

Fire Influence on Regional to Global
Environments and Air Quality (FIREX-AQ)
Campaign Level User Guide



Document Change Log

| Revision | Date | Affected Portions and Description |
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This document applies to FIREX-AQ data products that are archived at the Atmospheric Science Data Center (ASDC), at NASA Langley Research Center.

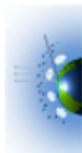


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Introduction:

The Fire Influence on Regional to Global Environments and Air Quality (FIREX-AQ) campaign was an intensive, [multi-organizational](#) study of the tropospheric chemistry and composition of smoke from open fires in the United States that intended to improve the understanding of the integrated impact of fires on air quality and climate. FIREX-AQ aimed to expand knowledge of the factors controlling emissions from wildfires and agricultural fires in the United States, and to gain understanding of the processes occurring during the evolution of the fire plumes. The overarching goals of the campaign were to provide measurements of trace gas, aerosol, and emissions for wild, agricultural, and prescribed fires in great detail; to relate these measurements to fuel and fire conditions at the point of emission; to evaluate the conditions determining plume rise; and to follow plumes downwind to understand the chemical/physical transformations and air quality impacts of the smoke. The research of FIREX-AQ contributed to an understanding of the impact of fire smoke on weather and global air quality. FIREX-AQ also contributed to the improvement of the estimation of fire emissions and of satellite technology in characterizing fires.

Completed in September 2019, FIREX-AQ utilized a combination of instrumented aircraft, ground-based stationary and mobile instrumentation, and satellites. Detailed fire plume sampling was carried out by the NASA DC-8 aircraft, which had a comprehensive instrument payload capable of measuring over 200 trace gas species, as well as aerosol microphysical, optical, and chemical properties to characterize fire plumes. Remote sensing of the plumes was conducted using Differential Absorption Lidar (DIAL) and High Spectral Resolution Lidar (HSRL). The DC-8 aircraft completed 23 science flights, including 15 flights from Boise, Idaho and 8 flights from Salina, Kansas. NASA's ER-2 completed 11 flights to support the objectives of the campaign. The ER-2 payload was made up of 8 remote-sensing instruments and provided critical fire information including fire temperature, fire plume heights, and vegetation/soil albedo information. Additional airborne plume sampling was carried out by the NOAA-Chem Twin Otter and NOAA-MET Twin Otter. The ground-based mobile labs and sites provided in-situ measurements of aerosol microphysical and optical properties, aerosol chemical compositions, and trace gas species.

Citation:

[How to Cite ASDC Data](#)

[DOI Citation Formatter](#)

Keywords:

NASA, NOAA, ASDC, Earth Science, Atmosphere, Aerosols, Atmospheric Chemistry, Air Quality, Trace Gas, Biomass Burning, Wildfires, Geographic Information Systems, Carbon Cycle/Carbon Budget Models, Emissions, Forest Fire Science, Fire Disturbance, Cropland, Agricultural Lands,



Prescribed Burns/Fires, Pasture, Forest Plantation, Silviculture, Shrubland/Scrub, Grasslands, Land Use/Land Cover Classification, LIDAR

Disclaimer:

The findings from FIREX-AQ are in a continual state of research, modification, and analysis. The information contained in this user guide may be subject to change after initial release. This user guide will continue to be updated as new data products become available; however, a reasonable latency should be expected.

Dataset Overview:

FIREX-AQ data products consist of observational products, derived products (including fire information and emission estimates), and satellite products that have been subset to the region of interest. The data from these categories have been grouped into data products, or collections based on platform, variable classification, and observation type (i.e., remote sensing versus in-situ). The variables within these collections have been summarized in the “Collection Details” section. To ensure the responsible scientific use of FIREX-AQ data products, data users are strongly encouraged to carefully study the file headers and to directly consult the instrument and science principal investigators (PIs) with questions. Additionally, data users should acknowledge the data source and offer co-authorship to relevant instrument and science PIs if data contributes to the scientific findings. DOIs are given at the mission level and the collection level. DOIs and citations are available at the links provided in the tables in the “Collections Details” section.

Observational Data Products:

The primary FIREX-AQ observation objective was to characterize the composition and vertical structure of fire plumes. This objective was achieved by deploying a combination of in-situ and remote sensing instruments on aircraft and surface platforms. The in-situ measurements provided a comprehensive characterization of trace gases, aerosol properties, and meteorological conditions, which can be used to assess fire emissions and plume evolution. The remote sensing measurements were mainly used to gauge fire location, fire characteristics, and plume structure. The observational data products from FIREX-AQ have been placed into groups based on the platform acquiring the measurements, the variables measured, and the type of observation (i.e., remote sensing versus in-situ), which have been further detailed in the subsections below.

The in-situ measurements are typically reported in time series (such as measurements as a function of sampling time[s]). The sampling location is given by the platform geographic coordinates. The fire and ecosystem burned locations are geographically accurate and have been determined using a combination of satellite and ground-based data. For airborne



measurements, the aircraft navigational parameters are provided as an independent data product.

All ER-2 remote sensing data are geolocated. The ER-2 aircraft navigation and attitude data are available in [FIREX AQ MetNav AircraftInSitu ER2 Data 1](#), which is detailed in [Table 22](#) in this document.

Instruments

Observational data were collected from a variety of instruments. A brief instrument description and, where applicable, measurement caveats can be found in the metadata embedded in the data files or in a descriptive document uploaded alongside the files. The instrument acronyms for each data product are also given in the [acronym list](#) at the end of this document. Further details can be obtained in referenced literature or by contacting the instrument team.

Measurement Uncertainty and Measurement Comparison

Measurement uncertainties are often reported as metadata embedded in the file headers or reported in a descriptive document uploaded alongside the files. While accuracy and precision estimates are given separately for some measurements, only overall uncertainties are provided for the others. Users are advised to contact the principal investigator responsible for the instrument when using precision and accuracy to estimate overall uncertainties if the information is not provided in the file header; the conventional method of using quadrature sum in this estimation may not always be appropriate.

In many instances during FIREX-AQ, multiple instruments and/or techniques measured the same mission-critical parameter (e.g., CH₂O, NO₂) to ensure the quality and availability of the data product, resulting in overlapping measurements for the same parameter. Measurement comparisons investigate these overlapping measurements of one parameter across multiple instruments and techniques to assess measurement consistency. The level of measurement consistency found during measurement comparison serves as one indicator of measurement uncertainty. The goal of measurement comparison is to quantify differences in overlapping measurements to guide users to the data appropriate for their needs.

Data Flags

The most common data flags used in the FIREX-AQ observational data products are for missing data and detection limits. Missing data flags indicate that the instruments were not recording data. Detection limit data flags indicate that the sampling condition was either below the lower detection limit or above the upper detection limit. These flags are defined in the metadata file header. Other flags can be found in various data files to indicate the instrument operational status (such as if dilution was applied or a thermal denuder was applied). There are two sampling event flags used in FIREX-AQ data products. Cloud flags indicate when the DC-8 aircraft encountered clouds and the physical state of the clouds. Smoke flags serve as identifiers for fire plumes with fire sources, fuels, and smoke age estimates. Two flags are present in the



Aerodyne Mobile Laboratory dataset indicating when the vehicle was at the ground site, and when the instruments sampled from the Potential Aerosol Mass (PAM) inlet.

DC-8 Observational Data Products

NASA's DC-8 aircraft conducted 23 science flights during FIREX-AQ. The main period of the DC-8 deployment lasted from 15 July to 5 September 2019 and consisted of 150 flight hours. The general sampling strategy involved high-altitude flight segments above fire smoke dedicated to the use of remote sensing instruments and low altitude flight segments within fire smoke dedicated to plume sampling. The measurements from instruments onboard the DC-8 are archived in multiple collections that represent in-situ and remote sensing measurements of aerosol properties, trace gases, cloud droplet properties, actinic flux, and photolysis coefficients. To better characterize the fire plumes, there are several instruments reporting at 1 Hz and higher frequencies. Additional details are summarized in [Tables 11-18](#).

The DC-8 sampled more than 500 individual plumes from over 100 fires. [Table 1](#) links each flight to the names and fuel types of the fires from which smoke plumes were observed. More detailed plume sampling events are summarized in the derived data product [FIREX-AQ-FIREFLAG-TABULARDATA ANALYSIS 20190724 R10 THRU20190905.zip](#), which provides sampling time periods and smoke flag code for each plume transect as well as fire locations. More detailed information for each fire can be found at the Inciweb hyperlink provided (where applicable). These tables can enable users to locate data related to specific smoke plumes collected from the DC-8. The data products themselves also include additional fire information, such as fire status and fuel types.

The MODIS/ASTER Airborne Simulator (MASTER) instrument data collected onboard the DC-8 is housed at the Oak Ridge National Laboratory (ORNL). Please visit the following link to access the data at ORNL: [MASTER FIREX-AQ Dataset](#).

Table 1: DC-8 Fire Sampling Summary¹

| Flight Date(s) | Fire Name | Fuel Type |
|------------------|----------------|--|
| 8/12/19, 8/13/19 | Castle | Ponderosa pine, two-needle pinyon, Utah juniper forest |
| 8/6/19 | Horsefly | Subalpine fir, lodgepole pine, whitebark pine, Engelmann spruce forest |
| 7/30/19 | Left Hand Fire | Grand fir, Douglas fir and forest, ponderosa pine/oceanspray forest |
| 8/2/19 | Lick Creek | Grand fir, Douglas fir and forest |

¹ Information regarding the fires sampled by specific platforms during FIREX-AQ is in a state of continual evolution; the information in Tables 1-9 may be subject to change as more data products become available.



| Flight Date(s) | Fire Name | Fuel Type |
|--------------------------------|----------------|--|
| 8/2/19 | Mica Creek | Grand fir, Douglas fir and forest |
| 7/29/19 | North Hills | Idaho fescue, bluebunch wheatgrass grassland, ponderosa pine savanna, Douglas fir, Pacific ponderosa pine/oceanspray forest |
| 8/2/19 | Ridgetop | Bluebunch wheatgrass, bluegrass grassland |
| 8/15/19 | Saber | Understory grass and litter primarily from ponderosa pine, two-needle pinyon, Utah juniper forest |
| 7/24/19, 7/25/19 | Shady | Timber litter and shrubs under Douglas fir, Pacific ponderosa, lodgepole pine/oceanspray forest |
| 7/24/19 | Sheep | Sagebrush shrubland with grasses |
| 8/15/19, 8/16/19 | Sheridan | Pinyon, Utah juniper forest |
| 8/12/19 | Springs | Ponderosa pine, Jeffery pine forest |
| 7/30/19 | Tucker | Sagebrush, greasewood shrubland with open grass |
| 8/3/19, 8/6/19, 8/7/19, 8/8/19 | Williams Flats | Ignited in primarily Idaho fescue, bluebunch wheatgrass grassland, expanded to primarily Douglas fir, Pacific ponderosa pine/oceanspray forest |

