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| **Atmospheric Radiation Measurement (ARM) airborne field campaign data products between 2013 and 2018****Overview:**For 30 years, the U.S. Department of Energy (DOE) Office of Science supported an instrumented Gulfstream-1 (G-1) aircraft for atmospheric field campaigns. Data from the final decade of G-1 operations were archived by the Atmospheric Radiation Measurement (ARM) user facility Data Center and made publicly available at no cost to all registered users. To ensure a consistent data format and to improve the accessibility of the ARM airborne data, an integrated dataset was recently developed covering the final six years of G-1 operations (2013 to 2018). The integrated dataset includes data collected from 236 flights (766.4 hours), which covered the Arctic, the U.S. Southern Great Plains (SGP), the U.S. West Coast, the Eastern North Atlantic (ENA), the Amazon Basin in Brazil, and the Sierras de Córdoba range in Argentina. These comprehensive data streams provide much-needed insight into spatiotemporal variability of thermodynamic quantities, aerosol and cloud states and properties for addressing essential science questions in Earth system process studies.

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| **Data Citation:** | https://www.doi.org/10.5439/1999133 |
| **Data Format:** | NetCDF |
| **Data Website:** | <https://arm.gov/capabilities/science-data-products/vaps/aafmerged> |
| **File Naming Convention:** | <site><facility><product>.<level>.YYYYMMDD.hhmmss.nc, where "site" is three letter general location designation, “facility” is capital letter and integer representation for specific location at site, "product" is the platoform (aafmerged), and "level" is the processing level (c1=quality controlled and derived products) |
| **Abstract:** | Our study explores a rich dataset from the final decade of the U.S. DOE's Gulfstream-1 (G-1) aircraft operations (2013-2018). Covering 236 flights across diverse regions, this airborne dataset, available at https://www.doi.org/10.5439/1999133, offers unprecedented insights into atmospheric dynamics, aerosols, and clouds. |
| **Purpose:** | These data were collected to provide new perspectives on the structure of the lower atmosphere and the aerosol and cloud properties across diverse regions such as the Arctic, U.S. Southern Great Plains, U.S. West Coast, Eastern North Atlantic, Amazon Basin in Brazil, and Sierras de Córdoba range in Argentina. |
| **Data Usage:** | Data can be used to gain fundamental understanding on the structure of the lower atmosphere and the aerosol and cloud properties across diverse regions, including comprehensive data streams address vital science questions in Earth system process studies. Data were collected from a moving platform and geospatial coordinates are provided. |
| **Arm Sites:** | Cloud, Aerosol, and Complex Terrain Interactions (CACTI), Cordoba, Argentina; Aerosol and Cloud Experiments in the Eastern North Atlantic, , Graciosa Island, Azores;Holistic Interactions of Shallow Clouds, Aerosols, and Land-Ecosystems (HI-SCALE), Lamont, Oklahoma;Airborne Carbon Measurements (ACME V), Barrow, Alaska; ARM Cloud Aerosol Precipitation Experiment (ACAPEX), coastal CA, USA;Observations and Modeling of the Green Ocean Amazon (GOAMAZON), Manacapuru, Amazonia, Brazil;Biomass Burning Observation Project (BBOP), Pasco, WA and Memphis, TN, USA |
| **Content Time Range:** | COR -> Begin: 2018-11-04 End: 2018-12-08ENA -> Begin: 2017-03-31 End: 2018-02-19SGP -> Begin: 2016-04-25 End: 2016-09-22NSA -> Begin: 2015-06-01 End: 2015-09-15ACX -> Begin: 2015-01-14 End: 2015-03-12MAO-> Begin: 2014-02-15 End: 2014-10-15OSC -> Begin: 2013-07-01 End: 2013-10-24 |
| **Data Type:** | research data - ASR funded |
| **Scientific Measurements(s):** | Please refer to Table S1 in the supplementary document. A example of header of this netCDF file is included in the supplementary document too.  |
| **Stratum Keyword(s):** |

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| Atmosphere: Boundary Layer, Troposphere, Aerosol, Cloud |

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| **Data Quality:** |

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| **Attribute Accuracy:** | Uncertainty assessments were conducted for each instrument in previous studies.( Rosati et al., 2016; Lance et al., 2010; Glienke and Mei, 2020, 2019; Glienke et al., 2023; Mei et al., 2020) |
| **Positional Accuracy:** | No formal positional accuracy tests were conducted. |
| **Consistency and Completeness Report:** | Data set is considered complete for the information presented, as described in the abstract. Users are advised to read the rest of the metadata record carefully for additional details. |
| **Factor Affecting the Research:** |  |

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| **Use Restrictions:** | Users of the data are requested to appropriately cite the dataset and are STRONGLY ENCOURAGED to reach out to the project team for guidance on proper usage of the data. Additionally, users of the data should include a statement that acknowledges support from the US Department of Energy the Atmospheric Radiation Measurement (ARM) User Facility and Atmospheric System Research (ASR) program for collecting the data. |
| **Distribution Info:** |

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| --- | --- |
| Organization Name: | ARM Archive User Services |
| Email: armarchive[at]ornl.gov | Phone: 1-888-ARM-DATA |
| Street: Oak Ridge National Laboratory | City: Oak Ridge |
| State: Tennessee | Postal: 37831-6290 |

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| **Additional Missing Info:** | A data paper describing the collection of this integrated data from seven field campaign is in preparation and will be submitted to Earth System Science Data later in 2024. Please contact the lead author (Fan Mei, fan.mei@pnnl.gov) for more details on this publication and its status. |
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