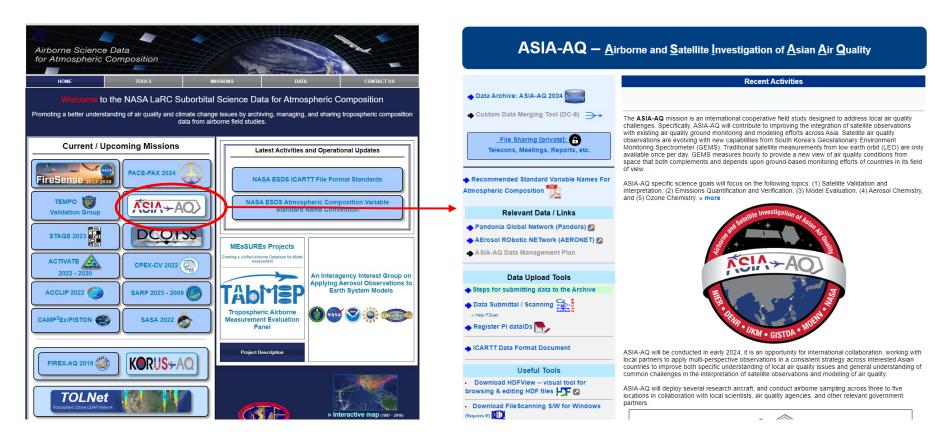
ASIA-AQ Field Data Repository dataID Registration and Data Upload

Michael Shook, Gao Chen, Ali Aknan, and Morgan Silverman

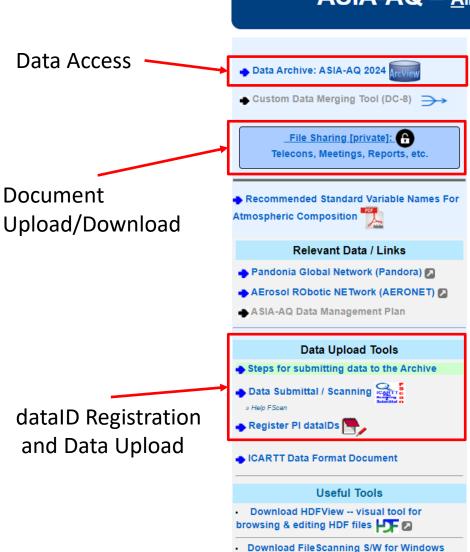
Introduction

- https://www-air.larc.nasa.gov/missions/asia-aq/
- A repository for all ASIA-AQ relevant observational and ancillary data products and relevant documentation/reports to facilitate science team data exchange and data processing
- File types include binary (HDF/netCDF), text (ICARTT), and image (jpg/png) files
- Password-protected document and file sharing



ASIA-AQ Field Data Repository

$ASIA-AQ - \underline{A}$ irborne and \underline{S} at ellite \underline{I} investigation of \underline{A} sian \underline{A} ir \underline{Q} uality



(Requires IE)

Recent Activities

The ASIA-AQ mission is an international cooperative field study designed to address local air quality challenges. Specifically, ASIA-AQ will contribute to improving the integration of satellite observations with existing air quality ground monitoring and modeling efforts across Asia. Satellite air quality observations are evolving with new capabilities from South Korea's Geostationary Environment Monitoring Spectrometer (GEMS). Traditional satellite measurements from low earth orbit (LEO) are only asialable once per day. GEMS measures hourly to provide a new view of air quality conditions from space that both complements and depends upon ground-based monitoring efforts of countries in its field of view.

ASIA-AQ specific science goals will focus on the following topics: (1) Satellite Validation and Interpretation, (2) Emissions Quantification and Verification, (3) Model Evaluation, (4) Aerosol Chemistry, and (5) Ozone Chemistry, w more



ASIA-AQ will be conducted in early 2024, it is an opportunity for international collaboration, working with local partners to apply multi-perspective observations in a consistent strategy across interested Asian countries to improve both specific understanding of local air quality issues and general understanding of common challenges in the interpretation of satellite observations and modeling of air quality.

ASIA-AQ will deploy several research aircraft, and conduct airborne sampling across three to five locations in collaboration with local scientists, air quality agencies, and other relevant government partners.