ER-2 Observational Data Products

NASA's ER-2 aircraft provided information about emissions from wildfires and agricultural fires using an airborne remote sensing suite. The ER-2 aircraft, based at NASA Armstrong Flight Research Center (AFRC) in Palmdale, CA, participated in FIREX-AQ for approximately 70 science flight hours with one engineering flight on 1 August and 11 science flights from 2 August to 19 August 2019. The 2 August flight was dedicated to instrument science check-out, calibration, and data tests. The ER-2 acted as a high-altitude research aircraft that carried satellite simulator instruments to characterize both fires and fire plumes and provided a link between in-situ and satellite observations. The ER-2 flew at approximately ~20 km altitude and had dedicated flight hours to coordinate with the DC-8 and NOAA Twin Otter aircraft. Coordination with the DC-8 was archived on 6 August 2019 over the Williams Flats Fire and 16 August 2019 over the



Sheridan Fire. Coordination with the NOAA Chem Twin Otter was archived on 20 and 21 August over the Little Bear and Ikes fires. The data products related to the ER-2 are grouped in multiple collections that represent each remote sensing instrument, measured aerosol and cloud properties, trace gases, fire location, fire characteristics, and in-situ meteorological and navigational measurements. These data products are summarized in [Tables 22-26](#).

[Table 2](#) links each flight to the names and types of the fires observed from the ER-2. This table can be used to search for data related to specific fires collected from the ER-2.

Table 2: ER-2 Fire Sampling Summary

| Flight Date(s) | Fire Name(s) | Fuel Type |
|------------------------------------|----------------|--|
| 8/15/19 | Boulin | Ponderosa pine, two-needle pinyon, Utah juniper forest |
| 8/15/19, 8/16/19, 8/20/19, 8/21/19 | Castle | Ponderosa pine, two-needle pinyon, Utah juniper forest |
| 8/2/19 | Dixon | Red fir forest |
| 8/16/19, 8/20/19, 8/21/19 | Ikes | Ponderosa pine, two-needle pinyon, Utah juniper forest |
| 8/20/19, 8/21/19 | Little Bear | White fir, gable oak forest, ponderosa pine savanna |
| 8/2/19 | Mill | Scrub oak chaparral shrubland, California black oak woodland |
| 8/15/19, 8/16/19, 8/21/19 | Sheridan | Pinyon, Utah juniper forest |
| 8/13/19 | Springs | Ponderosa pine, Jeffry pine forest |
| 8/15/19 | Trumbull | Pinyon, Utah juniper and ponderosa pine forest with timber and grass understory |
| 8/6/19, 8/7/19, 8/8/19 | Williams Flats | Ignited in primarily Idaho fescue, bluebunch wheatgrass grassland, expanded to primarily Douglas fir, Pacific ponderosa pine/oceanspray forest |

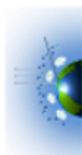
ER-2 data products from the AirMSPI, AVIRIS-C, CPL, and eMAS instruments are housed separately at different locations, which are detailed in [Table 3](#) below. [Table 3](#) outlines the principal investigator and data location for each instrument and provides related satellite information for each instrument to provide relevant information for sampling location.



Table 3: Summary of ER-2 Instruments, Data Locations, and Satellite Information

| Instrument | Principal Investigator | Data Location and dataID (where applicable) | Satellite Analogs | Nominal Spatial Resolution @ ER-2 Cruise | Nominal Swath @ ER-2 Cruise |
|------------|------------------------|--|-------------------|--|-----------------------------|
| AirMSPI | Dave Diner | ASDC: AirMSPI FIREX-AQ Terrain-projected Georegistered Radiance data 6² | MISR, MAIA | 10m | 10km |
| AVIRIS-C | Robert Green | NASA JPL AVIRIS Data Portal AVIRIS Data at ORNL | EMIT, SBG | 20m | 11km |
| CPL | Matthew McGill | ASDC: FIREX AQ Aerosol Cloud Aircraft Remote Sensing ER2 CPL Data 1 | CALIPSO | 20m along track 30 m vertical | N/A |
| eMAS | Steve Platnick | NASA ARC | MODIS, VIIRS, ABI | 50m | 37km |
| GCAS | Scott Janz | ASDC: FIREX AQ Trace Gas Aircraft ER2 GCAS Data 1 | TROPOMI, TEMPO | 500m | 16km |
| NAST-I | Allen Larar | ASDC: FIREX AQ Aircraft Remote Sensing ER2 NASTI Data 1 | AIRS, CrIS | 2600m | 40km |
| S-HIS | Joe Taylor | ASDC: FIREX AQ Aircraft In Situ ER2 SHIS Data 1 | AIRS, CrIS | 2000m | 40km |

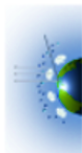
² This data is archived at the ASDC, within the [AirMSPI](#) collections as [AirMSPI FIREX-AQ Terrain-projected-Georegistered Radiance data 6](#). AirMSPI is an airborne prototype instrument that has been involved in numerous sub-orbital campaigns, such as ORACLES, ACEPOL, and SEAC4RS.



The ER-2 coordinated with multiple satellite overpasses over fire/smoke including flying on and along the tracks of multiple satellites to test performance of satellite retrievals as a function of viewing angle. [Table 4](#) below lists ER-2/satellite coordination during the campaign.

Table 4: Summary of ER-2 and Satellite Coordination

| Flight Date | Satellite Name(s) | ER-2 Sampling Time (UTC) |
|-------------|-----------------------|--------------------------|
| 8/2/2019 | TROPOMI | 21:30 |
| 8/6/2019 | TERRA | 19:10 |
| | TROPOMI | 20:10 |
| | CALIPSO | 21:15 |
| | NOAA-20 | 21:50 |
| 8/7/2019 | TROPOMI | 19:50 |
| | Terra | 20:42 |
| | TROPOMI | 21:30 |
| | Aqua | 21:33 |
| 8/8/2019 | METOP-A | 17:30 |
| | METOP-C | 18:11 |
| | TERRA on track | 18:54 |
| | TROPOMI | 20:00 |
| | NOAA-20 on track | 20:22 |
| | AQUA | 20:38 |
| | CALIPSO on track | 20:46 |
| | Suomi-NPP | 21:40 |
| | ICET-2 on track | 20:56 |
| | ISS (under ECOSTRESS) | N/A |
| 8/12/2019 | TERRA | 18:34 |
| 8/15/2019 | TERRA | 19:04 |
| | SUOMI-NPP | 20:39 |
| | TROPOMI | 20:40 |
| | AQUA | 20:41 |
| 8/16/2019 | TROPOMI | 20:25 |
| 8/19/2020 | METOP-C | 17:47 |
| 8/20/2019 | SUOMI-NPP | 20:46 |
| | TROPOMI | 20:50 |
| | AQUA | 21:00 |
| 8/21/2019 | SUOMI-NPP | 20:27 |
| | TROPOMI | 20:30 |



NOAA Chemistry Twin Otter Observational Data Products

NOAA's Chemistry Twin Otter aircraft conducted 40 science flights during FIREX-AQ. The Chemistry Twin Otter deployment lasted from July 29 to September 5 and consisted of 91.5 flight hours. The general sampling strategy was low altitude flight segments dedicated to plume sampling. And typically completed two or three flights per day. The aircraft was based in Boise, Idaho and Cedar City, Utah, but landed and refueled in regional airports throughout the western U.S. The data products from instruments onboard the NOAA Chemistry Twin Otter include in-situ measurements of aerosol properties, trace gases, photolysis coefficients, and meteorology. These are available in time-aligned files that are organized by instrument. Most instruments report data at 1 Hz. The Chemistry Twin Otter sampled 10 identified fires. Table 5 links each flight to the names and fuel types of fires from which smoke plumes were observed. Additional collection information is available in [Tables 31-35](#).

Table 5: Chemistry Twin Otter Fire Sampling Summary

| Flight Date(s) | Fire Name(s) | Fuel Type |
|--|---------------|---|
| 8/24/19, 8/25/19, 8/27/19, 8/28/19, 9/3/19, 9/4/19 | 204 Cow | Douglas fir, Pacific ponderosa pine/oceanspray forest |
| 9/4/19 | Canyon 66 | Douglas fir, Pacific ponderosa pine/oceanspray forest |
| 8/20/19, 8/21/19 | Castle | Ponderosa pine, two-needle pinyon, Utah juniper forest |
| 8/5/19 | Goose | Sagebrush shrubland, post prescribed burn |
| 8/9/19, 8/16/19, 8/17/19 | Granite Gulch | Whitebark pine/subalpine fir forest, Douglas fir, Pacific ponderosa pine/oceanspray forest |
| 8/9/19 | HK163 | Douglas fir, Pacific ponderosa pine/oceanspray forest, Ponderosa pine savanna |
| 8/20/19, 8/21/19 | Little Bear | White fir, gamble oak forest, ponderosa pine savanna |
| 8/9/19 | Nethker | Douglas fir, Pacific ponderosa pine/oceanspray forest, subalpine fir, lodgepole pine, whitebark pine, Engelmann spruce forest |



| Flight Date(s) | Fire Name(s) | Fuel Type |
|----------------|--------------|---|
| 9/5/19 | Smith Knob | Showy sedge, black alpine sedge grassland, Douglas fir, Pacific ponderosa/oceanspray forest |

NOAA Meteorology Twin Otter Observational Data Products

NOAA's Meteorology Twin Otter aircraft also conducted plume sampling during FIREX-AQ, with the deployment spanning a month from July 15 to August 15 2019. Based in Boise, ID, flights were dedicated to characterizing the spatial structure and temporal evolution of the input wind field, the dynamics associated with plume rise, injection height and downwind transport of the plume. The aircraft flew above the plume when possible, in order to provide complete vertical coverage of dynamics and aerosol concentration throughout the plume. The data products from instruments onboard the NOAA-MET Twin Otter include remote sensing measurements of fire radiative power, wind profiles, and aerosol backscatter intensity (*information courtesy of NOAA CSL*). Information about the fires sampled by the NOAA-MET Twin Otter is listed in [Table 6](#) below and details about the NOAA-MET Twin Otter collection are available in [Table 36](#).

More information about the fires listed in the table can be found courtesy of the NOAA CSL: [NOAA-Met Twin Otter Flight Info](#).

