



## Assessment Information

[CoreTrustSeal Requirements 2017–2019](#)

Repository:	NSIDC DAAC
Website:	<a href="http://nsidc.org/daac/">http://nsidc.org/daac/</a>
Certification Date:	13 February 2019
This repository is owned by:	University of Colorado



# NSIDC DAAC

## Notes Before Completing the Application

*We have read and understood the notes concerning our application submission.*

True

*Reviewer Entry*

**Reviewer 1**

Comments:

**Reviewer 2**

Comments:

## CORE TRUSTWORTHY DATA REPOSITORIES REQUIREMENTS

### Background & General Guidance

### Glossary of Terms

## BACKGROUND INFORMATION

### Context

*R0. Please provide context for your repository.*

*Repository Type. Select all relevant types from:*

Domain or subject-based repository, National repository system; including governmental

*Reviewer Entry*

**Reviewer 1**

Comments:  
Accept

**Reviewer 2**

Comments:  
Accept

***Brief Description of Repository***

The NASA Snow and Ice Distributed Active Archive Center (DAAC) at the National Snow and Ice Data Center (NSIDC) was established at the University of Colorado Boulder within the Cooperative Institute for Research in Environmental Sciences in 1993.

*Reviewer Entry*

**Reviewer 1**

Comments:  
Accept

**Reviewer 2**

Comments:  
Accept

***Brief Description of the Repository's Designated Community.***

The NSIDC DAAC is the NASA sponsored data center to handle satellite, airborne and in situ data sets relating to the cryosphere (snow and ice) within Earth Observing System Data and Information System (EOSDIS). The NSIDC DAAC supports cryospheric user communities conducting research related to sea ice, terrestrial snow, glaciers, ice sheets, ice shelves, and permafrost.

*Reviewer Entry*

**Reviewer 1**

Comments:  
Accept

**Reviewer 2**

Comments:  
Accept.

***Level of Curation Performed. Select all relevant types from:***

A. Content distributed as deposited, B. Basic curation – e.g. brief checking; addition of basic metadata or documentation, C. Enhanced curation – e.g. conversion to new formats; enhancement of documentation, D. Data-level curation – as in C above; but with additional editing of deposited data for accuracy

#### *Reviewer Entry*

##### **Reviewer 1**

Comments:

Accept

##### **Reviewer 2**

Comments:

Accept

## **Comments**

As one of the NASA EOSDIS DAACs, the NSIDC DAAC complies with the guidelines established by the parent organization, the NASA Earth Science Data and Information System (ESDIS) Project, using several processes. For example, the "Requirements for Archiving, Distribution and User Services in EOS Data and Information System (EOSDIS)" provides guidance on some of the official processes. It is available at [https://cdn.earthdata.nasa.gov/conduit/upload/6355/423-10-69\\_ADURD\\_RevB.docx](https://cdn.earthdata.nasa.gov/conduit/upload/6355/423-10-69_ADURD_RevB.docx).

The NSIDC DAAC employs a data set Level of Service (LoS) model which defines a range of data stewardship levels. The LoS tiers include Comprehensive, Standard, Basic, and No Data Access. These tiers distinguish the level of data review, documentation creation, and user support that the NSIDC DAAC provides for an individual data set. The NSIDC LoS model is described in the following document:

[https://nsidc.org/sites/nsidc.org/files/files/NSIDCLevelsOfService-V2\\_0a\(2\).pdf](https://nsidc.org/sites/nsidc.org/files/files/NSIDCLevelsOfService-V2_0a(2).pdf). However, the model has since been updated and a new version of this document is in draft.

The DAAC identifies the target LoS based on NASA requirements, the nature of the data set, and the intended data users. NSIDC DAAC curates information provided by data producers into data set (collection) and file (when applicable) metadata as well as data set user guides. The DAAC also advises data producers on data format and structure requirements and best practices, and develops services to reformat data (when appropriate). An example of metadata, documentation, and services provided for a data set by NSIDC DAAC can be seen on this data set landing page: <http://nsidc.org/data/spl2smp>. This page also includes an indication of the LoS for the specific data set and a description of the LoS tiers.

