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**Arctic Radiation-IceBridge Sea & Ice Experiment (ARISE) Data Management Plan**

**Arctic Radiation-IceBridge Sea & Ice Experiment (ARISE)**

**Data Management Plan**

Signature/Approval Page

|  |  |  |
| --- | --- | --- |
| **Reviewed by:** |  |  |
| ***Signature on file*** |  | ***January 9, 2015*** |
| Jeanne Behnke |  | Date |
| ESDIS Deputy Project Manager - Operations |  |  |
| GSFC - Code 423 |  |  |
| ***Signature on file*** |  | ***January 13, 2015*** |
| Jeff Walter |  | Date |
| ESDIS Deputy - Technical |  |  |
| GSFC - Code 423 |  |  |
| ***Signature on file*** |  | ***February 1, 2015*** |
| Steve Tanner |  | Date |
| NSIDC DAAC Operation IceBridge Manager |  |  |
| National Snow and Ice Data Center |  |  |
| **Approved by:** |  |  |
| ***Signature on file*** |  | ***January 15, 2015*** |
| Dawn Lowe |  | Date |
| ESDIS Project Manager |  |  |
| GSFC - Code 423 |  |  |
| ***Signature on file*** |  | ***January 20, 2015*** |
| Bill Smith |  | Date |
| ARISE Project Scientist |  |  |
| LaRC - Code E303 |  |  |
| ***Signature on file*** |  | ***January 7, 2015*** |
| Christy Hansen |  | Date |
| ARISE Project Manager |  |  |
| GSFC - Code 615 |  |  |
| ***Signature on file*** |  | ***January 30, 2015*** |
| John Kusterer |  | Date |
| Head, ASDC DAAC |  |  |
| Atmospheric Science Data Center |  |  |
| ***Signature on file*** |  | ***January 9, 2015*** |
| Brian Johnson |  | Date |
| NSIDC DAAC Manager |  |  |
| National Snow and Ice Data Center |  |  |
|  |  |  |

**[Electronic] Signatures available in B32 Room E148**

**online at:**  **https://ops1-cm.ems.eosdis.nasa.gov/cm2/**

Preface

This document is under Earth Science Data Information System (ESDIS) project configuration control. Once this document is approved, ESDIS approved changes are handled in accordance with Class I and Class II change control requirements described in the ESDIS Configuration Management Procedures, and changes to this document shall be made by document change notice (DCN) or by complete revision.

Any questions should be addressed to: [esdis-esmo-cmo@lists.nasa.gov](mailto:esdis-esmo-cmo@lists.nasa.gov)

ESDIS Configuration Management Office  
NASA/GSFC

Code 423

Greenbelt, Md. 20771

Abstract

This document is a detailed plan for the management of all Arctic Radiation-IceBridge Sea & Ice Experiment (ARISE) data to be archived at the National Snow and Ice Center (NSIDC) Distributed Active Archive Center (DAAC) and the Atmospheric Science Data Center (ASDC) DAAC throughout its project lifecycle beginning in August 2014. Its content is applicable to all data providers and all data sets unless specific exceptions are made.

***Keywords: ARISE, ASDC, NSIDC, DAAC, ICARTT***

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# 

# Introduction

## Scope

This document outlines a detailed plan for all aspects of Arctic Radiation IceBridge Sea & Ice Experiment (ARISE) data management throughout its project lifecycle. Its content is applicable to all data providers and all data sets unless specific exceptions are made.

## Mission Description

The ARISE mission is a single six-week mission, from late August to early October 2014, to collect airborne remote sensing and in-situ measurements for developing a quantitative process level understanding of the relationship between changes in Arctic ice and regional energy budget as influenced by clouds. From the NASA C-130, ARISE will measure spectral and broadband radiative flux profiles, quantify surface characteristics, cloud properties, and other atmospheric state parameters under a variety of Arctic atmospheric and surface conditions (including open water, sea ice, and land ice). Measurements will coincide with satellite overpasses when possible. The mission will acquire detailed measurements of land and sea ice characteristics to help bridge a gap in NASA satellite observations of changing Arctic ice conditions. It will utilize surface-based targets of opportunity to complement ARISE sampling strategies with the NASA C-130, including long-term monitoring stations, research vessels, and other surface and aircraft in-situ measurement campaigns that provide corresponding information on surface conditions, radiation, cloud properties and atmospheric state.