Table 6: Meteorology Twin Otter Fire Sampling Summary

| Flight Date(s) | Fire Name | Fuels (inciweb, NWCG, News) |
|--------------------------|---------------|--|
| 7/29/19, 7/30/19, 8/1/19 | Barren Hills | Grand fir, Douglas fir forest |
| 7/30/19 | Beeskove | Douglas fir, Pacific ponderosa pine/oceanspray forest |
| 7/29/19, 7/30/19 | Crab | Subalpine fir, lodgepole pine, whitebark pine, Engelmann spruce forest |
| 8/5/19 | Goose | Sagebrush shrubland, post prescribed burn |
| 8/7/19 | Granite Gulch | Whitebark pine/subalpine fir forest, Douglas fir, Pacific ponderosa pine/oceanspray forest |
| 8/9/19 | HK163 | Douglas fir, Pacific ponderosa pine/oceanspray forest, ponderosa pine savanna |
| 8/3/19 | Lizzy | Pasture/Barren |



| | | |
|--|-----------------|---|
| 7/27/19 | Milepost 97 | Douglas fir, madrone-tanoak forest |
| 8/9/19, 8/10/19, 8/11/19 | Nethker | Douglas fir, Pacific ponderosa pine/oceanspray forest, subalpine fir, lodgepole pine, whitebark pine, Engelmann spruce forest |
| 8/1/19, 8/2/19 | Nevada Mountain | Douglas fir, Pacific ponderosa pine/oceanspray forest |
| 7/26/19, 7/29/19, 8/1/19, 8/2/19, 8/3/19 | Shady | Timber litter and shrubs under Douglas fir, Pacific ponderosa lodgepole pine/oceanspray forest |
| 7/24/19 | Sheep | Sagebrush shrubland with grasses |

Ground Site Observational Data Products

FIREX-AQ ground sites provided continuous, surface-based measurements. Ground site data were collected from several sites within the period of 28 July to 29 August 2019. Location information is embedded in the data products. These measurements are specifically useful in assessing the impact of wildfires on the surface (nose level) through smoke and haze, which is crucial to air quality. The data products related to these ground sites are summarized in [Table 21](#).

A ground site was established at the McCall Activity Barn at Brundage Mountain in McCall, Idaho. The McCall Activity Barn served as an important ground site during FIREX-AQ, and various buildings, vehicles, and shipping containers housed instrumentation from numerous teams at the site, such as the Aerodyne Mobile Laboratory (AML) which is detailed in the following section, the NSF Mobile Lab, and the LCSC VOC group. Additionally, the AEROSOL RObotic NETwork (AERONET) contributed ground site data from the Distributed Regional Aerosol Gridded Observation Network (DRAGON-FIREX-AQ 2019); data from this network are available on the NASA GSFC [AERONET website](#).

Table 6 links ground site sampling periods to the names and fuel types of the fires from which smoke plumes were observed. This table can be used to search for data related to specific fires collected at the McCall, Idaho ground site.

Table 7: Distributed Regional Aerosol Gridded Observation Network (DRAGON) 2019 Fire Sampling Summary



| Observation Date | Fire Name | Fuel Type |
|---|----------------|---|
| 8/23/19, 8/24/19, 8/25/19, 8/26/19, 8/27/19, 8/28/19 | 204 Cow | Douglas fir, Pacific ponderosa pine/oceanspray forest |
| 8/8/19 | CCC Fire | Douglas fir, Pacific ponderosa pine/oceanspray forest |
| 8/20/19, 8/21/19 | Granite Gulch | Whitebark pine/subalpine fir forest and Douglas fir, Pacific ponderosa pine/oceanspray forest |
| 8/10/19, 8/11/19, 8/12/19, 8/13/19, 8/14/19, 8/15/19, 8/16/19, 8/17/19, 8/19/19, 8/22/19, 8/23/19, 8/24/19 | Nethker | Douglas fir, Pacific ponderosa pine/oceanspray forest, subalpine fir, lodgepole pine, whitebark pine, Engelmann spruce forest |
| 7/25/19, 7/26/19, 7/27/19 | Pipeline | Sagebrush shrubland, exotic species |
| 7/29/19 | Shady | Timber litter and shrubs under Douglas fir, Pacific ponderosa, lodgepole pine/oceanspray forest |
| 8/4/19, 8/5/19, 8/6/19, 8/7/19, 8/8/19 | Williams Flats | Ignited in primarily Idaho fescue-bluebunch wheatgrass grassland and expanded to primarily Douglas fir, Pacific ponderosa pine/oceanspray |

Ground Mobile Observational Data Products

Three instrumented mobile platforms were involved in FIREX-AQ. These mobile platforms were deployed at optimal locations for plume sampling and were capable of limited plume chasing. Just as they were for ground sites, measurements from mobile platforms were used in conjunction with airborne data to provide temporal contextual information and to better assess the impact of plumes on surface air quality.

Aerodyne Research, Inc. (ARI) deployed the Aerodyne Mobile Laboratory (AML) from 6 August to 28 August 2019 from a McCall, ID base location to investigate fire-impacted valley towns. From this base, AML also traveled to more distant fires across the western portion of the FIREX-AQ campaign. Data from the AML includes a comprehensive suite of trace gas and particulate measurements. Merged AML data is reported on a 1-minute time base for all instruments,



though most instruments measured at 1Hz intervals. 1Hz data is available from individual instrument PIs as indicated in the descriptive document [firexaq-AMLGAS MOBILE QA R1.docx](#), which provides information about the measurements, data, and sampling locations of AML. Table 8 outlines the fires from which plumes were observed and the fuel types of the fires. [Table 28](#) provides details on the data collected using AML.

The Langley Aerosol Research Group Experiment (LARGE) group deployed the NASA Langley Mobile Laboratory (MACH 2) from a Boise, ID base between 21 July and 28 August 2019 sampling 8 fires in 6 states across the western domain of FIREX-AQ. MACH 2 studied aerosol and trace gas measurements related to wildfires and the interactions of aerosols and trace gases. Table 9 outlines the fires from which smoke plumes were observed and the fuel types of the fires. [Table 29](#) provides details on the data collected from MACH 2.

The California Air Resources Board (CARB) Mobile Laboratory studied the interactions between urban and wildfire emissions in California from 15 August to 4 November 2019. [Table 10](#) outlines the fires from which smoke plumes were observed and the fuel types of the fires. [Table 27](#) provides details on the data collected using CARB.

FIREX-AQ's ground mobile coverage also included a mission-deployed temporary Aerosol RObotic NETwork (AERONET) ground mobile laboratory. The Aerodyne Mobile Laboratory (AML) was based from McCall, ID. Additionally, AERONET deployed a mobile laboratory equipped with DRAGON instrumentation that sampled fires from 25 July through 28 August; however, the data from the DRAGON mobile laboratory is housed [separately](#).

Navigational and locational data are embedded with other data products in this category. The data products related to ground-based mobile measurements are summarized in [Tables 27-29](#). Tables 8-10 provide details for the fires from which smoke plumes were observed from the MACH 2, the CARB Mobile Laboratory, and the Aerodyne Mobile Laboratory. These tables can be used to search for data related to specific fires observed from the mobile laboratories.

Table 8: Aerodyne Mobile Laboratory 2019 Fire Sampling Summary by Observation Date

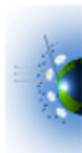
| Observation Date | Fire Name | Fuel Type |
|---------------------------|-----------|--|
| 8/25/19, 8/26/19 | 204 Cow | Douglas fir, Pacific ponderosa pine/oceanspray forest |
| 8/20/19, 8/21/19, 8/22/19 | Castle | Ponderosa pine, two-needle pinyon, Utah juniper forest |
| 8/20/19, 8/21/19, 8/22/19 | Ikes | Ponderosa pine, two-needle pinyon, Utah juniper forest |



| Observation Date | Fire Name | Fuel Type |
|------------------|------------|---|
| 8/9/19, 8/28/19 | Nethker | Douglas fir, Pacific ponderosa pine/oceanspray forest, subalpine fir, lodgepole pine, whitebark pine, Engelmann spruce forest |
| 8/27/19, 8/28/19 | Prescribed | Prescribed understory burn, litter primarily from Douglas fir, Pacific ponderosa pine/oceanspray forest |

Table 9: MACH 2 Fire Sampling Summary

| Observation Date | Fire Name | Fuel Type |
|--|---------------|---|
| 8/26/19, 8/27/19 | 204 Cow | Douglas fir, Pacific ponderosa pine/oceanspray forest |
| 8/2/19 | Black Diamond | Subalpine fir, lodgepole pine, whitebark pine, Engelmann spruce forest |
| 8/22/19, 8/23/19 | Castle | Ponderosa pine, two-needle pinyon, Utah juniper forest |
| 8/20/19, 8/21/19 | Little Bear | White fir, gamble oak forest, ponderosa pine savanna |
| 8/9/19, 8/10/19, 8/11/19, 8/12/19, 8/14/19, 8/15/19, 8/16/19 | Nethker | Douglas fir, Pacific ponderosa pine/oceanspray forest, subalpine fir, lodgepole pine, whitebark pine, Engelmann spruce forest |
| 7/28/19, 7/29/19 | Shady | Timber litter and shrubs under Douglas fir, Pacific ponderosa, lodgepole pine/oceanspray forest |
| 7/21/19, 7/22/19, 7/25/19 | Vader | Timber litter from primarily mature lodgepole pine forest |



| Observation Date | Fire Name | Fuel Type |
|--|----------------|--|
| 8/3/19, 8/4/19, 8/5/19, 8/6/19, 8/7/19 | Williams Flats | Ignited in primarily Idaho fescue-bluebunch wheatgrass grassland and expanded to primarily Douglas fir, Pacific ponderosa pine/oceanspray forest |

Table 10: CARB Mobile Laboratory Fire Sampling Summary

| Observation Date | Fire Name | Fuel Type |
|------------------|-----------|------------------------------------|
| 8/15/19, 8/30/19 | Springs | Ponderosa pine, Jeffry pine forest |

Derived Data Products:

The FIREX-AQ team generated several data products which they derived from observational data, modeling, and satellite observations. These derived products enable users to exploit the observational data products and to readily access information that is not directly available from the FIREX-AQ in-situ observations, but that are still necessary for an integrated data analysis. One of the derived data products is the DC-8 smoke flags product, which is intended to signify the sampling time of fire plumes. These flags were determined by examining the fire tracer observations, e.g., CH₃CN or CO. Plume and fire identifiers, estimated distance to fire, and fire mass combustion efficiency are also included in this derived product. The tabular summary data product lists all plume transects to link the fire origins with values such as estimated plume age, mass combustion efficiency, fuel, and other critical elements to the analysis of plume evolution and fire emissions. Given their importance, plume ages were evaluated as independent data products using model and different meteorological data.