#### *Reviewer Entry*

##### **Reviewer 1**

Comments:

Accept

##### **Reviewer 2**

Comments:  
Accept

***Outsource Partners. If applicable, please list them.***

None

*Reviewer Entry*

**Reviewer 1**

Comments:  
Accept

**Reviewer 2**

Comments:  
Accept

***Other Relevant Information.***

The general NSIDC Data Policies are described here: <https://nsidc.org/about/policies>.

The NSIDC DAAC's data policies and procedures are also guided and/or required by NASA EOSDIS.

*Reviewer Entry*

**Reviewer 1**

Comments:  
Accept

**Reviewer 2**

Comments:  
Accept

## **ORGANIZATIONAL INFRASTRUCTURE**

### **I. Mission/Scope**

***R1. The repository has an explicit mission to provide access to and preserve data in its domain.***

#### ***Compliance Level:***

4 – The guideline has been fully implemented in the repository

*Reviewer Entry*

**Reviewer 1**

Comments:

4 – The guideline has been fully implemented in the repository

**Reviewer 2**

Comments:

4 – The guideline has been fully implemented in the repository

***Response:***

As one of the Distributed Active Archive Centers (DAACs) within the Earth Observing System Data and Information System (EOSDIS), the NSIDC DAAC's mission is to be a custodian of NASA Earth science snow and ice data and ensure that data are easily accessible to users. Acting in concert, the DAACs provide reliable, robust services to users whose needs may cross the traditional boundaries of a science discipline, while supporting the particular needs of users within the discipline communities (<https://earthdata.nasa.gov/about/daacs>).

The NSIDC DAAC also supports the NSIDC mission to advance knowledge of the Earth's frozen regions. The NSIDC supports research into our world's frozen realms: the snow, ice, glaciers, frozen ground, and climate interactions that make up Earth's cryosphere. NSIDC manages and distributes scientific data, creates tools for data access, supports data users, performs scientific research, and educates the public about the cryosphere (<https://nsidc.org/about/overview>).

***Reviewer Entry*****Reviewer 1**

Comments:

Accept

**Reviewer 2**

Comments:

Accept

**II. Licenses**

***R2. The repository maintains all applicable licenses covering data access and use and monitors compliance.***

***Compliance Level:***

4 – The guideline has been fully implemented in the repository

***Reviewer Entry*****Reviewer 1**

Comments:

4 – The guideline has been fully implemented in the repository

**Reviewer 2**

Comments:

4 – The guideline has been fully implemented in the repository

***Response:***

The NSIDC DAAC conforms to NASA's Earth Science Data and Information Policy

(<https://earthdata.nasa.gov/earth-science-data-systems-program/policies/data-information-policy>) and provides free and open access to scientific data. NSIDC DAAC works directly with data producers throughout the data curation process to ensure that data contents are documented and preserved with the distribution package and appropriate credit is provided to the authors of the data. As a condition of use, users are asked to cite data with a data citation

(<http://nsidc.org/daac/citing-daac-data>).

***Reviewer Entry*****Reviewer 1**

Comments:

Accept

**Reviewer 2**

Comments:

Accept

### III. Continuity of access

***R3. The repository has a continuity plan to ensure ongoing access to and preservation of its holdings.***

***Compliance Level:***

4 – The guideline has been fully implemented in the repository

***Reviewer Entry*****Reviewer 1**

Comments:

4 – The guideline has been fully implemented in the repository

**Reviewer 2**

Comments:

4 – The guideline has been fully implemented in the repository

***Response:***

The long term stability of the data holdings at the NSIDC DAAC are assured by NASA, our sponsoring agency. NASA has clearly stated that it believes long term stewardship of NASA-collected remote sensing and field campaign data is essential. The NASA ESDIS Project, the Network Member of WDS, is responsible for funding and managing all the DAACs. The ESDIS Project is in turn funded by the Earth Science Data System Program at NASA Headquarters. The ESDIS Project is responsible for all data in its collection at all DAACs under NRRS 1441 (NASA Records Retention Schedules).

Each of the DAACs is governed by the "Requirements for Archiving, Distribution and User Services in EOS Data and Information System (EOSDIS)" available at [https://cdn.earthdata.nasa.gov/conduit/upload/6355/423-10-69\\_ADURD\\_RevB.docx](https://cdn.earthdata.nasa.gov/conduit/upload/6355/423-10-69_ADURD_RevB.docx). This document states: Requirements to archive and distribute the data for a given mission extend as long as required by the ESDIS Project. This duration at the DAAC is dependent on the active use of the data by NASA funded investigators and the provisions of long term archiving as determined by ESDIS. The ESDIS Project will work with the DAACs to ensure the long-term preservation of the DAAC archive collection.