The ARISE data products will be made available to the public from one of two Distributed Active Archive Centers (DAAC). Atmospheric irradiance and cloud products will be archived at and distributed from the Atmospheric Science Data Center (ASDC) DAAC at the NASA Langley Research Center (LaRC). The snow and ice products will be archived at and distributed from the National Snow and Ice Data Center (NSIDC) DAAC at the University of Colorado in Boulder.

# requirements

## Science Data Generation and Documentation

### All ARISE data products shall conform to the terms and conditions of the NASA Earth Science Data and Information Policy, which can be found at: [http://science.nasa.gov/earth-science-data/data-information-policy/.](http://science.nasa.gov/earth-science/earth-science-data/data-information-policy/.)

### ARISE data providers shall be assigned the responsibility of producing data products for their respective instruments.

### To keep end-to-end consistency, ARISE data providers shall reprocess in its entirety any given data product that requires an algorithm change.

### To keep end-to-end consistency, ARISE data providers shall reformat in its entirety any given data product that requires a format change.

### By the end of the mission, ARISE data providers shall provide all documentation necessary for final archival purposes as spelled out in the NASA Earth Science preservation document at: [https://earthdata.nasa.gov/423-SPEC-001\_NASA ESD\_Preservation\_Spec.pdf.](https://earthdata.nasa.gov/sites/default/files/field/document/423-SPEC-001_NASA%20ESD_Preservation_Spec_OriginalCh01_0.pdf.)

### For ARISE data products to be archived at ASDCDAAC (see tables in Section 3.1), the data provider shall provide a document with a brief description of the measurements, including the measurement principle, instrument description, calibration procedures, and standards (where applicable), data processing procedure (including software, if necessary), data validation (if applicable), data revision records, and uncertainties/detection limits. Since much of the information can often be found in peer-reviewed publications, relevant publications can be used as references. The document itself should primarily be focused on the details or modifications specific to the instrument operation for the ARISE field deployments. The ARISE project scientist, in consultation with the Instrument Investigator and an assigned representative from the ASDC DAAC, will determine the appropriate documentation requirements for each instrument on a case by case basis.

### For ARISE products to be archived at the NSIDC DAAC (see tables in Section 3.2), ARISE data providers shall provide documentation, as specified by NSIDC DAAC documentation content requirements located at: [http://nsidc.org/data/icebridge/nsidc-guide-document-template.docx](http://nsidc.org/data/icebridge/nsidc-guide-document-template-rev-01-june-2012-1.docx), to facilitate users’ understanding and use of their data products.

### ARISE data providers shall submit product documentation to the appropriate DAAC as early as possible before the first delivery of a new product, and be available to work with NSIDC and ASDC DAAC technical writers, to facilitate establishment of the new product. For subsequent data deliveries, data providers shall submit updates to documentation within one week after the submission of data to the DAAC for ingest, archive, and distribution.

### ARISE L1B and L2 data products shall be organized and partitioned temporally, following each flight’s trajectory.

### Individual data files delivered to the DAACs for archival shall not exceed 2 GB in size.

## Science Data Format and Metadata

ARISE data product formats, with the exception of Level 0 or raw data, shall conform to one of the NASA Earth Science Division (ESD) approved Data System standards. The formats will be selected in collaboration with the ESDIS project and documented in Section 3 of this Data Management Plan. The list of existing approved standards, along with guidelines for approval of new standards, can be found at: <http://earthdata.nasa.gov/data/references/data-format-standards>. Once decided upon and agreed to, a data set’s format should be kept consistent for all future deliveries, unless renegotiated with a plan for reprocessing of existing data.

### All data submissions to the NSIDC DAAC and ASDC DAAC shall have accompanying spatial, temporal, and product metadata that adhere to ESD-approved specifications at: <http://earthdata.nasa.gov/data/standards-and-references/metadata-standards>.

### For radiative and in-situ cloud property measurements going to the ASDC DAAC, the data provider should comply with the ICARTT metadata requirements. In the case of data submitted in the Hierarchical Data Format 5 (HDF5) or Network Common Data Form (NetCDF) formats, the data provider should also comply with the ICARTT metadata requirement, which can found at: <https://earthdata.nasa.gov/sites/default/files/field/document/ESDS-RFC-019-v1.1_0.pdf>.