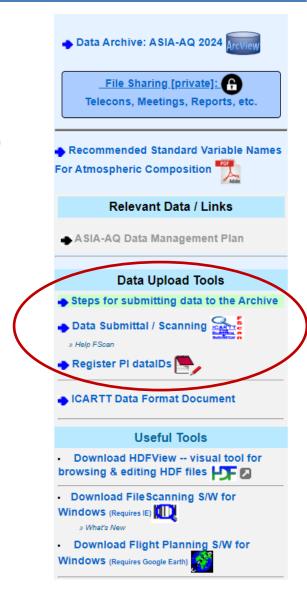
Points of Contact

Field Repository (www-air.larc.nasa.gov)

- Michael Shook, NASA Langley Research Center, michael.a.shook@nasa.gov, 757-864-5793
- Gao Chen, NASA Langley Research Center, gao.chen@nasa.gov, 757-759-5642 (cell)
- Ali Aknan, AMA/NASA Langley Research Center, ali.a.aknan@nasa.gov (website and file scanner)
- Morgan Silverman, AMA/NASA Langley Research Center, morgan.l.silverman@nasa.gov (standard name issues)

Data Submission Steps

- DataID Registration (one-time process):
 - dataID is part of the filename and will be used to organize PI files on the data repository
 - Links data files to PI (see file naming convention slide)
 - PI or file creator will need to first register dataID(s)
 before files can be submitted
- Data Submittal and Scanning:
 - File submission is through a scanning tool (FScan) for checking filenames and content
 - All incoming files are scanned:
 - ICARTT Files: file header, including keywords and data flags, as well as time stamps
 - HDF and netCDF files: data variable dimensions and attributes
 - Other files: file names
 - Support zipped multi-file upload
 - Script-based batch upload and download available
- Username/password: contact POCs



DataID Registration Page

The PI's data directory will be created from LastName. FirstName. Please enter PI name correctly. Each dataID represents a [separate] group of files in PI's data directory.

PI Last Name : PI First Name :		Platform (LocationID):	See file naming convention sl			
		NASA DC-8 Aircraft	(DC8)	_		
dataID: (max 45 chars) Prefix with assaaq- e.g., asiaaq-CO2		cription: (max 380 chars) ents; e.g., Carbon Dioxide Mixing Ratio	Instrument(s): (max 190 cha List Instruments; e.g., LI-COR 62	ars) 252		
Reset asiaaq-	Enter one description per	line AND press Enter	Enter one instrument per line			
+ Add Another dataID - Remove Last Entry						
Upload Your Instrument(s) Description Document: Choose File No file chosen (Select your file) ***(NOTE: Any new file/document upload WILL OVERWRITE your previously uploaded document)*** ***(If you have more than 1 file (document) to upload, please email the files to: gao.chen@nasa.gov and/or ali.a.aknan@nasa.gov. Thank you!)***						
OVERWRITE my previous record (i.e., ALL previously registered dataIDs for this mission will be removed).						
Link to PI website, instrument, experiment description, etc Optional: to display on LaRC Archive webpage						
Text describing PI experiment or measurements (e.g., NASA LaRC DIAL - Troposphere O3, Aerosols, and Clouds Profiles): Optional: to display on LaRC Archive webpage						
Submit						

Current Registered dataIDs on the Server for ASIAAQ 2024 PI Name: Last.First LocationID Registered dataIDs Edit APEL.ERIC (PI Link) DC8 asiaaq-TOGA-VOCs + Show Description

