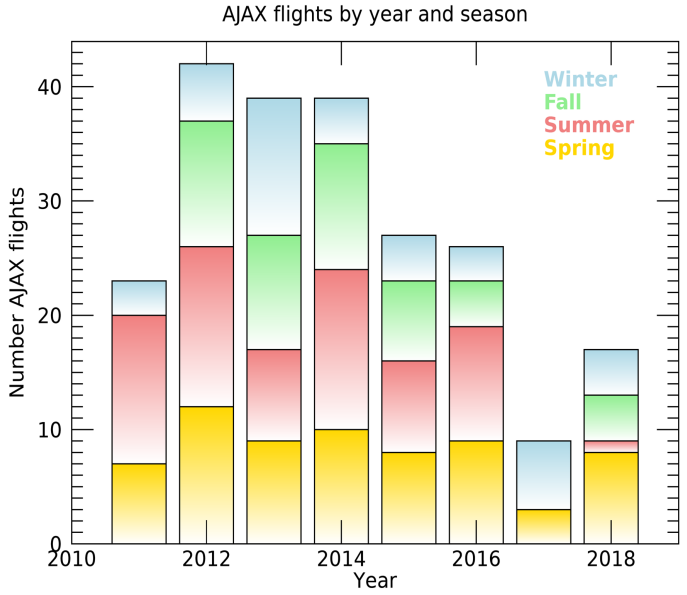
The unusual case of AJAX: Archiving a multi-year, multi-objective, multi-instrument data set

NASA ARC: **Emma Yates** (BAERI), Laura Iraci,

ASDC/ NASA LaRC: Kasey Phillips, Megan Buzanowicz, Nitin Arora, Nathan Jester, Susan Haberer, Gabriel Mojica,

ADMG: Deborah Smith

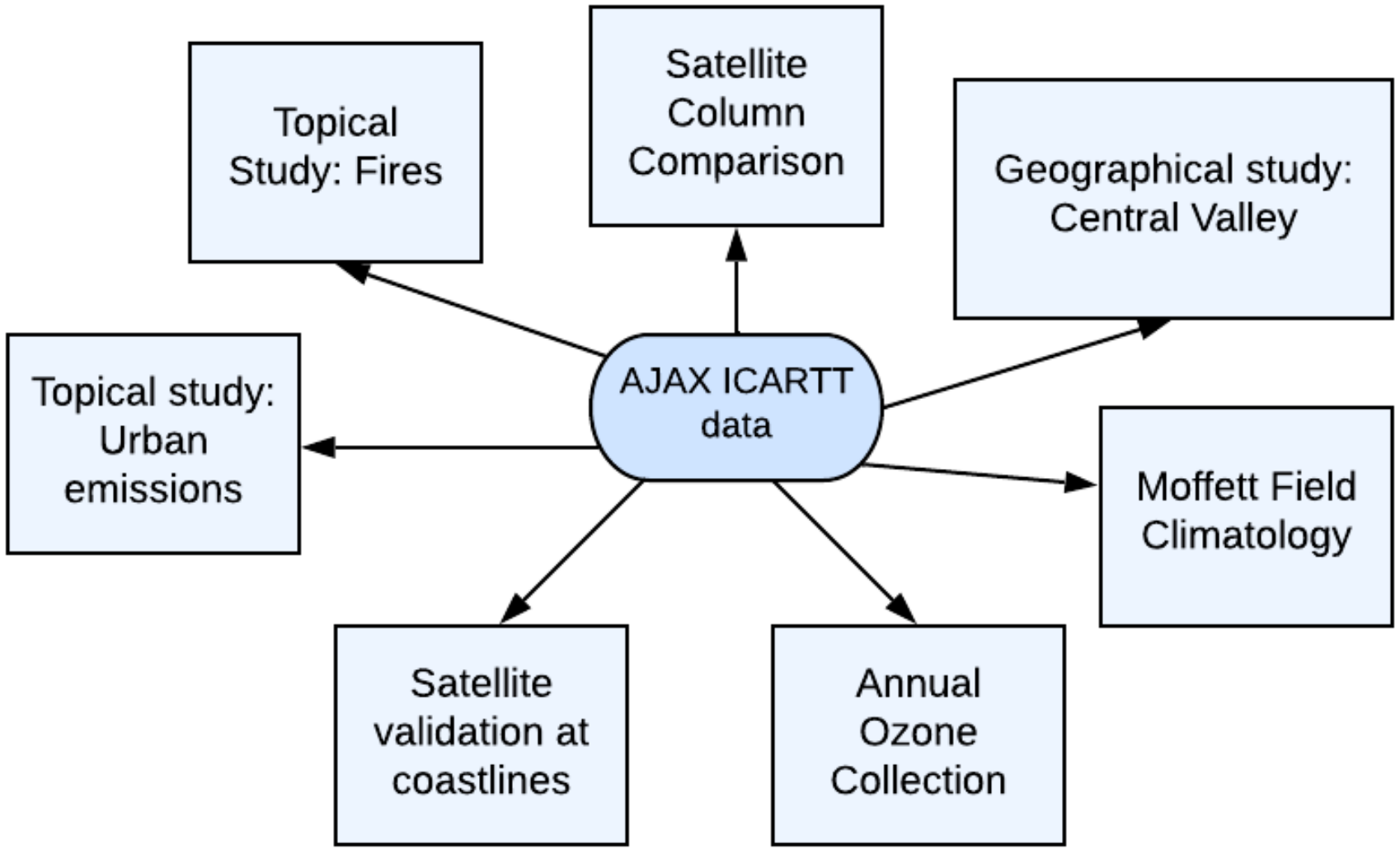
AJAX (Alpha Jet Atmospheric eXperiment)