### For data products going to the NSIDC DAAC, the data provider should adhere to accepted data format standards, and should generate appropriate metadata for ingest into EOS Data and Information System (EOSDIS) Core System (ECS). This metadata can most easily be generated through the use of the MetGen tool, provided by ESDIS.

# Providers, Products, and Deadlines

This section describes each of the individual data providers, their instruments, the data products that they generate, and their associated submission deadlines. For each data product, the following information is provided.

* Product collection short name
* A brief product description
* Data processing level
* Data format
* Estimated data volume per campaign (GB)
* Submission schedule
* Provider contact information
* Delivery mechanism

## Products To Be Archived at ASDC DAAC

The tables in this section list the products to be archived at the ASDC DAAC.

### Broadband Radiometer (BBR)

The Naval Research Laboratory’s Broadband Radiometers (BBR) consist of modified Kipp & Zonen CM-22 pyranometers (to measure solar irradiance) and CG-4 pyrgeometers (to measure IR irradiance) (see http://www.kippzonen.com/). The modifications to make these instruments more suitable for aircraft use include new instrument housings and amplification of the signal at the sensor. The instruments are run in current-loop mode to minimize the effects of noise in long signal cables. The housing is sealed and evacuated to prevent condensation or freezing inside the instrument. Each BBR has the following properties:

* Field-of-view: Hemispheric
* Temperature Range: -65C to +80C
* Estimated Accuracy: 3-5%
* Data Rate: 10Hz
* BBR Measured Quantities:
  + Directly measured: Down- and Up-welling Solar and IR Irradiance, total and diffuse down-welling broadband solar irradiance
  + Derived quantities: Net Irradiance, Radiative Forcing, Absorption, Heating Rates, Albedo

| **Provider POCs** | **Email Address** | **Telephone** |
| --- | --- | --- |
| Anthony Bucholtz  Naval Research Lab, Monterey, CA | [anthony.bucholtz@nrlmry.navy.mil](mailto:anthony.bucholtz@nrlmry.navy.mil) | 831-656-5024 |

Table 3‑1. BBR Products

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Short Name** | **Product Description** | **Data Level** | **Format** | **Volume per Flight** | **Submission Schedule** | **Delivery Mechanism** |
| ARISE-BBR | Up- and down-welling solar and IR broadband irradiances; total and diffuse down-welling broadband solar irradiance; (W/m2; 1 Hz resolution) | 3 | ICARTT | 3 MB | Field data: 24 hours after flight  Final data: 6 month after deployment | <https://www-air.larc.nasa.gov/cgi-bin/ArcView/arise> |

### Solar Spectral Flux Radiometer (SSFR)

The University of Colorado’s Solar Spectral Flux Radiometer is a moderate resolution flux (irradiance) spectrometer with 8 to 12 nm spectral resolution, simultaneous zenith and nadir viewing. It has a radiometric accuracy of 3% and a precision of 0.5%. The instrument is calibrated before and after every experiment, using a NIST-traceable lamp. During field experiments, the stability of the calibration is monitored before and after each flight using portable field calibrators.

Special Notes from PI, Sebastian Schmidt:

(1) Spectral Irradiances, both up- and down-welling, will be provided for all flight legs, with quality flags

(2) Surface Albedo will be provided on a case-by-case basis. They require data from multiple instruments (primarily 4STAR, but can also use drop sondes if available)

(3) Cloud retrievals will also be provided on a case-by-case basis and may also require data from drop sondes and KT-19. May also require data from the BBR since (2) and (3) are more of a research product. These may only be research quality, not standard products.