asiaaq-ISAF-CH2O

+ Show Description

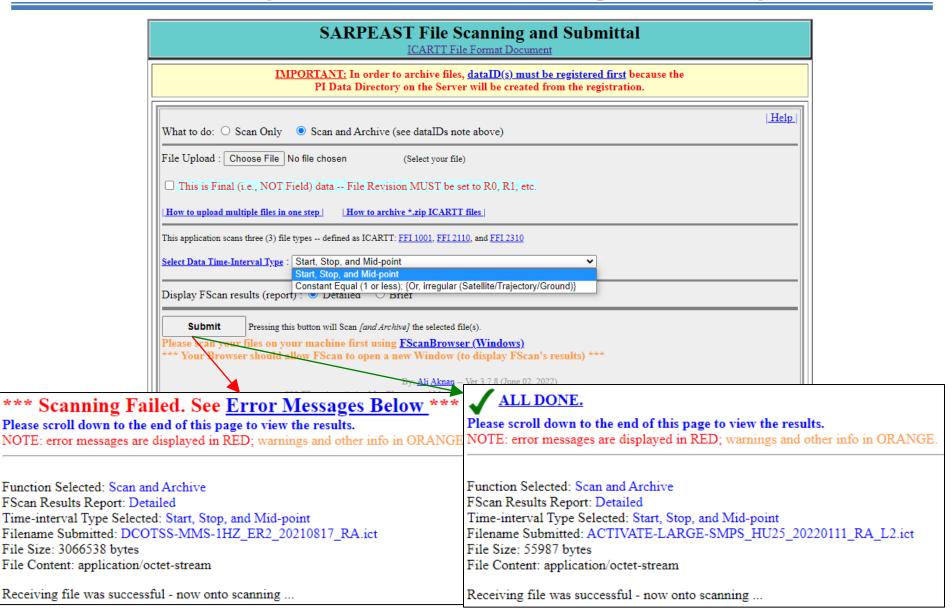
WOLFE.GLENN

DC8

Registered DataID Example

PI Last Name : PI First Name : Platform (<u>LocationID</u>) :						
HAIR JOHN	LaRC GIII Aircraft	(LARC-G3)				
dataID: (max 45 chars) Prefix with "asiaaq-" e.g., asiaaq-CO2	Data Description: (max 380 chars) Describe your measurments; e.g., Carbon Dioxide Mixing Ratio	Instrument(s): (max 190 chars) List Instruments; e.g., LI-COR 6252				
Reset asiaaq-HSRL2	HSRL measurements of clouds and aerosols, as well as DIAL measurements of Ozone Concentration	HSRL2				
Reset asiaaq-HSRL2-images	Full flight images of the lidar measurements of clouds, aerosols, and ozone, plus raster-specific images within a flight, designated as Ln (n can be 1,2,3,or 4)	HSRL2				
Reset asiaaq-HSRL2-mlh	Aerosol derived mixed layer heights and mean backscatter and extinction within several layers from HSRL2	HSRL2				
Reset asiaaq-HSRL2-NearSurface	High horizontal resolution measurements of HSRL2 atmospheric aerosol and ozone with lower vertical resolution. Several combinations of horizontal and	HSRL2				
+ Add Another dataID - Remove Last Entry						
Upload Your Instrument(s) Description Docume	nt: Choose File No file chosen (Select your file)					
(NOTE: Any new file/document upload WILL OVERWRITE your previously uploaded document)						
(If you have more than 1 file (document) to upload, please email the files to: gao.chen@nasa.gov and/or ali.a.aknan@nasa.gov. Thank you!)						
OVERWRITE my previous record (i.e., ALL previously registered dataIDs for this mission will be removed).						
Link to PI website, instrument, experiment description, etc						
https://science.larc.nasa.gov/hsrl/ Optional: to display on LaRC Archive webpage						
Text describing PI experiment or measurements (e.g., NASA LaRC DIAL - Troposphere O3, Aerosols, and Clouds Profiles): NASA LaRC High Spectral Resolution Lidar, Generation 2 Optional: to display on LaRC Archive webpage						
Submit Optional: to asplay on Lake Archive weepage						

Data Upload (FScan) Page Example



Note: results open on a separate page, may need to change browser permissions

ICARTT File Naming Convention for ASIA-AQ

DataID_LocationID_YYYYMMDD_R# [_Description].extension

- DataID: a short description of measured parameter/species, instrument, or model prefixed by "ASIAAQ-"
- **LocationID**: a controlled identifier of data platform, provided on the dataID registration website in a drop-down box.
 - ASIA-AQ locationIDs: DC8, LARC-G3, KINGAIR-1900D, KINGAIR-G90GT, MERGE, GROUND (for ASIA-AQ ground sites),
 AQ-MONITORING (for local air quality monitoring sites), MODEL, ANALYSIS, SATELLITE, TRAJECTORY, and OTHER
- YYYYMMDD: UTC date of takeoff for flight data or the beginning of the measurement for ground sites. Note: KST = UTC+9; PHST, MYT = UTC+8; ICT = UTC+7
- **R#**: Revision identifier. Typically, RA, RB, RC, ... for field data and R0, R1, R2, ... for the publication quality data. Note: archived files cannot be overwritten, *only replaced with subsequent revisions*
- Description: optional additional description of the file if necessary
- **Extension**: *.ict, *.nc, *.cdf, *.hdf, *.h4, *.h5, *.hdf4, *.hdf5, *.he5, *.kmz, *.kml, *.htm, *.html, *.txt, *.jpg, *.jpeg, *.gif, *.png, *.bmp, *.pdf, *.xls, *.xlsx, *.doc, *.docx, *.ppt, *.pptx
- Extension upon request: *.zip, *.tar, *.gz, or others
- The underscore, "_", is used ONLY to separate the different fields of the filename
- Examples: the filename for HSRL cloud and aerosol observations on January 31st, 2024:
 - ASIAAQ-HSRL_DC8_20240131_RA.h5 (for draft/field data)
 - ASIAAQ-HSRL_DC8_20240131_R0.h5 (for publication quality data)