#### *Reviewer Entry*

##### **Reviewer 1**

Comments:  
Accept

##### **Reviewer 2**

Comments:  
Accept

## **IV. Confidentiality/Ethics**

***R4. The repository ensures, to the extent possible, that data are created, curated, accessed, and used in compliance with disciplinary and ethical norms.***

### ***Compliance Level:***

0 – Not applicable

#### *Reviewer Entry*

##### **Reviewer 1**

Comments:  
0 – Not applicable

##### **Reviewer 2**

Comments:  
0 – Not applicable

## ***Response:***

NSIDC DAAC does not archive any data that requires explicit disclosure risk. All data are free and open to public. The data archived at the NSIDC DAAC are sensor data and information about the environment and NSIDC DAAC staff are well trained to handle such data. Personal/Sensitive information are not stored in the NSIDC DAAC archive system.

### ***Reviewer Entry***

#### **Reviewer 1**

Comments:  
Accept

#### **Reviewer 2**

Comments:  
Accept

## **V. Organizational infrastructure**

***R5. The repository has adequate funding and sufficient numbers of qualified staff managed through a clear system of governance to effectively carry out the mission.***

### ***Compliance Level:***

4 – The guideline has been fully implemented in the repository

### ***Reviewer Entry***

#### **Reviewer 1**

Comments:  
4 – The guideline has been fully implemented in the repository

#### **Reviewer 2**

Comments:  
4 – The guideline has been fully implemented in the repository

## ***Response:***

The NASA DAAC at NSIDC located at the University of Colorado at Boulder and is funded through a 5 year contract with the NASA GSFC Earth Science Data and Information System (ESDIS) Project. Average spending per year is approximately \$8,000,000. The DAAC is sufficiently funded to carry out its mission including support for staffing, IT, travel and other operating costs. The NSIDC DAAC maintains a highly skilled, cross-functional staff of ~50 people with an average of more than a decade of experience. NSIDC DAAC staff include a manager, a deputy manager, a chief scientist,

a systems engineer, data publication coordinators, data and user support specialists, data operations, developers, systems administrators, technical writers, and web/communications specialists (<https://nsidc.org/about/people.html>).

#### *Reviewer Entry*

##### **Reviewer 1**

Comments:

Accept

##### **Reviewer 2**

Comments:

Accept

## **VI. Expert guidance**

***R6. The repository adopts mechanism(s) to secure ongoing expert guidance and feedback (either inhouse or external, including scientific guidance, if relevant).***

### ***Compliance Level:***

4 – The guideline has been fully implemented in the repository

#### *Reviewer Entry*

##### **Reviewer 1**

Comments:

4 – The guideline has been fully implemented in the repository

##### **Reviewer 2**

Comments:

4 – The guideline has been fully implemented in the repository

### ***Response:***

The NSIDC DAAC has an active external science domain advisory committee, called the User Working Group, which consists of 12-15 discipline scientists. The User Working Group provides ongoing guidance to the DAAC regarding data holdings, system capabilities, documentation, data formats, and communications procedures which serve the needs of the scientific community. The DAAC has an annual face-to-face meeting and quarterly telecons with the User Working Group (<https://nsidc.org/daac/uwg>).

The NSIDC DAAC maintains a User Services Office (USO) who directly interact with the user community served by the DAAC. USO staff are skilled in both earth science and geospatial data which they use to support users with data selection, usage, and interpretation. The "Support" tab and the "Knowledge Base" on the NSIDC web site are examples of how USO

engages with users ( <https://nsidc.org/data/support>).

The NSIDC DAAC participates annually in the American Customer Satisfaction Index (ACSI) survey of users of the NASA EOSDIS DAACs. This survey has been conducted annually since 2004 by CFI, an external independent organization. The results from the survey provide a numerical index of customer satisfaction as well as detailed comments and suggestions for improvement of systems and services. These inputs are assessed regularly by the NASA ESDIS Project and the DAACs and changes implemented as appropriate.