Much of the success for the cloud retrievals depends on how the cloud legs are flown during the mission.

| **Provider POCs** | **Email Address** | **Telephone** |
| --- | --- | --- |
| Sebastian Schmidt  University of Colorado, Boulder, CO | <mailto:Sebastian.Schmidt@lasp.colorado.edu> | 303-492-6423 |

Table 3‑2.SSFR Products

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Short Name** | **Product Description** | **Data Level** | **Format** | **Volume per Flight** | **Submission Schedule** | **Delivery Mechanism** |
| ARISE-SSFR-Spectra | Calibrated irradiance spectra | 1 | NetCDF | 2 GB | Field data: 24 hours after flight  Final data: 6 month after deployment | <https://www-air.larc.nasa.gov/cgi-bin/ArcView/arise> |
| ARISE-SSFR-SA | Surface retrieval albedos | 2 | NetCDF | < 1 MB | Upon request; case by case basis |
| ARISE-SSFR-Cloud | Cloud retrievals (phase, tau, reff) | 2 | ICARTT | < 1 MB | Upon request; case by case basis |

### Spectrometer for Sky-Scanning, Sun-Tracking Atmospheric Research (4STAR)

The NASA Ames Spectrometer for Sky-Scanning, Sun-Tracking Atmospheric Research, or 4STAR, is an airborne instrument that measures aerosols (small particles suspended in the atmosphere), gases (ozone for example), and a variety of cloud properties. The 4STAR instrument has three different modes. The first of these, and the instrument’s main mode, is Sun-Tracking. Another operating mode, which will be used heavily during ARISE, is the zenith, (or upward) viewing mode. The last and most involved measurement mode is the Sky-Scanning mode.

| **Provider POCs** | **Email Address** | **Telephone** |
| --- | --- | --- |
| Jens Redemann  NASA Ames Research Center | Jens.redemann-1@nasa.gov | 650-604-6259 |

Table 3‑3. 4STAR Products

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Short Name** | **Product Description** | **Data Level** | **Format** | **Volume per Flight** | **Submission Schedule** | **Delivery Mechanism** |
| ARISE-4STAR-AOD | Aerosol optical depth, depth above the aircraft at 15-20 discrete | 2 | ICARTT | ~ 50 MB | Preliminary data 4 weeks after deployment end; final data 6 months after deployment | <https://www-air.larc.nasa.gov/cgi-bin/ArcView/arise> |
| ARISE-4STAR-WaterCol | Water vapor column content above the aircraft | 2 | ICARTT | ~ 25 MB | Preliminary data 4 weeks after deployment end; final data 6 months after deployment |
| ARISE-4STA-O3Col | Ozone column content above the aircraft | 2 | ICARTT | ~ 25 MB | Preliminary data 4 weeks after deployment end; final data 6 months after deployment |
| ARISE-4STAR-CloudRad | Zenith cloud radiances at discrete wavelengths (resolution TBD) | 1 | ICARTT | ~ 100 MB | Preliminary data 4 weeks after deployment end; final data 6 months after deployment |
| ARISE-4STAR-SkyRad | Sky radiances at 4 wavelengths (440, 673, 873, 1020 nm) for select cases | 1 | ICARTT | ~ 100 MB | Preliminary data 4 weeks after deployment end; final data 6 months after deployment |

### National Suborbital Education and Research Center (NSERC) KT19.85II (KT19)

The NSERC KT-19.85II radiometer makes measurements of cloud, surface temperature, and sensor case temperature. The NSERC KT19.85II data products will be hosted in the Airborne Sciences Data for Atmospheric Composition (ASD-AC) data repository and will be transferred to the ASDC DAAC within 9 months after deployment ends.

| **Provider POCs** | **Email Address** | **Telephone** |
| --- | --- | --- |
| David Van Gilst  National Suborbital Education and Research Center | [d.vangilst@nserc.und.edu](mailto:d.vangilst@nserc.und.edu) | 701-330-2978 |

Table 3‑4. KT-19.85II Infrared Pyrometers Products

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Short Name** | **Product Description** | **Data Level** | **Format** | **Volume per Flight** | **Submission Schedule** | **Delivery Mechanism** |
| ARISE-KT19 | 10 Hz calibrated surface/cloud temperature from nadir and zenith view of KT19 and case temperatures of each sensor | 2 | ICARTT | 4 MB | In-Field data: 24 hours after the flight; final data: 6 months after the deployment | <https://www-air.larc.nasa.gov/cgi-bin/ArcView/arise> |

### In Situ and Remote Sensing Probes for Cloud Properties

LaRC will provide in situ measurements of total, liquid, and ice water content, cloud droplet concentration, cloud droplet effective radius, and a derived semi-quantitative cloud coverage flag as well as remote sensing measurements described in the following table. The instrument suite includes: 1) a SEA WCM-2000 cloud water content sensor; 2) a pro-sensing G-band water-vapor radiometer (GVR); and 3) a DMT Cloud Droplet Probe (CDP) (LaRC DAAC).