The unusual case of AJAX:

- Year-round, long-term dataset
- Payload: 4 different instruments
  - O_3, CH_4 CO_2 and H_2O, HCHO, MMS
- Variety of flight objectives:
  - Satellite Cal/Val (GOSAT, OCO-2, TROPOMI)
  - Air Quality transport & trends
  - Extreme events: Atmospheric rivers, wildfires, urban outflow
- Involved in a variety of NASA and non-NASA field campaigns

Variety of AJAX data users



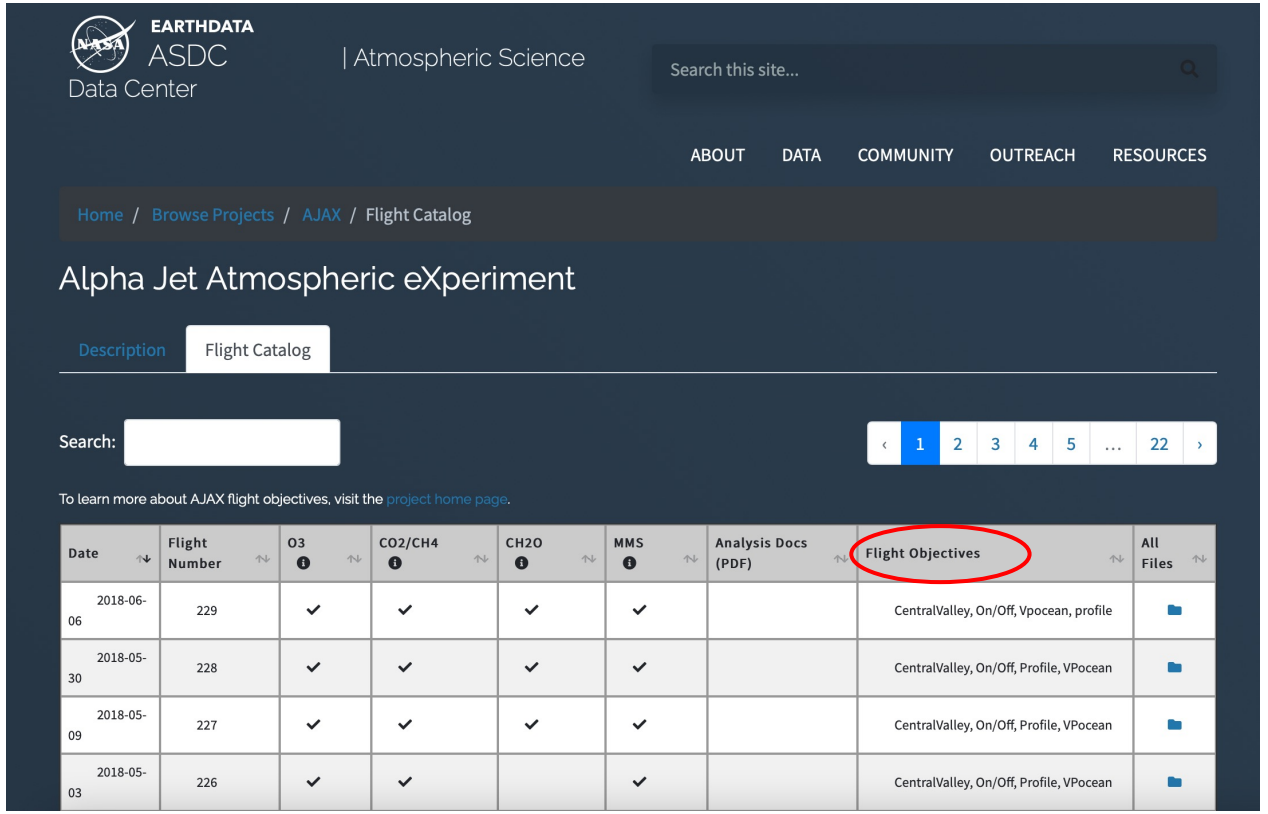
Help! We need to archive ~1000 datafiles!

