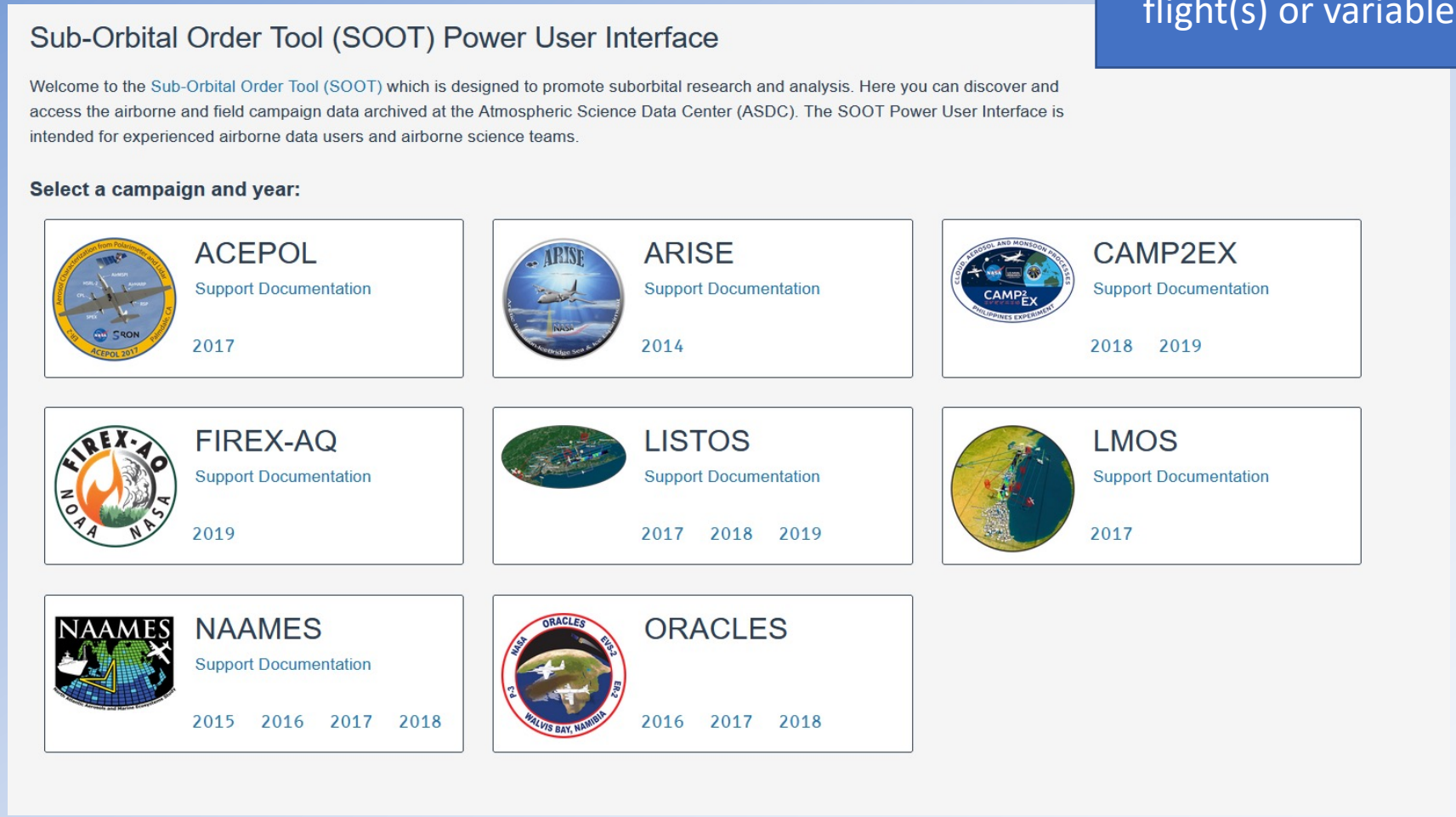
Get Dataset | Additional Options

Explore and retrieve information via collections



Data Distribution Options: Sub-Orbital Order Tool (SOOT) – future for DCOTSS

Support data access by flight: all variables from flight(s) or variables of interest for all flights



Contact Us/ Resources

ASDC DCOTSS Landing Page
Sub-Orbital Order Tool (SOOT)

Question? https://forum.earthdata.nasa.gov/

Kasey Phillips: Kasey.e.Phillips@nasa.gov
Megan Buzanowicz: megan.e.buzanowicz@nasa.gov

Structure of the Workshop

DCOTSS
NASA Earth Venture Suborbital 3
Dynamics and Chemistry of the Summer Stratosphere

- 1015-1215: 10-min instrument presentations, with a 10-min break from 1115-1125
- 1225-1300: Q&A session for instrument data
- 1300-1330: Break
- 1330-1430: Other data presentations (10-min each)
- 1430-1500: Q&A session for other data

*If time permits, questions allowed at the end of each instrument presentation