Special Note: The uncertainty in data volume for the G-Band radiometer is pretty high, since little is known about the instrument. However, the data volume is not expected to

| **Provider POCs** | **Email Address** | **Telephone** |
| --- | --- | --- |
| William Smith  NASA Langley Research Center | [William.L.Smith@nasa.gov](mailto:d.vangilst@nserc.und.edu) | 757-864-8577 |
| Bruce Anderson  NASA Langley Research Center | [Bruce.E.Anderson@nasa.gov](mailto:Bruce.E.Anderson@nasa.gov) | 757-864-5850 |

Table 3‑5. In Situ and Remote Sensing Cloud Probe Data Products

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Short Name** | **Product Description** | **Data Level** | **Format** | **Volume per Flight** | **Submission Schedule** | **Delivery Mechanism** |
| ARISE-WC | Liquid cloud water content, g/m3 | 2 | ICARTT | ~5 MB | Field data 48 hours after each flight, final data within 6 months of the deployment | <https://www-air.larc.nasa.gov/cgi-bin/ArcView/arise> |
| ARISE-WC | Total cloud water content, g/m3 | 2 | ICARTT | ~5 MB | Field data 48 hours after each flight, final data within 6 months of the deployment |

**Table 3‑5. In Situ and Remote Sensing Cloud Probe Data Products (continued)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Short Name** | **Product Description** | **Data Level** | **Format** | **Volume per Flight** | **Submission Schedule** | **Delivery Mechanism** |
| ARISE-WC | Ice cloud water content, g/m3 | 2 | ICARTT | ~5 MB | Field data 48 hours after each flight, final data within 6 months of the deployment | <https://www-air.larc.nasa.gov/cgi-bin/ArcView/arise> |
| ARISE-GVR | Zenith cloud water path | 2 | ICARTT | ~100 MB | Field data 48 hours after each flight, final data within 6 months of the deployment |
| ARISE-GVR | Zenith precipitable water | 2 | ICARTT | ~100 MB | Field data 48 hours after each flight, final data within 6 months of the deployment |
| ARISE-CDP | Size-resolved droplet number density | 2 | ICARTT | ~1 GB | Field data 48 hours after each flight, final data within 6 months of the deployment |
| ARISE-CDP | 1-sec logical flag to indicate cloud presence (0=no cloud, 1=cloud) | 2 | ICARTT | ~5 MB | Field data 48 hours after each flight, final data within 6 months of the deployment |
| ARISE-CDP | Cloud droplet effective radius | 2 | ICARTT | ~5 MB | Field data 48 hours after each flight, final data within 6 months of the deployment |

### C-130 Aircraft Navigational and Meteorological Data

The NSERC provides a collection of airborne in-flight meteorological and in-cabin measurements, as well as nadir and zenith looking high definition video. Instruments flown on the C-130 include cabin pressure and temperature measurements, a 3-stage hygrometer, total air temperature sensor, static and total pressure transducers, the ARIM-200 3-D winds measurement system, and Forward/Nadir looking high definition cameras. There are also zenith-looking thermal emission measurements. The NSERC data products will be hosted in ASD-AC data repository and be transferred to the ASDC DAAC within 9 months after the deployment.

| **Provider POCs** | **Email Address** | **Telephone** |
| --- | --- | --- |
| Rick Shetter  National Suborbital Education and Research Center | [r.shetter@nserc.und.edu](mailto:d.vangilst@nserc.und.edu) | 701-330-2126 |

Table 3‑6. C-130 Aircraft Navigational and Meteorological Products

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Short Name** | **Product Description** | **Data Level** | **Format** | **Volume per Flight** | **Submission Schedule** | **Delivery Mechanism** |
| ARISE-NavMet | Aircraft location, attitude, and met. variables | 1 | ICARTT | < 1 GB | Field data: 24 hours after flight  Final data: 6 months after deployment | <https://www-air.larc.nasa.gov/cgi-bin/ArcView/arise> |

## Products To Be Archived at NSIDC DAAC

The tables in this section list the products to be archived at the NSIDC DAAC.