- Beginning 2021 we started working with ASDC/ADMG:
  - Kasey Phillips, Megan Buzanowicz, Nitin Arora, Nathan Jester, Susan Haberer, Gabriel Mojica, Deborah Smith
- Questions/challenges we had along the way:
  - How can we structure this big collection so different users can find different subsets?
  - Conversion of datafiles to ICARTT Format
  - Can we make a compendium of a subset of flights with a DOI?

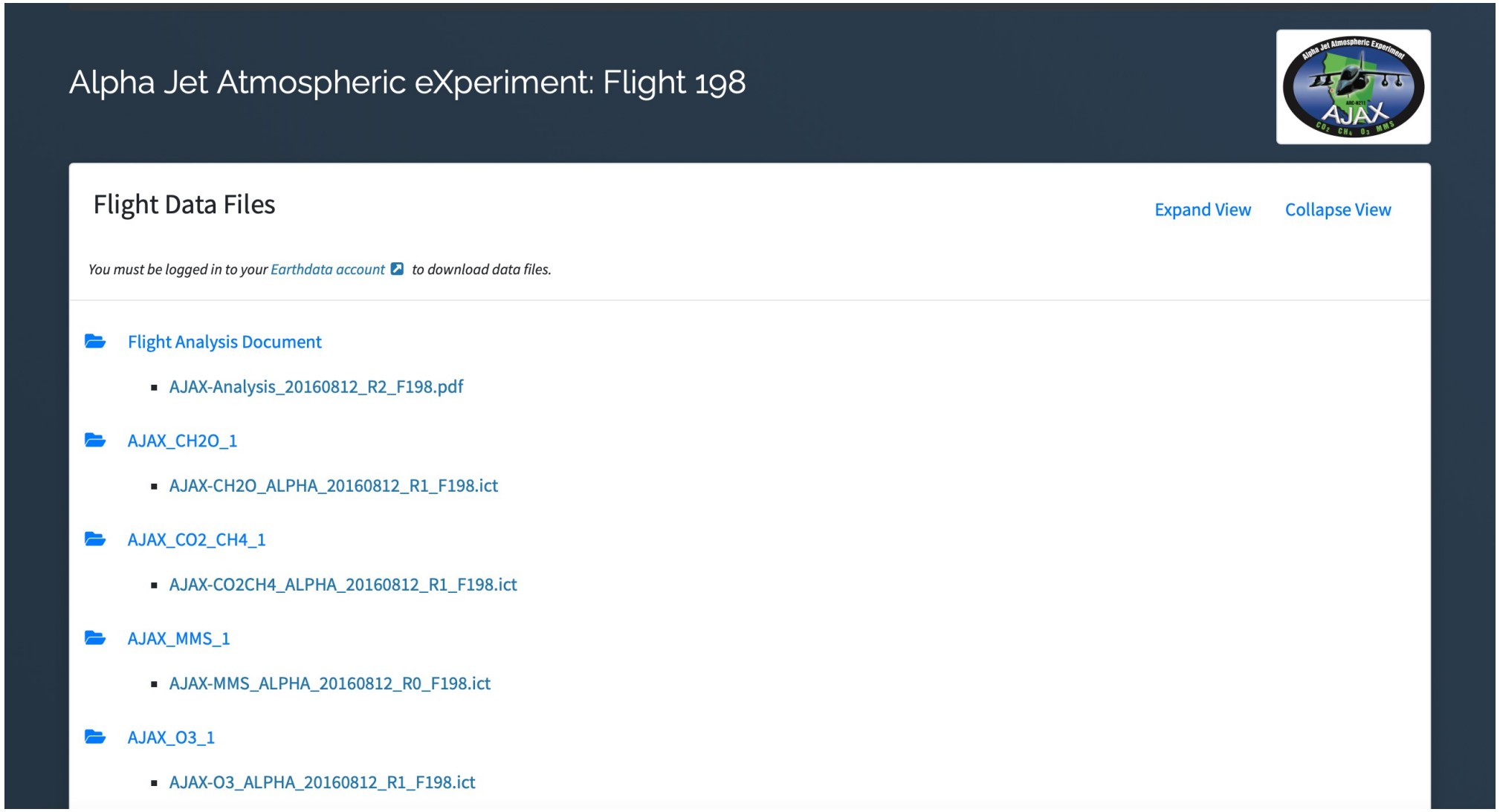
Flight catalog questions

How to facilitate searching?