The incorporation of satellite observations plays a major role in the analysis and location of fires and their emissions. The FIREX-AQ Fuel2Fire science team spatiotemporally subset fire locations, burned area, ecosystems, fuels, fire emissions, and SITUation and other ground-based reports (e.g., GeoMAC). A combination of satellite- and ground-based data (FCCS, MODIS, VIIRS, Planet, Sentinel, GOES-16, and GOES-17) were used to derive daily, per fire datasets for every FIREX-AQ aircraft and ground sampling domain for all platforms. For the western fires, emissions are calculated based on the Fuel Characteristic Classification System (FCCS) fuels, fire weather, and satellite data [active fire, Fire Radiative Power (FRP)]. The subset data products are given in a combination of images, maps, tables, pdfs, docs, ArcGIS spatially explicit data, and 1-second data in ICARTT format.

Individual derived products are summarized in [Table 20](#).



Satellite Data Products:

The FIREX-AQ science team members and partners have spatiotemporally subset the VIIRS, GOES-16, and GOES-17 satellite data into the temporal FIREX-AQ aircraft sampling domain. The subset data products are given in a combination of images and numerical data. [Table 30](#) provides a brief product description, file format, instrument, principal investigator, and affiliation for satellite data products.

Merged Data Products:

The users who worked with data from airborne field campaigns have probably used merged data products, which aggregate data files from different in-situ instruments to one file. This allows users to readily examine parameters measured by different instruments. The need for the merge files reflects that 1) different instruments often have different sampling time stamps and/or integration time periods and 2) the data from these instruments are often reported in separate data files. The merge process is to put multiple in-situ measurements from a same platform as well as aircraft navigational and attitude parameters to a common time base (i.e., merge time base). This is implemented using weighted time average of individual instrument data onto the common time base. The weighting factor estimate is based on the overlap between an instrument sampling time interval and merge time interval. The merged data products are detailed in [Table 19](#).

General File Format Guidelines:

The two file formats most often used for remote sensing measurements and satellite data are Hierarchical Data Format (HDF) and Network Common Data Form (netCDF). [HDF](#) is a standard format for large datasets and comes in two file types: HDF4 and HDF5. The data from FIREX-AQ in HDF format are HDF5 files. [HDFView](#) can be used to browse and edit HDF files and can also be used to browse netCDF files. [NetCDF](#) supports the creation, access, and sharing of array-oriented scientific data. Both HDF and NetCDF files can be explored using the software application [Panoply](#).

The FIREX-AQ in-situ measurement data products are most often in The International Consortium for Atmospheric Research on Transport and Transformation (ICARTT) format. The [ICARTT](#) data format is a text-based, self-describing, and simple-to-use file structure consisting of a metadata file header and a comma-separated value (CSV) data section. The file header includes variable definition, uncertainty estimate, and data reporting information, a brief measurement/instrument description and caveat, as well as a brief revision history. The ICARTT format version used for FIREX-AQ is 1.1 with additional features from ICARTT 2.0, i.e., standardized time stamp variable names and variable standard names as tags for data product variables. These variable standard names enhance the data usability and simplify the data



ingest process to the permanent archive, the ASDC. ICARTT files can be opened with a preferred text or CSV file viewing software.

FIREX-AQ data products vary between using the abovementioned file formats and other formats, such as .pdf, .png, or .jpg. [Tables 11 through 36](#) include the file format used for each dataID.

File Naming Convention:

Data File Organization:

ICARTT file naming conventions, regardless of the file format type, dictate the naming of FIREX-AQ data products. As discussed in the “File Naming Convention” sub-section below, this organizational scheme depends on a data product identifier (dataID) and a measurement platform (locationID). One data file contains the data collected during one flight or during a sampling day for ground-based operation from one or more instrument(s) operated by one instrument team, which can be identified by the instrument PI. When a data file contains data from more than one instrument, the sampling time stamps for all instruments are synchronized so that all data can be reported using a common sampling time stamp.

The data files generated from the same instrument(s) from different flights or different sampling days have consistent structure (i.e., have the same number and sequence of the variables as well as consistent variable names for these files).

File Naming Convention:

The FIREX-AQ data files adopt ICARTT naming convention:

DataID_LocationID_YYYYMMDD_R#_Description.extension

Where:

DataID: A data product identifier, e.g., a short description of measured parameter/species, instrument, or model. The dataID for FIREX-AQ data products are prefixed by “FIREX AQ”, e.g., FIREX AQ-SAGA, FIREX AQ-LIF-NO

LocationID: An identifier of measurement/sampling platform, e.g., “DC8,” “ER2,” “Mobile,” “Ground,” “Analysis,” or “Satellite”

YYYYMMDD: UTC sampling date when the flight takes off

R#: Revision number. The revision number will be R0, R1, R2, for the publication quality data. Note: archived files cannot be overwritten, only replaced by files with subsequent revisions

Description: Optional additional description of the file if necessary. For example:



“L1” or “L2” are the equivalent of “Launch 1” or “Launch 2”
“V1” or “V2” are the equivalent of “Volume 1” or “Volume 2”

Extension: “ict” for ICARTT files, “nc” for netCDF, and “h5” for HDF 5 files, etc.

Examples: The filename for “Water Vapor Volumetric Mixing Ratio” measurement made on August 21, 2019 DC-8 flight may be:

FIREX-AQ-DLH_DC8_20190821_R0.ict

Collection Details:

FIREX-AQ measurements have been grouped into collections, also referred to as “data products”. Collections for observational data products are generally organized by platform, type of variables measured, and observation type (in-situ or remote sensing). Some collections have been separated in this organizational schema by instrument where appropriate. Derived data products, satellite data products and merged data products are organized into separate collections. The organization of FIREX-AQ data by collection enables users to readily access all data necessary for a comprehensive characterization of fire plumes. The data products within these collections have been summarized in the following tables, which provide dataID (the unique identifier for each product), a description of the measured variables within the data product, the instrument(s) used, the principal investigator, their affiliation, and measurement reporting frequency (in appropriate instances). The hyperlinks associated with each collection within the following tables can be used to explore additional documentation and related information as well as to access data on Earthdata Search and the ASDC’s Sub-Orbital Order Tool (SOOT)



Table 11
Collection: [FIREX AQ Aerosol Aircraft In Situ DC8 Data 1](#)
Platform: DC-8
Dates: 15 July – 05 September 2019

EARTHDATA



| Data ID | Key Variables | File Format | Instrument | Sampling Frequency | Principal Investigator | Institution |
|------------------------------|-------------------------------------|-------------|------------|--------------------|------------------------|---------------|
| FIREX AQ-NOAA-LiNeph-P11-405 | Scattering phase function | ICARTT | LINEPH | Variable | Adam Ahern | NOAA ESRL CSD |
| FIREX AQ-NOAA-LiNeph-P11-660 | Scattering phase function | ICARTT | LINEPH | Variable | Adam Ahern | NOAA ESRL CSD |
| FIREX AQ-NOAA-LiNeph-P12-405 | Scattering polarized phase function | ICARTT | LINEPH | Variable | Adam Ahern | NOAA ESRL CSD |
| FIREX AQ-NOAA-LiNeph-P12-660 | Scattering polarized phase function | ICARTT | LINEPH | Variable | Adam Ahern | NOAA ESRL CSD |
| firexaq-SAGA-AERO | Aerosol water soluble composition | ICARTT | Filter/IC | ~1 Hz | Jack Dibb | UNH |
| FIREX AQ-AMS | Aerosol Composition | ICARTT | AMS | 1 Hz | Jose Jimenez | UC Boulder |



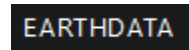
| | | | | | | |
|--------------------------------|-----------------------------------|--------|----------------------|----------|----------------|---------------|
| FIREXAQ-AMSSD | Size resolved aerosol composition | ICARTT | AMS | Variable | Jose Jimenez | UC Boulder |
| firexaq-EESI | OA | ICARTT | EESI ToFMS | 1 Hz | Jose Jimenez | UC Boulder |
| FIREXAQ-LARGE-LAScold | Size distribution | ICARTT | LAS | 1 Hz | Richard Moore | NASA LaRC |
| FIREXAQ-LARGE-LAShot | Size distribution (heated) | ICARTT | LAS | 1 Hz | Richard Moore | NASA LaRC |
| FIREXAQ-LARGE-OPTICAL | Scattering, absorption, fRH | ICARTT | fRH | 1 Hz | Richard Moore | NASA LaRC |
| FIREXAQ-LARGE-SMPS | Size distribution | ICARTT | SMPS | 0.02 Hz | Richard Moore | NASA LaRC |
| FIREXAQ-LARGE-AerosolCloudConc | Aerosol concentration, CCN | ICARTT | CPCs, LAS, SMPS, CCN | 1 Hz | Richard Moore | NASA LaRC |
| FIREXAQ-SP2-BC-1HZ | Black carbon | ICARTT | SP2 | 1 Hz | Joshua Schwarz | NOAA ESRL CSD |
| firexaq-AOP-optical | Extinction, absorption | ICARTT | AOP | 1 Hz | Nick Wagner | NOAA ESRL CSD |
| firexaq-AOP-UHSAS-TD | Size distribution (heated) | ICARTT | UHSAS/TD | 1 Hz | Nick Wagner | NOAA ESRL CSD |



| | | | | | | |
|-----------------------|---------------------------|--------|-------------|----------|--------------|--------------|
| FIREXAQ-SAGA-AERO-BrC | Absorption (brown carbon) | ICARTT | Filter/LWCC | Variable | Rodney Weber | Georgia Tech |
| FIREXAQ-SAGA-MC-BrC | Absorption (brown carbon) | ICARTT | MC/LWCC | 0.01 Hz | Rodney Weber | Georgia Tech |

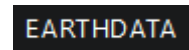


Table 12
Collection: [FIREXAQ Cloud AircraftInSitu DC8 Data 1](#)
Platform: DC-8
Dates: 22 July – 05 September 2019



| Data ID | Key Variables | File Format | Instrument | Sampling Frequency | Principal Investigator | Institution |
|-----------------------------|---------------------------------|-------------|------------|--------------------|------------------------|-------------|
| FIREXAQ-LARGE-CDP | Cloud Droplet Size distribution | ICARTT | CDP | 1 Hz | Richard Moore | NASA LaRC |
| FIREXAQ-LARGE-CPSPD | Cloud Droplet Size distribution | ICARTT | CPSPD | 1 Hz | Richard Moore | NASA LaRC |
| firexaq-CARE-cloudindicator | Cloud Flag | ICARTT | CAPS | 1 Hz | Bernadett Weinzierl | U of Vienna |
| firexaq-CARE-NCoarseAerosol | Number concentration | ICARTT | CAPS | 1 Hz | Bernadett Weinzierl | U of Vienna |