### Land, Vegetation, and Ice Sensor (LVIS)

NASA's LVIS is a scanning laser altimeter instrument that is flown, by aircraft, over target areas to collect data on surface topography, surface roughness, and vegetation coverage. LVIS has a scan angle of 12 degrees, which produces a 2 km wide swath from a 10-kilometer flight altitude. LVIS is a full-waveform laser altimeter, and, as such, the transmit and return waveforms are collected for each laser shot and released as the LVIS L1B product. LVIS also includes data from an integrated Inertial Navigation System (INS) and GPS, is designed, developed and operated by the Laser Remote Sensing Laboratory, at NASA’s Goddard Space Flight Center.

| **Provider POCs** | **Email Address** | **Telephone** |
| --- | --- | --- |
| Bryan Blair  NASA Goddard Space Flight Center | [James.B.Blair@nasa.gov](mailto:James.B.Blair@nasa.gov) | 301-614-6741 |
| Michelle Hofton  NASA Goddard Space Flight Center | [mhofton@umd.edu](mailto:mhofton@umd.edu) | 301-405-8543 |
| Emily Wilson  NASA Goddard Space Flight Center | [Emily.L.Wilson@nasa.gov](mailto:Emily.L.Wilson@nasa.gov) | 301-286-6155 |
| Shar Etemad  NASA Goddard Space Flight Center | [Shahriar.Etemad@nasa.gov](mailto:Shahriar.Etemad@nasa.gov) | 301-614-6962 |

Table ‑. LVIS Products

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Short Name** | **Product Description** | **Data Level** | **Format** | **Volume per Flight** | **Submission Schedule** | **Delivery Mechanism** |
| ILVIS0 | IceBridge LVIS L0 raw ranges (note that this is imagery) | 0 | JPEG | 5 TB | 1 month following deployment end | Hard drive |
| ILVIS1B | IceBridge LVIS L1B geolocated return energy waveforms | 1B | HDF5 | 700 GB | 6 months following deployment end | FTP |
| ILVIS2 | IceBridge LVIS L2 geolocated surface elevation product | 2 | Fixed Format ASCII | 100 GB | 6 months following deployment end | FTP |
| IPPLV1B | IceBridge LVIS POS/AV L1B corrected position and attitude data | 1B | Sbet | 20 GB | 6 months following deployment end | FTP |
| TBD | Placeholder for possible cloud top measurements | 0 |  | ~ 1 TB |  |  |
| TBD | Placeholder for possible cloud top measurements | 1B |  | ~ 0.5 TB |  |  |
| TBD | Placeholder for possible cloud top measurements | 2 |  | ~ 100 GB |  |  |

### Goddard Operation IceBridge (OIB)

The NASA IceBridge Sea Ice Freeboard (ADSIF4) data set contains derived geophysical data products including sea ice freeboard, sea ice elevation, and sea surface elevation measurements in Greenland from IceBridge LVIS and LVIS camera data sets. These data, collected as part of Operation IceBridge funded campaigns, are stored in American Standard Code For Information Interchange (ASCII) text files and are available via File Transfer Protocol (FTP) for the ARISE campaign in 2014.

The NASA IceBridge melt pond distribution (ADMPD2) data set contains derived melt pond location and areal coverage in Greenland from IceBridge the LVIS camera data set. The data, collected as part of Operation IceBridge funded campaigns, are stored in Geographic Tagged Image File Format (GeoTIFF) and are available via FTP for the ARISE campaign in 2014.

A description on the se ice freeboard and radiation products (ADMFR4) merged freeboard and radiation data is TBD.

Table ‑. OIB Products

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Short Name** | **Product Description** | **Data Level** | **Format** | **Volume per Flight** | **Submission Schedule** | **Delivery Mechanism** |
| ADSIF4 | Derived sea ice freeboard | 4 | ASCII and/or NetCDF | ~ 2.5 GB for each 8 hr sea ice flight | 12 months following deployment end | FTP |
| ADMFR4 | Derived sea ice freeboard and reflected solar radiation | 4 | ASCII and/or NetCDF | ~ 3.0 GB for each 8 hr sea ice flight | 12 months following deployment end | FTP |
| ADMPD2 | Derived melt pond distribution | 2 | GeoTIFF or NetCDF | GeoTIFF would be about the same size as digital camera imagery, a NetCDF file containing only melt pond locations would be much smaller | 12 months following deployment end | FTP |