- date, flight number, species, flight objective



Grouping of data



ICARTT format questions

- Use of other & special comments
- ICARTT Data Management Implementation Plan was very useful

AJAX-O3_ALPHA_20180606_R1_F229.ict

```
42, 1001, V02_2016
Iraci, Laura
NASA Ames Research Center
In Situ Airborne Ozone
Alpha Jet Atmospheric eXperiment (AJAX)
1,1
2018, 6, 6, 2021, 9, 20
0
Int_Start, seconds, Time_Start, number_of_seconds_from_00000_UTC
6
1, 1, 1, 1, 1, 1
-9999, -9999, -9999, -9999, -9999, -9999
Int_End, seconds, Time_Stop, number_of_seconds_from_00000_UTC
TIME, seconds, Time_Mid, Use_This_Time_For_All_Analyses number_of_seconds_elapsed_from_00000_UTC_until_the average of
Int_Start and Int_End
G_Lat, deg +N, Platform_Latitude_insitu_None, GPS Latitude
G_Lon, deg +E, Platform_Longitude_insitu_None, GPS Longitude
G_Alt, m, Platform_AltitudeEllipsoid_insitu_None, GPS WGS84 Altitude Reference
O3, ppbv, Gas_O3_InSitu_S_AVMR, ozone mixing ratio
1
SPECIAL_COMMENTS: Flight: F229| Flight Objectives: On/Off, VPocean, Profile, CentralValley| Flight Date: 6/6/2018
21
PI_CONTACT_INFO: NASA ARC, MS245-5, Moffett Field, CA, 94035 laura.t.iraci@nasa.gov, 650-604-0129
PLATFORM: H211 Alpha Jet
LOCATION: Mountain View, CA
ASSOCIATED_DATA: N/A
INSTRUMENT_INFO: 2B Technologies, model 205, S/N: 734, GPS from MMS
DATA_INFO: Latitude (deg), Longitude (deg), Altitude (GPS m), O3 parts per billion by volume (ppbv)
UNCERTAINTY: Ozone calibration uncertainty is +/-3 ppbv
ULOD_FLAG: -7777
ULOD_VALUE: N/A
LLOD_FLAG: -8888
LLOD_VALUE: N/A