The NSIDC DAAC regularly partners with other DAACs on data management and data service related activities. The NSIDC DAAC also participates in expert communities such as the Earth Science Data System Working Groups (ESDSWG) and Earth Science Information Partners (ESIP). ESDSWG is a NASA organization that focuses on the exploration and development of recommendations derived from pertinent community insights of NASA's heterogeneous and distributed Earth science data systems. ESIP is a networked community that brings together science, data and information technology practitioners. Through these partnerships NSIDC DAAC stays informed of evolution in data science and adopts new technology as needed.

#### *Reviewer Entry*

##### **Reviewer 1**

Comments:

Accept

##### **Reviewer 2**

Comments:

Accept

## **DIGITAL OBJECT MANAGEMENT**

### **VII. Data integrity and authenticity**

***R7. The repository guarantees the integrity and authenticity of the data.***

#### ***Compliance Level:***

4 – The guideline has been fully implemented in the repository

#### *Reviewer Entry*

##### **Reviewer 1**

Comments:

4 – The guideline has been fully implemented in the repository

## **Reviewer 2**

Comments:

4 – The guideline has been fully implemented in the repository

## ***Response:***

The NSIDC DAAC employs checksums (cksum, md5) to ensure data file integrity. The EOSDIS Core System (ECS), which NSIDC DAAC operates to perform ingest, archival and distribution, verifies checksums provided by the data producer after data transfer prior to ingest. The ECS system also includes data verification utilities which are ran against the data holdings to perform fixity checks every 90 days. Checksums are provided in the metadata to data users to enable user verification of data integrity. For data maintained in the DAAC's legacy data management system, manual verification of checksums are perform and retained in a database which is used to perform fixity checks every 90 days.

The NSIDC DAAC follows a data collection versioning strategy which organizes and documents major and minor data set versions. The DAAC works closely with the data producer during the stewardship process to identify and properly manage data versions. Data sets are organized by major version as shown in the data directory structure:

<https://n5eil01u.ecs.nsidc.org/SMAP> (Requires NASA Earthdata Login). Metadata records, user guides, and Digital Objection Identifiers (DOIs) are maintained for each major version, as shown through a data set landing page:

<http://nsidc.org/data/spl2smp/versions/4>. Differences between versions are documented, as shown on the data set landing page under "Version Summary". Metadata and documentation are also maintained for past versions of data sets and are linked to the most recent version as show by this data set landing page for a previous version:

<http://nsidc.org/data/spl2smp/versions/3>. Version information is also documented and presented to users through web pages such as the following example: [https://nsidc.org/data/smap/data\\_versions](https://nsidc.org/data/smap/data_versions)

The retention policy for older versions of data are negotiated for each NASA mission with ESDIS and the mission and documented in Interface Control Documents (ICDs). In most cases, NSIDC DAAC maintains at least the past and current copy of data in the archive. As previously noted, metadata and documentation for all past versions are always maintained for provenance.

## ***Reviewer Entry***

### **Reviewer 1**

Comments:

Accept

### **Reviewer 2**

Comments:

Accept

## **VIII. Appraisal**

***R8. The repository accepts data and metadata based on defined criteria to ensure relevance and understandability for data users.***

### ***Compliance Level:***

4 – The guideline has been fully implemented in the repository

#### ***Reviewer Entry***

##### **Reviewer 1**

Comments:

4 – The guideline has been fully implemented in the repository

##### **Reviewer 2**

Comments:

4 – The guideline has been fully implemented in the repository

### ***Response:***

The data sets assigned to NSIDC DAAC for archiving and distribution are produced by science teams funded by NASA as a part of a satellite or aircraft mission, a field experiment or a research project. Data sets may also be assigned for archiving and distribution at the NSIDC DAAC as a result of interagency or international agreements between NASA and other partners. In all cases, NASA assigns the data sets to the appropriate DAAC based on the Earth science discipline user community served by the DAAC. Given the rigorous review processes used by NASA in the selection of the science teams, the data sets produced by them are assured to be relevant to the users served by the DAACs.

In some cases, science investigators may submit data sets to the DAAC directly for archiving and distribution. In these cases, the NSIDC DAAC follows the NASA EOSDIS data accession process for review and approval of new data sets into the DAAC catalog. The process includes assessment and approval by the DAAC, the User Working Group, the ESDIS project and NASA Headquarters. See attached document [ANNEX A].