# Data Stewardship

The NSIDC DAAC and ASDC DAAC, with support from the ESDIS project, are responsible for ingest, archive, and distribution of all ARISE data products. This includes Level 0 data (where specified), higher-level products, ancillary data, metadata, algorithm source code, documentation, and other information in accordance with EOSDIS archive policies and the NASA Earth Science Data and Information Policy, which can be found at: <http://science.nasa.gov/earth-science/earth-science-data/data-information-policy/>. Responsibilities also include the distribution of the above-mentioned products to users in accordance with the ARISE mission and EOSDIS data distribution policies. Public release of these data shall also conform to the NASA Earth Science Data and Information Policy.

In order to ensure that NASA’s expectations for data preservation and usability are met, the NSIDC and ASDC DAACs may delay publication of any data set that is not delivered with full documentation (as specified in the NASA documentation content specifications) or that does not meet delivery requirements.

## Acceptance of New Data Sets

Before a new ARISE data product is sent to the NSIDC or ASDC DAACs, the following steps must first be implemented:

### A description of the data product in question will be documented by the provider and sent to the ARISE project Office, the ESDIS project, and the appropriate DAAC. This description will include:

1. A description of the science content of the data product and its relevance to ARISE science requirements.
2. Level of product (0-4)
3. Expected data volume (per life of mission)
4. Current archive location

### Any new product that is proposed will be reviewed by ESDIS and the ARISE project Office to make sure that the product is scientifically relevant, within the scope of the ARISE mission objectives, and that sufficient resources are available to support it. An evaluation of its current archive status will be made to determine if the product can be “brokered”, or linked, from its existing location rather than ingested into the NSIDC or ASDC DAAC. Only when data is judged to be safely archived and sufficiently documented will a brokering arrangement be considered. In the case of brokering, NSIDC or ASDC DAAC will enable discovery of the data through appropriate links, but bear no further responsibility for archiving or distributing the data.

### Create appropriate short names and long names for each data product. NSIDC and ASDC DAACs will do this in coordination with the provider.

### ESDIS will update this Data Management Plan.

## Data Submission Process

Before the first submission, each provider must, in coordination with the appropriate DAAC, create and validate the collection level metadata for the data set. For products going to NSIDC DAAC, this is an Earth Science Data Type (ESDT); for products going to the ASDC DAAC, the collection level and granule level metadata will be created from discussions between measurement PI, ASD-AC staff, and ASDC DAAC staff. A detailed description is given in section 4.2.2. Any changes to the collection level metadata must be done in coordination with the ARISE project Office and the appropriate DAAC.

The provider is responsible for the quality of both the collection level and file level metadata for data to be archived at the NSIDC DAAC.

### For data products going to the NSIDC DAAC, providers will submit their data directly into the NSIDC DAAC and work directly with the NSIDC DAAC staff to perform integration testing prior to routine ingest of data into the operational system. Data shall be submitted to the NSIDC DAAC within the timeframe indicated by the “Submission Schedule” in the data tables. The provider is responsible for creating the necessary metadata and Product Delivery Record (PDR) files before each data submission. After receipt of ingest, status notices from the NSIDC DAAC archive system, the provider, with support from the DAAC is responsible for all error correction and re-delivery.

### For data products going to the ASDC DAAC, providers will instead submit their data in two phases to the ASD-AC, rather than the ASDC DAAC. The first phase is during the deployment during which the providers shall submit the field data within 48 hours after the end of each flight, if the flight schedule allows. The field data is defined as the data based on field calibration (if applicable) and minimum QC/QA checks, and is intended to provide a quick look of the instrument operational status. For the second phase, the instrument PIs will submit the final data for public release to the ASD-AC within the timeframe indicated by the “Submission Schedule” in the data tables in Section 3.1. The final data are expected to be publication quality, which are processed with post-deployment calibrations (if applicable) and verified through full QC/QA procedures. The ASD-AC staff will have sole responsibility for transferring products from the ASD-AC to the ASDC DAAC within six weeks after receipt of the calibrated data from the providers.