DM_CONTACT_INFO: Emma Yates, NASA ARC; emma.l.yates@nasa.gov; 650-604-2237
PROJECT_INFO: Alpha Jet Atmospheric eXperiment (AJAX), https://www.nasa.gov/centers/ames/earthscience/programs/ajax
STIPULATIONS_ON_USE: All position and mixing ratio values provided are calculated to be correct at TIME(Time_Mid). Use
of other time indices will result in dislocation of the measurements during aircraft travel. For responsible scientific
use of the data sets provided in this archive, data users are strongly encouraged to carefully study the file headers
and associated documentation.
USERS OF THIS DATA ARE STRONGLY ENCOURAGED TO CONTACT THE EXPERIMENTERS, AND ANY PRESENTATION OR PUBLICATION OF THE DATA
CONTAINED IN THIS FILE SHOULD ACKNOWLEDGE THE NASA AMES RESEARCH CENTER, AJAX PROJECT. Users are expected to abide by
the AJAX Data Policy and offer co-authorship to relevant instrument PIs when appropriate.
OTHER_COMMENTS: Calibration factors applied: S = 0.950000 Z = -0.810000
Users should only consider Time_Mid when interpreting these measurements.
REVISION: R1
R1: Final data
R0: Preliminary data
Int_Start, Int_End, TIME, G_Lat, G_Lon, G_Alt, O3
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      69890.0,      69898.0,      69894.0,      -9999.0000,      -9999.0000,      -9999.0000,      29.8180
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      69910.0,      69918.0,      69914.0,      -9999.0000,      -9999.0000,      -9999.0000,      31.4140
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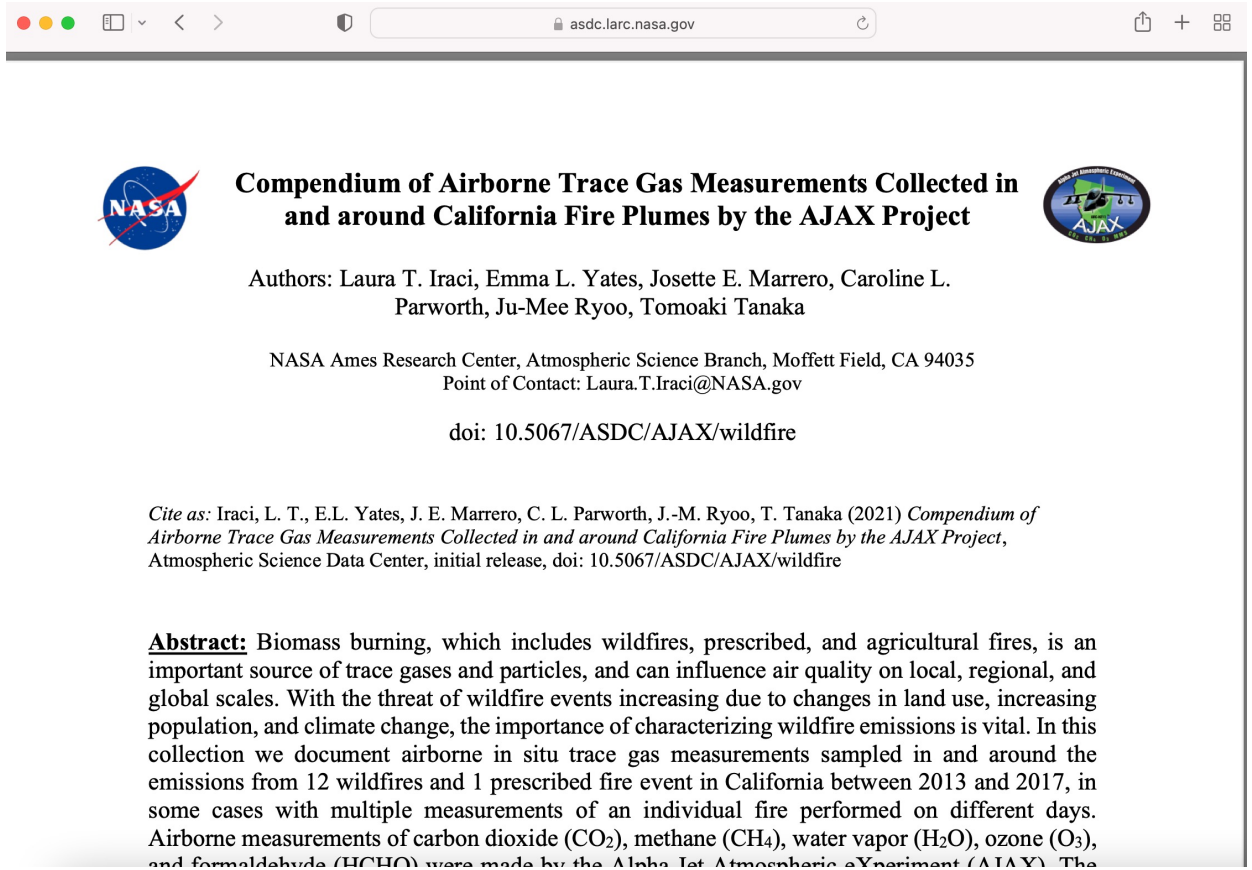