When data are deemed to be outside of the domain and mission of the NSIDC DAAC, the DAAC attempts to direct the data producer to a more appropriate data repository (e.g. another DAAC, a general repository)

The NSIDC DAAC recommends the use of NASA-approved standard data formats to data producers to ensure data are well described and interoperable (<https://earthdata.nasa.gov/user-resources/standards-and-references>). Acceptance of data not conforming to a NASA standard format is at the discretion of the DAAC and NASA.

The NSIDC DAAC curates metadata for provenance, discovery and usage. The level of curation is determined by the identified Level of Service for the data set (see response to Levels of Curation). The NSIDC DAAC complies with the ESDIS Metadata Requirements - Base Reference for NASA Earth Science Data Products (423-RQMT-003) and submits all metadata to and complies with all requirements of the NASA Common Metadata Repository (CMR)

(<https://earthdata.nasa.gov/about/science-system-description/eosdis-components/common-metadata-repository>).

For NASA satellite and airborne missions, operational quality review of the data values is generally a requirement of the data producer and documented in the mission Data Management Plan. These quality assessments are typically reported as quality flags in the data files. Other known quality issues are reported to NSIDC DAAC and described in supporting documentation. The NSIDC DAAC also performs the quality processes described in R11.

#### *Reviewer Entry*

##### **Reviewer 1**

Comments:  
Accept

##### **Reviewer 2**

Comments:  
Accept

## **IX. Documented storage procedures**

***R9. The repository applies documented processes and procedures in managing archival storage of the data.***

### ***Compliance Level:***

4 – The guideline has been fully implemented in the repository

#### *Reviewer Entry*

##### **Reviewer 1**

Comments:  
4 – The guideline has been fully implemented in the repository

##### **Reviewer 2**

Comments:  
4 – The guideline has been fully implemented in the repository

### ***Response:***

As one of the DAACs within the NASA ESDIS Network, the NSIDC DAAC complies with the Requirements for Archiving, Distribution and User Services in EOS Data and Information System (EOSDIS) (a.k.a. ADURD).

While NSIDC DAAC staff work a typical business schedule (M-F, 9-5), NSIDC DAAC systems are operational 24x7 within a monitored machine room with backup power and active systems monitoring. NSIDC DAAC supports automatic user order fulfillment for most data sets, and posts notices of scheduled maintenance at least two business days prior to any

planned maintenance on both the NSIDC DAAC Web site and the NASA Earthdata Search portal.

The NSIDC DAAC uses both on-site and off-site backups and maintains multiple copies of data sets using state of the art technologies. The NSIDC DAAC data preservation posture is reviewed annually by measuring each of the DAAC's archival strategies against risk of data loss and user impact to primary data system outage. The NSIDC DAAC uses the NASA "Archiving, Distribution and User Services Requirements Document" (<https://earthdata.nasa.gov/about/esdis-project/esdis-policy/adurd>) and the "ESDIS Data Backup Analysis Report" as a guide to this review and adjusts archival strategies as needed.

#### *Reviewer Entry*

##### **Reviewer 1**

Comments:

Accept

##### **Reviewer 2**

Comments:

Accept

## **X. Preservation plan**

***R10. The repository assumes responsibility for long-term preservation and manages this function in a planned and documented way.***

### ***Compliance Level:***

4 – The guideline has been fully implemented in the repository

#### *Reviewer Entry*

##### **Reviewer 1**

Comments:

4 – The guideline has been fully implemented in the repository

##### **Reviewer 2**

Comments:

4 – The guideline has been fully implemented in the repository

### ***Response:***

The NSIDC DAAC staff curate data for long-term preservation and usage in accordance with the NASA EOSDIS's data preservation guideline (<https://earthdata.nasa.gov/user-resources/standards-and-references/preservation-content-spec>).