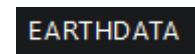
Table 13
Collection: [FIREXAQ TraceGas AircraftRemoteSensing DC8 Data 1](#)
Platform: DC-8
Dates: 15 July – 05 September 2019



| Data ID | Key Variables | File Format | Instrument | Sampling Frequency | Principal Investigator | Institution |
|----------------------------|--------------------------|-------------|------------|--------------------|------------------------|-------------|
| FIREXAQ-UCLA-MiniDOAS-5AVG | NO2, CH2O, HONO, SO2, O4 | NetCDF | Mini-DOAS | Variable | Jochen Stutz | UCLA |
| FIREXAQ-UCLA-MiniDOAS | NO2, CH2O, HONO, SO2, O4 | NetCDF | Mini-DOAS | Variable | Jochen Stutz | UCLA |



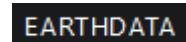
Table 14
Collection: [FIREX AQ MetNav AircraftInSitu DC8 Data 1](#)
Platform: DC-8
Dates: 15 July – 05 September 2019



| Data ID | Key Variables | File Format | Instrument | Sampling Frequency | Principal Investigator | Institution |
|--------------------|--|-------------|---------------------------------|--------------------|------------------------|-------------|
| FIREX AQ-MetNav5Hz | Aircraft navigation and attitude parameters, pressure, temperature | ICARTT | LN251, TTS, Pressure Transducer | 5 Hz | Melissa Yang | NSRC |
| FIREX AQ-MetNav | Aircraft navigation and attitude parameters, pressure, temperature | ICARTT | LN251, TTS, Pressure Transducer | 1 Hz | Melissa Yang | NSRC |
| FIREX AQ-MMS-1HZ | Pressure, temperature, horizontal and vertical wind | ICARTT | MMS | 1 Hz | Paul Bui | NASA ARC |
| FIREX AQ-MMS-20HZ | Pressure, temperature, horizontal and vertical wind | .zip | MMS | 20 Hz | Paul Bui | NASA ARC |
| FIREX AQ-DLH-20Hz | H2O(v) | ICARTT | DLH | 20 Hz | Glenn Diskin | NASA LaRC |

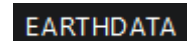


Table 15
Collection: [FIREXAQ JValues AircraftInSitu DC8 Data 1](#)
Platform: DC-8
Dates: 15 July – 05 September 2019



| Data ID | Key Variables | File Format | Instrument | Sampling Frequency | Principal Investigator | Institution |
|-----------------|-------------------------|-------------|------------|--------------------|------------------------|--------------|
| FIREXAQ-CAFS-JV | Photolytic coefficients | ICARTT | CAFS | 1 Hz | Samuel Hall | NCAR ACOM |

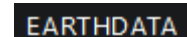
Table 16
Collection: [FIREXAQ HSRL AircraftRemoteSensing DC8 Data 1](#)
Platform: DC-8
Dates: 17 July – 05 September 2019



| Data ID | Key Variables | File Format | Instrument | Sampling Frequency | Principal Investigator | Institution |
|---------------------|-------------------------------|-------------------|------------|--------------------|------------------------|-------------|
| FIREXAQ-DIAL-IMAGES | O3, aerosol property profiles | .zip | DIAL-HSRL | N/A | Jonathan Hair | NASA LaRC |
| FIREXAQ-DIAL | O3, aerosol property profiles | .zip, ICARTT, HDF | DIAL-HSRL | Variable | Jonathan Hair | NASA LaRC |



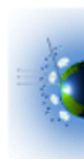
Table 17
Collection: [FIREXAQ TraceGas AircraftInSitu DC8 Data 1](#)
Platform: DC-8
Dates: 15 July – 05 September 2019



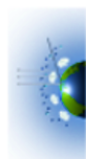

| Data ID | Key Variables | File Format | Instrument | Sampling Frequency | Principal Investigator | Institution |
|------------------------|---------------------|-------------|------------|--------------------|------------------------|---------------|
| FIREXAQ-TOGA-VOCs | VOCs | ICARTT | TOGA | 105 Hz | Eric Apel | NCAR ACOM |
| firexaq-UCI-WAS | VOCs | ICARTT | WAS/gc | Variable | Donald Blake | UC Irvine |
| FIREXAQ-CO2-7000 | CO2 | ICARTT | LICOR 7000 | 1 Hz | Glenn Diskin | NASA LaRC |
| FIREXAQ-CO2-7000-5Hz | CO2 | ICARTT | LICOR 7000 | 5 Hz | Glenn Diskin | NASA LaRC |
| FIREXAQ-DACOM-5Hz | CO, CH4 | ICARTT | DACOM | 5 Hz | Glenn Diskin | NASA LaRC |
| FIREXAQ-DACOM | CO, CH4 | ICARTT | DACOM | 1 Hz | Glenn Diskin | NASA LaRC |
| FIREXAQ-C2H6 | C2H6 | ICARTT | CAMS | 1 Hz | Alan Fried | UC Boulder |
| FIREXAQ-CH2O | CH2O | ICARTT | CAMS | 1 Hz | Alan Fried | UC Boulder |
| FIREXAQ-NOAA-iWAS-VOCs | VOCs | ICARTT | iWAS/GC-MS | Variable | Jessica Gilman | NOAA ESRL CSD |
| firexaq-ISAF-CH2O-10Hz | CH2O | ICARTT | ISAF | 10 Hz | Thomas Hanisco | NASA GSFC |
| firexaq-ISAF-CH2O-1Hz | CH2O | ICARTT | ISAF | 1 Hz | Thomas Hanisco | NASA GSFC |
| FIREXAQ-GTCIMS-PANS | PAN, PPN, APAN, PBN | ICARTT | CIMS | 1 Hz | Greg Huey | Georgia Tech |



| | | | | | | |
|----------------------------|----------|--------|-------|-------|----------------|---------------|
| FIREXQAQ-GTCIMS-PAN-10Hz | PAN | ICARTT | CIMS | 10 Hz | Greg Huey | Georgia Tech |
| FIREXQAQ-GTCIMS-APAN-10Hz | APAN | ICARTT | CIMS | 10 Hz | Greg Huey | Georgia Tech |
| FIREXQAQ-LIF-NO-5Hz | NO | ICARTT | LIF | 5 Hz | Andrew Rollins | NOAA ESRL CSD |
| FIREXQAQ-LIF-NO | NO | ICARTT | LIF | 1 Hz | Andrew Rollins | NOAA ESRL CSD |
| FIREXQAQ-LIF-SO2-5Hz | SO2 | ICARTT | LIF | 5 Hz | Andrew Rollins | NOAA ESRL CSD |
| FIREXQAQ-LIF-SO2 | SO2 | ICARTT | LIF | 1 Hz | Andrew Rollins | NOAA ESRL CSD |
| firexaq-NOyO3-NO2 | NO2 | ICARTT | CL | 1 Hz | Thomas Ryerson | NOAA ESRL CSD |
| firexaq-NOyO3-NO | NO | ICARTT | NOyO3 | 1 Hz | Thomas Ryerson | NOAA ESRL CSD |
| firexaq-NOyO3-NOy | NOy | ICARTT | NOyO3 | 1 Hz | Thomas Ryerson | NOAA ESRL CSD |
| firexaq-NOyO3-O3 | O3 | ICARTT | NOyO3 | 1 Hz | Thomas Ryerson | NOAA ESRL CSD |
| FIREXQAQ-NOAACIMS-BrCl | BrCl | ICARTT | CIMS | 1 Hz | Patrick Veres | NOAA ESRL CSD |
| FIREXQAQ-NOAACIMS-BrCN | BrCN | ICARTT | CIMS | 1 Hz | Patrick Veres | NOAA ESRL CSD |
| FIREXQAQ-NOAACIMS-BrO | BrO | ICARTT | CIMS | 1 Hz | Patrick Veres | NOAA ESRL CSD |
| FIREXQAQ-NOAACIMS-CH3COOCI | CH3COOCI | ICARTT | CIMS | 1 Hz | Patrick Veres | NOAA ESRL CSD |



| | | | | | | |
|--|-------|--------|------------|------|-----------------|------------------|
| FIREXAQ- NOAACIMS-CI2 | CI2 | ICARTT | CIMS | 1 Hz | Patrick Veres | NOAA ESRL CSD |
| FIREXAQ- NOAACIMS- CINO2 | CINO2 | ICARTT | CIMS | 1 Hz | Patrick Veres | NOAA ESRL CSD |
| FIREXAQ- NOAACIMS-HCN | HCN | ICARTT | CIMS | 1 Hz | Patrick Veres | NOAA ESRL CSD |
| FIREXAQ- NOAACIMS- HCOOH | HCOOH | ICARTT | CIMS | 1 Hz | Patrick Veres | NOAA ESRL CSD |
| FIREXAQ- NOAACIMS- HNCO | HNCO | ICARTT | CIMS | 1 Hz | Patrick Veres | NOAA ESRL CSD |
| FIREXAQ- NOAACIMS- HNO2 | HNO2 | ICARTT | CIMS | 1 Hz | Patrick Veres | NOAA ESRL CSD |
| FIREXAQ- NOAACIMS- HPMTF | HPMTF | ICARTT | CIMS | 1 Hz | Patrick Veres | NOAA ESRL CSD |
| FIREXAQ- NOAACIMS- N2O5 | N2O5 | ICARTT | CIMS | 1 Hz | Patrick Veres | NOAA ESRL CSD |
| firexaq- NOAAPTR- Urban-VOCs-1Hz | VOCs | ICARTT | PTR-ToF-MS | 1 Hz | Carsten Warneke | NOAA ESRL CSD |
| firexaq- NOAAPTR- Urban-VOCs-5Hz | VOCs | ICARTT | PTR-ToF-MS | 5 Hz | Carsten Warneke | NOAA ESRL CSD |
| firexaq- NOAAPTR-VOCs- 1Hz | VOCs | ICARTT | PTR-ToF-MS | 1 Hz | Carsten Warneke | NOAA ESRL CSD |