Special compendium

AJAX wildfire data set:

- DOI: 10.5067/ASDC/AJAX/Wildfire



asdc.larc.nasa.gov

Compendium of Airborne Trace Gas Measurements Collected in and around California Fire Plumes by the AJAX Project

Authors: Laura T. Iraci, Emma L. Yates, Josette E. Marrero, Caroline L. Parworth, Ju-Mee Ryoo, Tomoaki Tanaka

NASA Ames Research Center, Atmospheric Science Branch, Moffett Field, CA 94035
Point of Contact: Laura.T.Iraci@NASA.gov

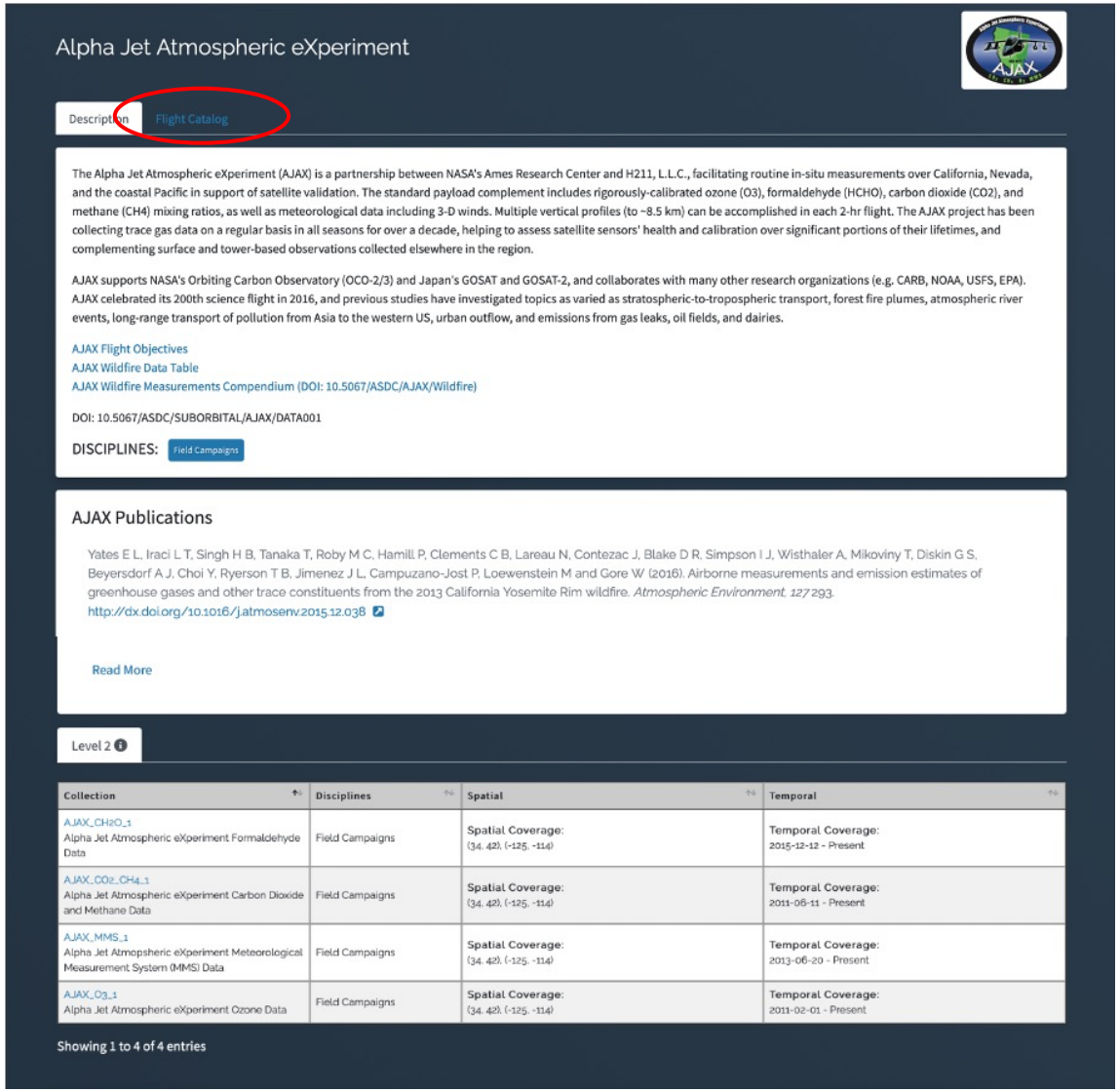
doi: 10.5067/ASDC/AJAX/wildfire

Cite as: Iraci, L. T., E.L. Yates, J. E. Marrero, C. L. Parworth, J.-M. Ryoo, T. Tanaka (2021) *Compendium of Airborne Trace Gas Measurements Collected in and around California Fire Plumes by the AJAX Project*, Atmospheric Science Data Center, initial release, doi: 10.5067/ASDC/AJAX/wildfire

Abstract: Biomass burning, which includes wildfires, prescribed, and agricultural fires, is an important source of trace gases and particles, and can influence air quality on local, regional, and global scales. With the threat of wildfire events increasing due to changes in land use, increasing population, and climate change, the importance of characterizing wildfire emissions is vital. In this collection we document airborne in situ trace gas measurements sampled in and around the emissions from 12 wildfires and 1 prescribed fire event in California between 2013 and 2017, in some cases with multiple measurements of an individual fire performed on different days. Airborne measurements of carbon dioxide (CO_2), methane (CH_4), water vapor (H_2O), ozone (O_3), and formaldehyde (HCHO) were made by the Alpha Jet Atmospheric eXperiment (AJAX). The