As indicated in that document: The data resulting from NASA's missions are a valuable resource that needs to be

preserved for the benefit of future generations. In the near-term, as long as the missions' data are being used actively for scientific research, it continues to be important to provide easy access to data and services commensurate with current information technology. For the longer term, when the research community focus shifts toward new missions and observations, it is essential to preserve the previous mission data and the information needed so that a new user in the future will be able to understand how the data were used for deriving information, knowledge and policy recommendations, and to be able to "repeat the experiment" to ascertain the validity and possible limitations of conclusions reached in the past and to provide confidence in long term trends that depended on data from multiple missions. While NASA is not legislatively mandated to preserve data permanently as are other agencies such as the U.S. Geological Survey (USGS), National Oceanic and Atmospheric Administration (NOAA) and National Archives and Records Administration (NARA), it is essential for NASA to preserve all the data and associated content beyond the lives of NASA's missions to meet NASA's near-term objective of providing access to data and services for active scientific research. Also NASA has to ensure that the data and associated content are preserved for transition to permanent archival agencies. To fulfill this responsibility, identification of the specific content items that need to be preserved from each of NASA's missions is essential.

Most of the data and associated items held at the DAAC are governed by NASA's Earth Science Data and Information Policy (<https://earthdata.nasa.gov/earth-science-data-systems-program/policies/data-information-policy>). The few exceptions (e.g., documents governed by International Trade and Arms Regulation – ITAR) requiring clearance from NASA for distribution are handled on a case-by-case basis.

The high-level requirements provided by NASA to the data producers include the requirement to transfer data to a designated DAAC according to an agreed upon schedule. The requirement also includes compliance with the NASA Earth Science Data Preservation Content Specification mentioned above. Details of data and metadata standards are worked out between the <<xxxx>> DAAC and the data producers, and are compatible with those specified at <https://earthdata.nasa.gov/user-resources/standards-and-references#ed-standards>.

#### *Reviewer Entry*

##### **Reviewer 1**

Comments:

Accept

##### **Reviewer 2**

Comments:

Accept

## **XI. Data quality**

***R11. The repository has appropriate expertise to address technical data and metadata quality and ensures that sufficient information is available for end users to make quality-related evaluations.***

## ***Compliance Level:***

4 – The guideline has been fully implemented in the repository

### ***Reviewer Entry***

#### **Reviewer 1**

Comments:

4 – The guideline has been fully implemented in the repository

#### **Reviewer 2**

Comments:

4 – The guideline has been fully implemented in the repository

## ***Response:***

NSIDC DAAC performs data quality checks (in accordance with the assigned Level of Service) as a part of the data stewardship process. The quality checks include:

1. Verify file sizes, checksum and number of files
2. Data set and its contents are clearly described
3. Geospatial and temporal information are complete and described
4. Variables and units follow standards or are well defined
5. Publication or manuscript describing the data is provided
6. Methodology, calibrations, and algorithms provided
7. Known issues/limitations clearly described
8. Statements are properly referenced

The NSIDC DAAC develops data set user guides during curation which contain sections specific to data quality and integrity as reported by the data producer or documented through community feedback. The user guides also include a References and Related Publications section specific to peer-reviewed publications written about the data set. An example user guide can be seen here: <http://nsidc.org/data/mod10a1>.

In addition, NSIDC DAAC maintains a listing of peer-reviewed publications from the earth science community describing their research and the use of particular data sets. For example, see the MODIS Published Research page here: <https://nsidc.org/data/modis/research.html>.

The NSIDC DAAC's metadata database, used to create and store data set metadata, enforces minimum metadata requirements and applies validation of valids from the Global Change Master Directory and schema requirements from NASA's Common Metadata Repository (CMR).

The NSIDC DAAC staff participate in the NASA Earth Science Data System Working Groups (ESDSWG) for Data Quality. As recommendations become codified, the NSIDC DAAC will look toward these recommendations for future best

practices in capturing and disseminating data quality information.

Refer to R5 for Organizational Infrastructure (skillsets), R6 for Expert Guidance, R7 for Data Integrity and Authenticity, R8 for Appraisal, R12 Workflows and R14 for Data Reuse

*Reviewer Entry*

**Reviewer 1**

Comments:  
Accept

**Reviewer 2**

Comments:  
Accept

## XII. Workflows

*R12. Archiving takes place according to defined workflows from ingest to dissemination.*

***Compliance Level:***

4 – The guideline has been fully implemented in the repository

*Reviewer Entry*

**Reviewer 1**

Comments:  
4 – The guideline has been fully implemented in the repository

**Reviewer 2**

Comments:  
4 – The guideline has been fully implemented in the repository

***Response:***

The NSIDC DAAC employs two well established data management systems and associated workflows for data ingest, archiving, and distribution:

1. NASA EOSDIS Core System (ECS)
2. NSIDC university data management system.

Those data sets archived in the ECS, the primary system, follow the process outlined in the Polling with Delivery Record Mechanism Standard

(<https://earthdata.nasa.gov/user-resources/standards-and-references/polling-with-delivery-record-pdr-mechanism>). The

workflows are formally documented between each NASA Science Investigator-led Processing System (SIPS) and NSIDC DAAC in Interface Control Documents (ICDs) and Operations Agreements (OAs). NSIDC DAAC's implementation of this process involves automatically ingesting data files, metadata files, and any associated ancillary files from the data provider using a per-negotiated protocol (SFTP, SCP, HTTPs, or GridFTP). Data are then verified against the Product Delivery Record and, if successful, are archived first on spinning disk (where, if the data is to be public, can be accessed via an HTTPs endpoint) then to a tape backup. Metadata are parsed and stored alongside the data on disk and tape, as well as being sent to NASA's Common Metadata Repository for search and order functions. Inventory metadata (parsed from the metadata file or created by the ingest process, which includes the fixity information) is stored in a local database for validation and data management processes.

For data that is archived in the NSIDC university data management system, the process is more manual. A data transfer mechanism and manifest format is negotiated with the data provider and documented in an Operations Agreement and/or Data Management Plan, and the data are staged on spinning disk. The data are then verified against the manifest and are written to the archive where they may be accessed via HTTPs if the data are to be public. Nightly, the data are backed up to a tape backup system and to a secondary backup at CU Denver. Additionally, fixity information is generated at this point and stored in a local database for use in data validation and data management.

Updates occur similarly in either system - if a new major version of a data set is to be ingested, it is treated as a new entity and the previous version is moved to a non-public archive once the new version has been successfully ingested. In the case of a minor version change, individual files within a major version may be replaced and the fixity information updated (in the case of ECS this is automatic, while on our NSIDC university system, this is manual). The old versions of data (either major or minor version) may be kept in a non-public archive for a time depending on the retention policy of the mission/project.

The software and hardware environment for both the ECS and NSIDC university systems is managed within Change Control and Configuration Management processes. The NSIDC DAAC employs a Change Control Board (CCB) to evaluate and schedule all modifications to the ECS system baseline, consisting of one test mode and one production mode. When software is delivered from the ECS development team, NSIDC DAAC Operations installs the software into the test mode and performs a system checkout following a regression test plan. If the software is working as expected, it is installed in the operational mode during planned maintenance and tested again. The NSIDC DAAC performs Configuration Management of the NSIDC university system through three main efforts: agile development with continuous integration and production deployment, a Technical Services Change Control Board (TSCCB) which reviews and approves changes to the production environment, and a Production Software Support (PSS) process for tracking and resolving software bugs and enhancements.

Appraisal and selection of data as well as approaches for data outside of the mission/collection profile are described in Appraisal R8.

### *Reviewer Entry*

#### **Reviewer 1**

Comments:  
Accept

**Reviewer 2**

Comments:  
Accept

## XIII. Data discovery and identification

*R13. The repository enables users to discover the data and refer to them in a persistent way through proper citation.*

### *Compliance Level:*

4 – The guideline has been fully implemented in the repository

#### *Reviewer Entry*

**Reviewer 1**

Comments:  
4 – The guideline has been fully implemented in the repository

**Reviewer 2**

Comments:  
4 – The guideline has been fully implemented in the repository

### *Response:*

To facilitate users' discovery of data, the DAACs offer several methods. At the EOSDIS Network level, the Earthdata Search provides search, preview, download and access capabilities for all the DAAC holdings (<https://search.earthdata.nasa.gov/>). The specific data discovery mechanisms supported by NSIDC DAAC include:

1. NSIDC DAAC website which enables discovery through data collections and data parameter themes (<https://nsidc.org/daac>)
2. NSIDC Data Search which allows users to dynamically filter and compare data sets (<https://nsidc.org/data/search>)
3. Application Program Interfaces (APIs) for machine-to-machine data discovery and access (<https://nsidc.org/api>)

Metadata describing data distributed by NSIDC DAAC are provided to the NASA EOSDIS Common Metadata Repository (CMR). The CMR is a high-performance, high-quality, continuously evolving metadata system that catalogs all data and service metadata records for the EOSDIS system and is the authoritative management system for all EOSDIS metadata. These metadata records are registered, modified, discovered, and accessed through programmatic interfaces leveraging standard protocols and APIs.