| | | | | | | |
|------------------------------------|-----------------------------|--------|------------|-------|-----------------|------------------|
| firexaq- NOAAPTR-VOCs- 2Hz | VOCs | ICARTT | PTR-ToF-MS | 2 Hz | Carsten Warneke | NOAA ESRL CSD |
| firexaq- NOAAPTR-VOCs- 5Hz | VOCs | ICARTT | PTR-ToF-MS | 5 Hz | Carsten Warneke | NOAA ESRL CSD |
| firexaq-CIT- BUTENE-HN- 10Hz | Butene Hydroxynitrates | ICARTT | ToF-CIMS | 10 Hz | Paul Wennberg | Cal Tech |
| firexaq-CIT- BUTENE-HN-1Hz | Butene Hydroxynitrates | ICARTT | ToF-CIMS | 1 Hz | Paul Wennberg | Cal Tech |
| firexaq-CIT- BUTENE-HP- 10Hz | C4 Hydroxyperoxide | ICARTT | ToF-CIMS | 10 Hz | Paul Wennberg | Cal Tech |
| firexaq-CIT- BUTENE-HP-1Hz | C4 Hydroxyperoxide | ICARTT | ToF-CIMS | 1 Hz | Paul Wennberg | Cal Tech |
| firexaq-CIT- ETHENE-HN- 10Hz | Ethene Hydroxynitrate | ICARTT | ToF-CIMS | 10 Hz | Paul Wennberg | Cal Tech |
| firexaq-CIT- ETHENE-HN-1Hz | Ethene Hydroxynitrate | ICARTT | ToF-CIMS | 1 Hz | Paul Wennberg | Cal Tech |
| firexaq-CIT- ETHENE-HP-10Hz | Ethene Hydroxyperoxide | ICARTT | ToF-CIMS | 10 Hz | Paul Wennberg | Cal Tech |
| firexaq-CIT- ETHENE-HP-1Hz | Ethene Hydroxyperoxide | ICARTT | ToF-CIMS | 1 Hz | Paul Wennberg | Cal Tech |
| firexaq-CIT- ISOPN-10Hz | Isoprene Hydroxynitrates | ICARTT | ToF-CIMS | 10 Hz | Paul Wennberg | Cal Tech |
| firexaq-CIT- ISOPN-1Hz | Isoprene Hydroxynitrates | ICARTT | ToF-CIMS | 1 Hz | Paul Wennberg | Cal Tech |
| firexaq-CIT- PHENOL-10Hz | Phenol | ICARTT | ToF-CIMS | 10 Hz | Paul Wennberg | Cal Tech |

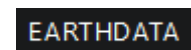


| | | | | | | |
|-----------------------------|----------------------------|--------|----------|-------|---------------|----------|
| firexaq-CIT-PHENOL-1Hz | Phenol | ICARTT | ToF-CIMS | 1 Hz | Paul Wennberg | Cal Tech |
| firexaq-CIT-PROPENE-HN-10Hz | Propene Hydroxynitrate | ICARTT | ToF-CIMS | 10 Hz | Paul Wennberg | Cal Tech |
| firexaq-CIT-PROPENE-HN-1Hz | Propene Hydroxynitrate | ICARTT | ToF-CIMS | 1 Hz | Paul Wennberg | Cal Tech |
| firexaq-CIT-PROPENE-HP-10Hz | Propene Hydroxyperoxide | ICARTT | ToF-CIMS | 10 Hz | Paul Wennberg | Cal Tech |
| firexaq-CIT-PROPENE-HP-1Hz | Propene Hydroxyperoxide | ICARTT | ToF-CIMS | 1 Hz | Paul Wennberg | Cal Tech |
| firexaq-CIT-H2O2-10Hz | H2O2 | ICARTT | ToF-CIMS | 10 Hz | Paul Wennberg | Cal Tech |
| firexaq-CIT-H2O2-1Hz | H2O2 | ICARTT | ToF-CIMS | 1 Hz | Paul Wennberg | Cal Tech |
| firexaq-CIT-HCN-10Hz | HCN | ICARTT | ToF-CIMS | 10 Hz | Paul Wennberg | Cal Tech |
| firexaq-CIT-HCN-1Hz | HCN | ICARTT | ToF-CIMS | 1 Hz | Paul Wennberg | Cal Tech |
| firexaq-CIT-HNO3-10Hz | HNO3 | ICARTT | ToF-CIMS | 10 Hz | Paul Wennberg | Cal Tech |
| firexaq-CIT-HNO3-1Hz | HNO3 | ICARTT | ToF-CIMS | 1 Hz | Paul Wennberg | Cal Tech |
| firexaq-CIT-CH3OOH | CH3OOH | ICARTT | ToF-CIMS | | Paul Wennberg | Cal Tech |
| firexaq-CIT-GLYC | Glycoaldehyde | ICARTT | ToF-CIMS | | Paul Wennberg | Cal Tech |
| firexaq-CIT-IEPOX | IEPOX | ICARTT | ToF-CIMS | | Paul Wennberg | Cal Tech |



| | | | | | | |
|------------------------|---------|--------|------------|------|-----------------|-----------|
| firexaq-CIT-ISOPOOH | ISOPOOH | ICARTT | ToF-CIMS | | Paul Wennberg | Cal Tech |
| firexaq-CIT-PAA | PAA | ICARTT | ToF-CIMS | | Paul Wennberg | Cal Tech |
| firexaq-PTRMS-HCHO-1Hz | CH2O | ICARTT | PTR-ToF-MS | 1 Hz | Armin Wisthaler | U of Oslo |

Table 18
Collection: [FIREXAQ Radiation AircraftInSitu DC8 Data 1](#)
Platform: DC-8
Dates: 22 July – 05 September 2019



| Data ID | Key Variables | File Format | Instrument | Sampling Frequency | Principal Investigator | Institution |
|-------------------------------------|-----------------------|-------------|------------|--------------------|------------------------|--------------|
| firexaq-cafs-ActinicFluxDownwelling | Downwelling component | ICARTT | CAFS | ~1 Hz | Samuel Hall | NCAR ACOM |
| firexaq-cafs-ActinicFluxUpwelling | Upwelling component | ICARTT | CAFS | ~1 Hz | Samuel Hall | NCAR ACOM |



Table 19
Collection: [FIREXAQ Merge Data 2](#)
Platform: DC-8
Dates: 22 July – 06 September 2019

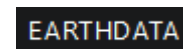
EARTHDATA



| Data ID | Key Variables | File Format | Instrument | Principal Investigator | Institution |
|-------------------------------|---|-------------|------------|------------------------|-------------|
| firexaq-mrg01-dc8_merge | 1-sec merged variables | ICARTT | Multiple | Gao Chen | NASA LaRC |
| firexaq-mrg10-dc8_merge | 10-sec merged variables | ICARTT | Multiple | Gao Chen | NASA LaRC |
| firexaq-mrg60-dc8_merge | 60-sec merged variables | ICARTT | Multiple | Gao Chen | NASA LaRC |
| firexaq-mrgiWAS-dc8_merge | Merged variables to FIREXAQ-NOAA-iWAS-VOCs dataID | ICARTT | Multiple | Gao Chen | NASA LaRC |
| firexaq-mrgSAGAAero-dc8_merge | Merged variables to firexaq-SAGA-AERO dataID | ICARTT | Multiple | Gao Chen | NASA LaRC |
| firexaq-mrgSAGAMC-dc8_merge | Merged variables to firexaq-SAGA-MC dataID | ICARTT | Multiple | Gao Chen | NASA LaRC |
| firexaq-mrgTOGA-dc8_merge | Merged variables to FIREXAQ-TOGA-VOCs dataID | ICARTT | Multiple | Gao Chen | NASA LaRC |
| firexaq-mrgWAS-dc8_merge | Merged variables to firexaq-UCI-WAS dataID | ICARTT | Multiple | Gao Chen | NASA LaRC |
| firexaq-mrgAMS60-dc8_merge | Merged variables based on FIREXAQ-AMS60 time base | ICARTT | Multiple | Gao Chen | NASA LaRC |



Table 20
Collection: [FIREX AQ Analysis Data 1](#)
Platform: Multiple
Dates: 24 July – 03 September 2019



| Data ID | Key Variables | File Format | Instrument | Sampling Frequency | Principal Investigator | Institution |
|--|---|-------------------|--|--------------------|------------------------|---------------|
| FIREX AQ-Plume-Ratios-5hz | Plume ratios | ICARTT | DACOM, LICOR | 5 Hz | Hannah Halliday | NASA LaRC |
| FIREX AQ-Plume-Ratios-1hz | Plume ratios | ICARTT | DACOM, LICOR | 1 Hz | Hannah Halliday | NASA LaRC |
| FIREX AQ-FIREFLAG-TABULARDATA | Transect start stop times and associated transect-level information | .xlsx | N/A | 1 Hz | Joshua Schwarz | NOAA ESRL CSD |
| firexaq-Fuel2Fire-TotalCarbonEmissions | Total, new, residual carbon, flaming, smoldering emissions | ICARTT | FCCS-fuel, VIIRS, GOES, MODIS, ground data | 1 Hz | Amber Soja | NIA |
| FIREX AQ-Fuel2Fire-EcosystemsBurned | Total area burned, percent area burned | .xlsx | N/A | N/A | Amber Soja | NIA |
| FIREX AQ-Fuel2Fire-EasternCentralFires | Flight tracks, fire names, and images | .zip, .kmz, .xlsx | N/A | N/A | Amber Soja | NIA |
| FIREX AQ-Fuel2Fire-Ancillary | Ancillary data | .zip | N/A | N/A | Amber Soja | NIA |



Table 21
Collection: [FIREXAQ Ground InSitu Data 1](#)
Platform: Ground-based observations
Dates: 4 June – 10 August 2019

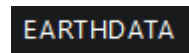
EARTHDATA



| Data ID | Key Variables | File Format | Instrument | Sampling Frequency | Principal Investigator | Institution |
|-------------------------|-----------------------------|-------------|--|--------------------|------------------------|-------------|
| firexaq-GCTOF-VOC-npa | VOCs | ICARTT | GC-EI-ToF | 1 Hz | Megan Claflin | Aerodyne |
| firexaq-GCTOF-VOC | VOCs | ICARTT | GC-EI-ToF | 1 Hz | Megan Claflin | Aerodyne |
| firexaq-acsm | Aerosol Composition | ICARTT | ACSM | 0.2 Hz | Philip Croteau | Aerodyne |
| firexaq-OCEC-McCall | OC, EC | ICARTT | OC/EC Analyzer | Variable | Allen Goldstein | UC Berkeley |
| firexaq-cTAG-McCall | OAs | ICARTT | cTAG | Variable | Allen Goldstein | UC Berkeley |
| firexaq-LCSC-SO2 | SO2 | .xlsx | PUVF | 1 Hz | Nancy Johnston | LCSC ACRG |
| firexaq-LCSC-VOC | C15H24, C7H7Cl, C10H16, etc | .xlsx | TD-GC-MS | Variable | Nancy Johnston | LCSC ACRG |
| firexaq-McCallAuxandMet | Meteorology | ICARTT | Derived from McCall Airport measurements | 0.2 Hz | Tara Yacovitch | Aerodyne |