ASDC AJAX landing page

- Includes links to:
  - “AJAX Flight Objectives”
  - Wildfire compendium
  - publications



Search for collections or topics

Filter Granules Clear Filters

Granule Search

Granule ID(s)

Search Single or Multiple Granule IDs...

Temporal

Start

YYYY-MM-DD HH:mm:ss

End

YYYY-MM-DD HH:mm:ss

Recurring?

Day/Night

Find granules captured during the day, night or anytime.

Search Results (8,531 Collections)

Alpha Jet Atmospheric eXperiment Carbon Dioxide and Methane Data

Showing 20 of 194 matching granules Sort View

AJAX-CO2CH4_ALPHA_20110622_R1_F23.ict
START 2011-06-22 20:53:53
END 2011-06-22 21:54:09

AJAX-CO2CH4_ALPHA_20110623_R1_F24.ict
START 2011-06-23 20:39:57
END 2011-06-23 22:18:30

AJAX-CO2CH4_ALPHA_20110625_R1_F25.ict
START 2011-06-25 20:02:38
END 2011-06-25 22:03:40

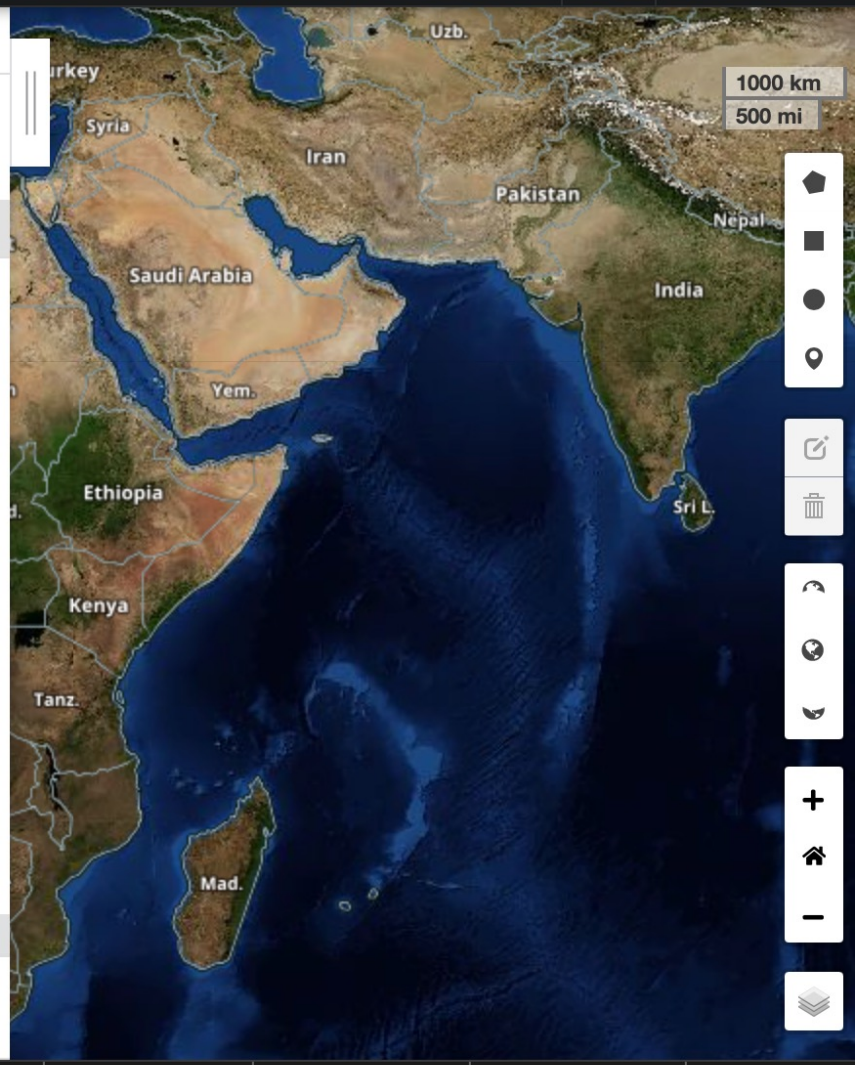
AJAX-CO2CH4_ALPHA_20110626_R1_F26.ict
START 2011-06-26 20:29:46
END 2011-06-26 22:36:47

AJAX-CO2CH4_ALPHA_20110720_R1

AJAX-CO2CH4_ALPHA_201

Search Time: 1.4s

Subscriptions Add Download All 194



MONTH 2022 Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep

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Alpha Jet Atmospheric eXperiment Carbon Dioxide and Methane Data

Status	Access Method	Granules
Complete (100%)	Download	194 Granules

Download your data directly from the links below, or use the provided download script.