ASIA-AQ Data Submission Schedule

Mission Phase	Data Type	Submission Deadline	Access Control
Field Deployment	Field Data	24 hour after each flight or cal. day	Science team and Partners
Post- Deployment	Publication- quality or "Final" Data	October 1, 2024	Public

- Field data submission deadline may vary depending on field operation constraints
- The final data should be of publication quality and time synced to the time standard for each platform

ASIA-AQ Data Format Requirements

- The ASIA-AQ data will conform to ICARTT, netCDF, or HDF format standards. This supports NASA's Open-Source Science and Open Data initiatives by making ASIA-AQ data FAIR
- All in-situ measurements are required to report data in ICARTT format (http://www-air.larc.nasa.gov/missions/etc/lcarttDataFormat.htm)
- ICARTT files will be scanned to ensure compliance with the format requirements
- HDF and netCDF files should be as CF-compliant as possible, i.e., having all required global and variable attributes and properly dimensioned data variables (template URL to be posted)
- In-field and remote assistance will be available to the science team to troubleshoot file format and submission issues

ASIA-AQ Data Reporting Best Practices

- Use the same number, names, and order of variables throughout the mission for files within the same dataID and revision. This prevents issues with the online merge tool, and FScan now checks the variable list between files
- Measurement Time Reporting:
 - Fixed variable name(s): Time Start, Time Stop, and Time Mid
 - Report start, stop, and mid times if integration interval larger than 1 sec
 - Can use one time stamp (e.g., Time_Start or Time_Stop) for data at ≥ 1 Hz
- Use file header (e.g., DATA_INFO) or metadata to indicate whether the measurement time is synced to the time standard
- Trace gases: Indicate whether measurement is reported in dry or ambient condition
- Report absolute concentrations and aerosol extensive properties at STP:
 273.15K and 1013.25 hPa (i.e., 0°C and 1atm)
- Use required attributes for HDF and netCDF files and properly dimension data variables
- Variable short name should not start with a number or contain "-"
- Recommend standard unit notation: <u>WMO Codes Registry: wmdr/unit</u>

ACVSNC Variable Standard Names

 Atmospheric Composition Variable Standard Name Convention (ACVSNC) is a NASA Earth Science Data Systems convention, intended to make data more findable and interoperable, and (re)usable:

https://www-air.larc.nasa.gov/missions/etc/AtmosphericCompositionVariableStandardNames.pdf

- Constructed from controlled vocabulary
- Tags, NOT short names or variable names:
 - For ICARTT files: short name, unit, standard name, long name

```
CH2O_pptv, pptv, Gas_CH2O_insitu_S_AVMR, mixing ratio by volume

CH2O_LOD_pptv, pptv, Gas_CH2O_insitu_S_AVMR, Limit of Detection

NOy_pptv, pptv, Gas_NOyasNO_insitu_M_AVMR, Total Reactive Nitrogen Mixing Ratio

Sc700_total, Mm-1, AER_Scattering_insitu_red_RHd_Total_AMB, Dry Scattering at 700nm (Total_Aerosols)
```

- For netCDF and HDF files: use ACVSN_standard_name attribute
- Contact Morgan, Gao, or Michael for questions or adding new standard names

ASIA-AQ Science Data Policy

All participants are requested to accept the following responsibilities:

- > Submit data in ICARTT, netCDF or HDF format no later than the deadlines
- ➤ If unexpected events lead to any delay in data submission, the PI is required to notify the project leadership as soon as issues are known
- ➤ Publication-quality or "final" data should be submitted to the archive prior to any presentation at scientific conferences (e.g. AGU, AMS) or manuscript preparation, unless explicit authorization is obtained from the program managers
- ➤ All aircraft measurements from a common platform should be synchronized to science team pre-agreed time standard
- Consult with PIs when using their data in conference/data workshop presentations and/or manuscript
- ➤ Invite PIs of any data used to be co-authors (particularly during post-deployment research phase)
- > PIs should be available to answer questions about their data

ASIA-AQ Data Merge

- ASIA-AQ science team can use the "Custom Data Merging Tool" for DC-8 merges
- The project merge will be made and updated by the field repository staff when significant amount data are submitted or updated
- The "Custom Data Merging Tool" will allow science team member to make merges from ICARTT data files submitted to the repository with options to choose variables, merge time scale, and flight(s)
- Contact POCs for questions or requests