## Naming Conventions

### File Naming Convention for data to be submitted to NSIDC DAAC

Science data files and their associated supporting files must use a standard naming convention. A file and its associated files should use the same name; the file extension distinguishes the data file from the associated files. File names should include the ESDT shortname, date and time of data collection, version identification, and any additional information that might be needed to uniquely identify the data file.

Example, for ATM L1B data:

Data file: ILATM1B\_V01\_04212010\_04452366\_A.h5

### File Naming Convention for data to be submitted to ASDC DAAC

For data files that will be submitted to ASDC DAAC, the file names should follow the ICARTT file naming convention as shown below:

dataID\_locationID\_YYYYMMDD\_R#.extension

The only allowed characters are: A-Z 0-9\_.- (that is, upper case alphanumeric, underscore, period, and hyphen). The use of the underscore character is restricted by the ICARTT format naming convention and may only be used to separate fields, as shown above. Fields are described as follows:

**dataID**: an identifier of measured parameter/species, instrument, or model (e.g., O3; NxOy; and PTRMS). For ARISE data files, the PIs are required to use “ARISE-” as prefixes for their DataIDs, i.e., ARISE-SSFR and ARISE-BBR

**locationID**: an identifier of airborne platform, in this case, C130

**YYYY**: four-digit year

**MM**: two-digit month

**DD**: two-digit day (for flight data, the date corresponds to the UT date at takeoff)

**R#**: data revision number. For field data, revision number # will start from letter “A”, e.g., RA, RB, … etc. Numerical values will be used for the preliminary and final data, e.g., R0, R1, R2 … etc.

**Extension:** “ict” for ICARTT files, “h4” for HDF 4 files and “h5” for HDF 5 files.

For example, the filename for the C-130 SSFR measurement made on July, 30, 2014 flight may be:

ARISE-SSFR\_C130\_20140730\_RA.ict (for field data), or

ARISE-SSFR\_C130\_20140730\_R0.ict (for final data)

Abbreviations and Acronyms

|  |  |
| --- | --- |
| 4STAR | Spectrometer for Sky-Scanning, Sun-Tracking Atmospheric Research |
| ARISE | Arctic Radiation-IceBridge Sea & Ice Experiment |
| ASCII | American Standard Code for Information Interchange |
| ASD-AC | Airborne Sciences Data for Atmospheric Composition |
| ASDC | Atmospheric Science Data Center |
| ATM | Airborne Topographic Mapper |
| BBR | Broadband Radiometer |
| CCB | Configuration Change Board |
| CCR | Configuration Change Request |
| CDP | Cloud Droplet Probe |
| DAAC | Distributed Active Archive Center |
| DCN | Document Change Notice |
| DMT | Drop Measurement Technologies (vendor) |
| ECS | EOSDIS Core System |
| EOS | Earth Observing System |
| EOSDIS | EOS Data and Information System |
| ESD | Earth Science Division |
| ESDIS | Earth Science Data and Information System |
| ESDT | Earth Science Data Type |
| FTP | File Transfer Protocol |
| GB | 109 bytes |
| GEOTIFF | Geospatial Tagged Image File Format |
| GPS | Global Positioning Satellite |
| GSFC | Goddard Space Flight Center |
| GVR | G-band Water Vapor Radiometer |
| HDF5 | Hierarchical Data Format 5 |
| HZ | Hertz |
| ICARTT | International Consortium for Atmospheric Research on Transport and Transformation |
| INS | Inertial Navigation System |
| IR | Infrared |
| KM | Kilometer |
| KT19 | KT19.85II data products |
| L0 – L4 | Level 0 through Level 4 |
| LaRC | Langley Research Center |
| LVIS | Land, Vegetation, and Ice Sensor |
| MB | 106 bytes |
| MetGen | Metadata Generator |
| NASA | National Aeronautics and Space Administration |
| NetCDF | Network Common Data Form |
| NIST | National Institute Of Standards And Technology |
| NM | Nanometer |
| NSERC | National Suborbital Education and Research Center |
| NSIDC | National Snow and Ice Data Center |
| OIB | Operation IceBridge |
| PDR | Product Delivery Record |
| PI | Principal Investigator |
| POC | Point of Contact |
| QA | Quality Assurance |
| QC | Quality Control |
| SSFR | Solar Spectral Flux Radiometer |
| TBD | To Be Determined |
| UT | Universal Time |