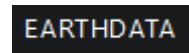


Table 22
Collection: [FIREXAQ MetNav AircraftInSitu ER2 Data 1](#)
Platform: ER-2
Dates: 1 August – 21 August 2019



| Data ID | Key Variables | File Format | Instrument | Principal Investigator | Institution |
|----------------|---|-------------|------------|------------------------|-------------|
| FIREXAQ-MetNav | Aircraft navigation and attitude parameters | ICARTT | NASDAT | Olga Kalshnikova | JPL |

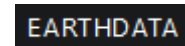
Table 23
Collection: [FIREXAQ TraceGas AircraftRemoteSensing ER2 GCAS Data 1](#)
Platform: ER-2
Dates: 2 August – 21 August 2019



| Data ID | Key Variables | File Format | Instrument | Principal Investigator | Institution |
|-------------------------|---------------|-------------|------------|------------------------|-------------|
| firexaq-GCAS-CH2O | CH2O, NO2 | HDF | GCAS | Scott Janz | NASA GSFC |
| firexaq-GCAS-HNO2 | HNO2 | HDF | GCAS | Scott Janz | NASA GSFC |
| firexaq-GCAS-NO2-C2H2O2 | NO2, C2H2O2 | HDF, KMZ | GCAS | Scott Janz | NASA GSFC |

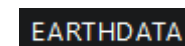


Table 24
Collection: [FIREXAQ AerosolCloud AircraftRemoteSensing ER2 CPL Data 1](#)
Platform: ER-2
Dates: 1 August – 21 August 2019



| Data ID | Key Variables | File Format | Instrument | Principal Investigator | Institution |
|--------------------|--|-------------|------------|------------------------|-------------|
| Firexaq-CPL-L1B | Size Distribution | HDF | CPL | Matt McGill | NASA GSFC |
| firexaq-CPL-L2-Lay | Aerosol properties, cloud properties, mixed layer height | HDF | CPL | Matt McGill | NASA GSFC |
| firexaq-CPL-L2-Pro | Aerosol properties, cloud properties | HDF | CPL | Matt McGill | NASA GSFC |

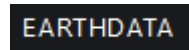
Table 25
Collection: [FIREXAQ TraceGas AircraftRemoteSensing ER2 SHIS Data 1](#)
Platform: ER-2
Dates: 2 August – 21 August 2019



| Data ID | Key Variables | File Format | Instrument | Principal Investigator | Institution |
|------------------|------------------|-------------|------------|------------------------|----------------|
| firexaq-shis-rad | Temperature, H2O | NetCDF | SHIS | Joe Taylor | U of WI - SSEC |
| firexaq-shis-rtv | Temperature, H2O | HDF, NetCDF | SHIS | Joe Taylor | U of WI - SSEC |

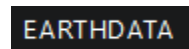


Table 26
Collection: [FIREXAQ TraceGas AircraftRemoteSensing ER2 NASTI Data 1](#)
Platform: ER-2
Dates: 2 August – 21 August 2019



| Data ID | Key Variables | File Format | Instrument | Principal Investigator | Institution |
|------------------|---------------------|-------------|------------|------------------------|-------------|
| FIREXAQ-NASTI-GP | CO, temperature, RH | NetCDF | NAST-I | Allen Larar | NASA LaRC |

Table 27
Collection: [FIREXAQ SurfaceMobile CARB InSitu Data 1](#)
Platform: CARB
Dates: 15 August – 4 November 2019



| Data ID | Key Variables | File Format | Instrument | Principal Investigator | Institution |
|-----------------|--|-------------|------------|------------------------|------------------------|
| FIREXAQ-CARB-MC | Navigation, meteorology, trace gases, BC, aerosol absorption | ICARTT | Multiple | Shang Liu | CARB Research Division |



Table 28
Collection: [FIREXAQ SurfaceMobile Aerodyne InSitu Data 1](#)
Platform: Aerodyne
Dates: 6 August – 28 August 2019

EARTHDATA



| Data ID | Key Variables | File Format | Instrument | Principal Investigator | Institution |
|---------------------------------------|--|-------------|-------------------|------------------------|-------------|
| firexaq-AMS-AerosolChemicalLoadings | ChI, NH4, NO3, SO4, OA | ICARTT | HR ToF AMS | Edward Fortner | Aerodyne |
| firexaq-SPAMS-AerosolChemicalLoadings | BC, ChI, NH4, NO3, SO4, OA | ICARTT | HR ToF AMS, SP2 | Edward Fortner | Aerodyne |
| firexaq-filter-AML | OAs | ICARTT | GC-HRToFMS, OC/EC | Allen Goldstein | UC Berkeley |
| firexaq-VocusPTRMS-VOC | VOCs | ICARTT | PTR ToF-MS | Francesca Maljuf | Aerodyne |
| firexaq-SP2BNL | BC Size distribution | ICARTT | SP2 | Tim Onasch | Aerodyne |
| firexaq-AMLGAS | Navigation, meteorology, and trace gases | ICARTT | AMLGAS | Tara Yacovitch | Aerodyne |

Table 29
Collection: [FIREXAQ SurfaceMobile MACH2 InSitu Data 1](#)
Platform: MACH2
Dates: 21 July – 26 August 2019

EARTHDATA



| Data ID | Key Variables | File Format | Instrument | Principal Investigator | Institution |
|---------------------|---|-------------|------------|------------------------|-------------|
| FIREXAQ-MACH2-LARGE | Navigation, trace gases, aerosol properties | ICARTT | Multiple | Bruce Anderson | NASA LaRC |



| | | | | | |
|------------------------------------|--|--------|----------------------|-------------------|---------------|
| FIREXAQ-MACH2-LARGE-APS | Aerosol size distribution | ICARTT | APS | Bruce Anderson | NASA LaRC |
| FIREXAQ-MACH2-LARGE-OPS | Aerosol size distribution | ICARTT | OPS | Bruce Anderson | NASA LaRC |
| FIREXAQ-MACH2-SAGAAERO | Aerosol Composition | ICARTT | Filter/IC | Jack Dibb | UNH |
| FIREXAQ-MACH2-SAGAMC | HNO ₃ , HONO | ICARTT | MC/IC | Jack Dibb | UNH |
| FIREXAQ-MACH2-RN-Isotopes | Isotopic compositions for HONO, NO _x , NO ₂ , HNO ₃ , NO ₃ | ICARTT | Colorimetry and IRMS | Meredith Hastings | Brown |
| FIREXAQ-MACH2-SpEx-ExtCoeffSpectra | Aerosol Extinction Spectrum | ICARTT | SpEx | Carolyn Jordan | NIA/NASA LaRC |

Table 30
Collection: [FIREXAQ Satellite Data 2](#)
Platform: Satellite
Dates: 01 July – 30 September 2019

EARTHDATA

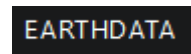


| Data ID | Key Variables | File Format | Instrument | Principal Investigator | Institution |
|-------------------------------|---|-------------|------------|------------------------|-------------|
| FIREXAQ-VIIRS-SNPP-AF | Fire detection | .tar | VIIRS | Ivan Csiszar | NASA/UMD |
| firexaq-GOES17-images-DC8 | True color still images and movies of fires | .zip | GOES | Christopher Holmes | FSU |
| firexaq-GOES17-data-WesternUS | True color still images and movies of fires | .zip | GOES | Christopher Holmes | FSU |
| firexaq-GOES16-images-DC8 | True color still images and movies of fires | .zip | GOES | Christopher Holmes | FSU |



| | | | | | |
|-------------------------------|---|------|------|--------------------|-----|
| firexaq-GOES16-data-WesternUS | True color still images and movies of fires | .zip | GOES | Christopher Holmes | FSU |
| firexaq-GOES16-data-EasternUS | True color still images and movies of fires | .zip | GOES | Christopher Holmes | FSU |
| FIREXAQ-GOES17-FDCC | Fire detection | .tar | GOES | Chris Schmidt | |
| FIREXAQ-GOES16-FDCC | Fire detection | .tar | GOES | Chris Schmidt | |

Table 31
Collection: [FIREXAQ TraceGas AircraftInSitu N48 Data 1](#)
Platform: NOAA-CHEM Twin Otter
Dates: 29 July – 06 September 2019



| Data ID | Key Variables | File Format | Instrument | Principal Investigator | Institution |
|-------------------|--|-------------|-----------------------------|------------------------|--------------|
| FIREXAQ-GCGCTOFMS | VOCs | ICARTT | Tenax cartridge autosampler | Kelley Barsanti | UC-Riverside |
| FIREXAQ-COCO2CH4 | CO, CO2, CH4, H2O | ICARTT | Picarro CRDS | Michael Robinson | NOAA ESRL |
| FIREXAQ-UWCIMS | Acids, Acid gases, Oxygenated organics, Organic nitrates, Halogens | ICARTT | I-ToF CIMS | Joel Thornton | UW |
| FIREXAQ-NONO2O3 | NO, NO2, O3 | ICARTT | Chemiluminescence | Andy Weinheimer | NCAR/UCAR |



Table 32
Collection: [FIREX AQ Aerosol AircraftInSitu N48 Data 1](#)
Platform: NOAA-CHEM Twin Otter
Dates: 15 July – 05 September 2019

EARTHDATA



| Data ID | Key Variables | File Format | Instrument | Principal Investigator | Institution |
|-----------------------|--|-------------|-------------------|------------------------|-----------------|
| FIREX AQ-UHSAS | Aerosol Size Distributions | ICARTT | UHSAS | Alessandro Franchin | NCAR/UCAR |
| FIREX AQ-CLAP | Absorption Coefficient | ICARTT | CLAP | Alessandro Franchin | NCAR/UCAR |
| FIREX AQ-AMS | Non-refractory PM1 aerosol composition | ICARTT | AMS | Ann Middlebrook | NOAA ESRL CSD |
| FIREX AQ-BrCPiLS | Aerosol WSOC Concentration | ICARTT | Brown Carbon PiLS | Rebecca Washenfelder | NOAA ESRL CSD |
| FIREX AQ-PILSOOffline | Particle Composition | ICARTT | Brown Carbon PiLS | Cora Young | York University |