Download Files | Download Script

Linux: You must first make the script an executable by running the line 'chmod 777 download.sh' from the command line. After that is complete, the file can be executed by typing './download.sh'. For a detailed walk through of this process, please reference this How To guide.

Windows: The file can be executed within Windows by first installing a Unix-like command line utility such as Cygwin. After installing Cygwin (or a similar utility), run the line 'chmod 777 download.sh' from the utility's command line, and then execute by typing './download.sh'.

Retrieved 194 files for 194 granules

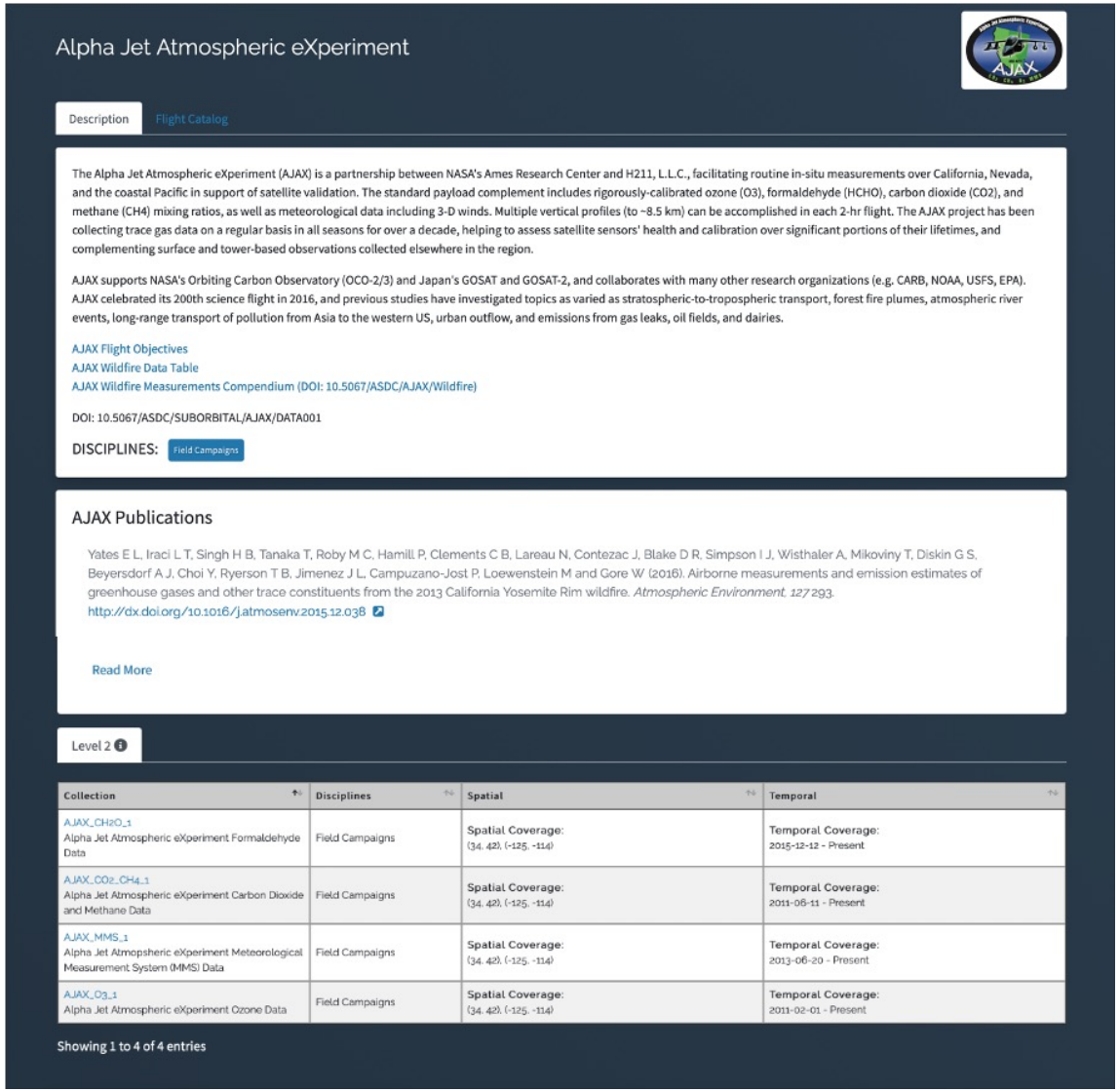
Copy Save Expand

```
#!/bin/bash

GREP_OPTIONS=''
```

ASDC AJAX landing page

- Includes links to:
  - “AJAX Flight Objectives”
  - Wildfire compendium
  - publications
- Level 2 dataset download:
  - Suggestion for improvement: one click for whole dataset
- Encouraging data use:
  - Homepage imagery & release announcement
  - ASDC web hits for AJAX collections
  - Flight catalog tutorial would be helpful



Summary

Which datasets have you produced?

- AJAX

What worked well?

- Flight catalog
- Use of special/other comments
- Special compendium

Suggestions:

- One click for entire dataset
- Flight catalog tutorial

What DAAC have you worked with?

- ASDC

What pain points did you find when working with the DAAC?

- Grouping of data
- Time stamp requirements (ICARTT)

Have you tried to use in the cloud?

- No