Table 33
Collection: [FIREX AQ MetNav AircraftInSitu N48 Data 1](#)
Platform: NOAA-CHEM Twin Otter
Dates: 29 July – 06 September 2019

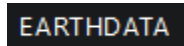
EARTHDATA



| Data ID | Key Variables | File Format | Instrument | Principal Investigator | Institution |
|---------------------|-------------------------------|-------------|---------------------------|------------------------|-------------|
| FIREX AQ-FlightData | Altitude, latitude, longitude | ICARTT | ARIM200 Digital Air Probe | Michael Robinson | NOAA ESRL |

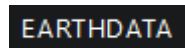


Table 34
Collection: [FIREXAQ Analysis N48 Data 1](#)
Platform: NOAA-CHEM Twin Otter
Dates: 29 July – 06 September 2019



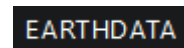
| Data ID | Key Variables | File Format | Instrument | Principal Investigator | Institution |
|----------------------|---------------------|-------------|------------|------------------------|-------------|
| FIREXAQ-FSU-smokeage | Smoke age estimates | ICARTT | N/A | Christopher Holmes | FSU |

Table 35
Collection: [FIREXAQ jValue AircraftInSitu N48 Data 1](#)
Platform: NOAA-CHEM Twin Otter
Dates: 29 July – 07 September 2019



| Data ID | Key Variables | File Format | Instrument | Principal Investigator | Institution |
|--------------|----------------------|-------------|--------------------|------------------------|-------------|
| FIREXAQ-jNO2 | NO2 photolysis rates | ICARTT | Filter radiometers | Michael Robinson | NOAA ESRL |

Table 36
Collection: [FIREXAQ N46 Data 1](#)
Platform: NOAA-CHEM Twin Otter
Dates: 23 July – 14 August 2019



| Data ID | Key Variables | File Format | Instrument | Principal Investigator | Institution |
|-------------------------|------------------------|-------------|--------------------------|------------------------|-------------|
| FIREXAQ-MicroDop02-Vert | Vertical Wind Profiles | NetCDF-3 | Micropulse Doppler lidar | Alan Brewer | NOAA ESRL |



| | | | | | |
|--------------------------|------------------|----------|----------------------------|-------------|-----------|
| FIREXAQ-MicroDop02-wProf | Wind Profiles | NetCDF-3 | Micropulse Dopper lidar | Alan Brewer | NOAA ESRL |
| FIREXAQ-FireTemp | Fire Temperature | ICARTT | NightFOX UAS | Ru-Shan Gao | NOAA ESRL |



Acknowledgements:

The ASDC gratefully acknowledges members of the FIREX-AQ science team for their feedback provided on this user guide and for their contributions during the revision process.

Resources:

References:

[FIREX-AQ Overview Paper](#)
[ASDC FIREX-AQ Landing Page](#)
[Earthdata Search FIREX-AQ Collections](#)
[ESPO Project Homepage](#)
[FIREX-AQ NOAA Landing Page](#)
[Atmospheric Composition Variable Standard Name Recommendations](#)
[ICARTT File Format V2.0](#)
[ADMG Airborne and Field Data Inventory Definitions](#)

Relevant Publications:

The ranges of the DC-8 and Twin Otter aircraft are explained in the FIREX-AQ whitepaper. Additional information about the background of the mission and initial intentions for the mission are available in the whitepaper as well.

Warneke, C., Schwarz, J. P., Ryerson, T., Crawford, J., Dibb, J., & Lefer, B. (2018). Fire Influence on Regional to Global Environments and Air Quality (FIREX-AQ): A NOAA/NASA Interagency Intensive Study of North American Fires. Retrieved from <https://csl.noaa.gov/projects/firex-aq/whitepaper.pdf>

Related data:

[FASMEE](#)
[FIREX Fire Lab 2016](#)
[Joint Fire Science Program's Fire Western Wildfire Campaign](#)
[NOAA FIREX-AQ Data](#)
[Sectoral Applications Research Program \(SARP\) \(NOAA website\)](#)
[Satellite instruments that support FIREX-AQ \(NOAA website\)](#)
[WE-CAN 2018](#)

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 Phone: 757-864-8656



Hours: 8:00 am - 4:30 pm ET
 Monday - Friday
 Closed on USA Federal Holidays

Ask us questions on the Earthdata Forum and a subject matter expert will address your question as soon as possible.

Project Points of Contact:

Users are encouraged to contact instrument and science team PIs, who are outlined in Tables 11 through 28, for additional information.

Earthdata Forum: <https://forum.earthdata.nasa.gov/viewforum.php?f=7>

Acronym List:

Key:

Instrument/Instrument Group Acronyms

General Acronyms

| | |
|---------------------------------|--|
| ACES | Active Sensing of CO ₂ Emissions over Nights, Days, and Seasons (ASCENDS) CarbonHawk Experiment Simulator |
| ACSM | Aerosol Chemical Speciation Monitor |
| AERONET | AEROSOL ROBOTIC NETWORK |
| AirMSPI | Airborne Multi-angle SpectroPolarimeter Imager |
| AMLGAS | Aerodyne Mobile Laboratory Position, Wind, and Gas-Phase Tracers |
| AMS | Aerosol Mass Spectrometer |
| AOP | In-Situ Measurements of Aerosol Optical Properties |
| APS | Aerosol Particle Sizer |
| ASDC | Atmospheric Science Data Center at NASA LaRC |
| AVIRIS | Airborne Visible/Infrared Imaging Spectrometer |
| CAMS | Compact Atmospheric Multispecies Spectrometer |
| CANOE | Compact Airborne NO ₂ Experiment |
| CAFS | NCAR CCD Actinic Flux Spectroradiometers |
| CAPS | Cloud, Aerosol and Precipitation Spectrometer |
| CARB-MC | California Air Resources Board Ground Mobile Measurement Platform |
| CARE | Cloud, Aerosol, and Refractive Index Experiment |
| CIMS | Chemical Ionization Mass Spectrometer |
| CLAP | Continuous Light Absorption Photometer |
| CPL | Cloud Physics Lidar |
| CRDS | Cavity Ring-Down Spectroscopy |
| CSL | Chemical Sciences Laboratory |
| CTAG | Comprehensive Thermal Desorption Aerosol Gas Chromatograph |
| DACOM | Differential Absorption Carbon monOxide Measurement |
| DC-8 (platform) | Douglas Commercial 8 |



| | |
|-----------------------------|--|
| DIAL | Differential Absorption Lidar |
| DLH | Diode Laser Hygrometer |
| DOAS | Differential Optical Absorption Spectrometer |
| DOE BNL | Department of Energy Brookhaven National Laboratory |
| DOI | Digital Object Identifier |
| EESI-ToF-MS | CU Aircraft Extractive Electrospray Time-of-Flight Mass Spectrometer |
| eMAS | Enhanced MODIS Airborne Simulator |
| ER-2 (platform) | Earth Resources 2 |
| ESRL | Earth System Research Laboratories |
| FCCS | Fuel Characteristic Classification System |
| FIREX-AQ | Fire Influence on Regional to Global Environments and Air Quality |
| GCAS | Geostationary Coastal and Air Pollution Events (GEO-CAPE) Airborne Simulator |
| GC-EI-ToF | Gas Chromatograph Electron Impact Mass Spectrometer |
| GC-HRToFMS | Two-Dimensional Gas Chromatograph High-Resolution Time-of-Flight Mass Spectrometer |
| HR ToF AMS | High-Resolution Time-of-Flight Aerosol Mass Spectrometer |
| HSRL | High Spectral Resolution Lidar |
| I-ToF CIMS | Iodide Ion Time-of-Flight Chemical Ionization Mass Spectrometer |
| ICARTT | International Consortium for Atmospheric Research on Transport and Transportation |
| ISAF | In Situ Airborne Formaldehyde |
| IWAS | NOAA Improved Whole Air Sampler |
| LARGE | Langley Aerosol Research Group Experiment |
| LCSC | Lewis-Clark State College |
| LGR | Los Gatos Research Gas Analyzers |
| LIF | Laser Induced Fluorescence |
| LINEPH | NOAA Laser Imaging Nephelometer |
| LWCC | Liquid Waveguide Capillary Cell |
| MMS | Meteorological Measurement System |
| NASA | National Aeronautics and Space Administration |
| NASA AFRC | NASA Armstrong Flight Research Center |
| NASA ARC | NASA Ames Research Center |
| NASA GSFC | NASA Goddard Space Flight Center |
| NASA JPL | NASA Jet Propulsion Laboratory |
| NASA LaRC | NASA Langley Research Center |
| NASDAT | NASA Airborne Science Data and Telemetry System |
| NAST-I | National Airborne Sounder Testbed - Interferometer |
| NCAR | National Center for Atmospheric Research |
| NCAR ACOM | NCAR Atmospheric Chemistry Observations & Modeling Laboratory |
| NIA | National Institute of Aerospace |
| NOAA | National Oceanic and Atmospheric Administration |
| NOAA CSL | NOAA Chemical Sciences Laboratory |
| NOAA ESRL | NOAA Earth System Research Laboratories |



| | |
|----------------------------|--|
| NOyO3 | NOAA Nitrogen Oxides and Ozone |
| NSRC | National Sub-Orbital Research Center |
| OC/EC | Organic Carbon/Elemental Carbon Analyzer |
| ORNL | Oak Ridge National Laboratory |
| OPS | Optical Particle Sizer |
| PAM | Potential Aerosol Mass |
| PI | Principal Investigator |
| PiLS | Particle Into Liquid Sampler |
| PTR-ToF-MS | Proton-Transfer-Reaction Time-of-Flight Mass Spectrometer |
| RN | Reduced Nitrogen |
| ROZE | NASA Rapid Ozone Experiment |
| SAGA | Soluble Acidic Gases and Aerosols |
| SHIS | Scanning High-Resolution Interferometer Sounder |
| SMPS | Scanning Mobility Particle Sizer |
| SOOT | Sub-Orbital Order Tool |
| SP2 | Single Particle Soot Photometer |
| SPAMS | Single-Particle Aerosol Mass Spectrometer |
| SpEx | Spectral Aerosol Extinction Monitor |
| SSEC | University of Wisconsin Space Science and Engineering Center |
| TD-GC-MS | Thermal Desorption Gas Chromatograph Mass Spectrometer |
| TOGA | Trace Organic Gas Analyzer |
| UAS | Uncrewed Aerial System |
| UCAR | University Corporation for Atmospheric Research |
| UCI WAS | University of California Irvine Whole Air Sampler |
| UHSAS | Ultra-High Sensitivity Aerosol Spectrometer |
| UNH | University of New Hampshire |