The NSIDC DAAC assigns a Digital Object Identifier (DOI) to all data sets which is included in the data citation. The data citation and DOI are presented to users on the data set landing pages within the "Citing These Data" tab (Ex. <http://nsidc.org/data/mod10a1/versions/6>) as well as in the data set (collection) metadata record.

*Reviewer Entry*

**Reviewer 1**

Comments:  
Accept

**Reviewer 2**

Comments:  
Accept

## XIV. Data reuse

*R14. The repository enables reuse of the data over time, ensuring that appropriate metadata are available to support the understanding and use of the data.*

### *Compliance Level:*

4 – The guideline has been fully implemented in the repository

*Reviewer Entry*

**Reviewer 1**

Comments:  
4 – The guideline has been fully implemented in the repository

**Reviewer 2**

Comments:  
4 – The guideline has been fully implemented in the repository

### *Response:*

The NSIDC DAAC develops collection- and file-level (when appropriate) metadata and supporting documentation for all data sets to enable data discovery, access, and use. This information is developed by an NSIDC DAAC curation team with domain expertise in measurement techniques and instruments, research applications, user communities, and data formats.

The NSIDC DAAC also curates a users guide for each data set, which includes information on the data structure, algorithm, and processing steps. When available, the user guide also references peer-reviewed publications outlining the

data set processing steps and algorithm. For some NASA satellite mission data, the data production software is available upon request through a Delivered Algorithm Packages (DAPs).

The NSIDC DAAC encourages use of NASA Earth Science approved standard data formats to improve usability and interoperability (<https://earthdata.nasa.gov/user-resources/standards-and-references>).

*Reviewer Entry*

**Reviewer 1**

Comments:  
Accept

**Reviewer 2**

Comments:  
Accept

## TECHNOLOGY

### XV. Technical infrastructure

*R15. The repository functions on well-supported operating systems and other core infrastructural software and is using hardware and software technologies appropriate to the services it provides to its Designated Community.*

***Compliance Level:***

4 – The guideline has been fully implemented in the repository

*Reviewer Entry*

**Reviewer 1**

Comments:  
4 – The guideline has been fully implemented in the repository

**Reviewer 2**

Comments:  
4 – The guideline has been fully implemented in the repository

***Response:***

The NSIDC DAAC follows community standards such as OGC, OpenAPI, OpenDAP, REST, SOAP, ISO 19115, etc. There are no significant deviations from the standards.

The NSIDC DAAC operates a robust, scalable IT infrastructure. Core hardware and software infrastructure includes:

1. Commercial hard drive enclosures configured as a redundant array of disks
2. Interconnected fiber channel fabric
3. Server and storage systems networked with 1Gb and 10Gb ethernet
4. Stornext software to manage filesystem metadata and data management across disk and tape platforms
5. All hardware is equipped with redundant power supplies
6. On-site short term (15 minutes) UPS battery backup
7. On-site diesel generator provides power during extended utility power outage
8. Offsite disaster recover infrastructure; NFS server, disk arrays
9. A thorough software inventory database is maintained internally
10. Hardware inventory and system documentation maintained internally

Infrastructure hardware is reviewed and assessed annually and budgeted through the DAAC's annual workplan process with the NASA ESDIS project. Servers and data storage equipment are replaced on a five to seven year rotation.

Near real-time data are available and provisioned for 24x7 public access. Internal 10Gb and fiber channel networks combined with the University of Colorado Boulder's network infrastructure provide abundant bandwidth. NSIDC DAAC NRT data are consumed by science users around the world.

#### *Reviewer Entry*

##### **Reviewer 1**

Comments:  
Accept

##### **Reviewer 2**

Comments:  
Accept

## **XVI. Security**

***R16. The technical infrastructure of the repository provides for protection of the facility and its data, products, services, and users.***

### ***Compliance Level:***

4 – The guideline has been fully implemented in the repository

#### *Reviewer Entry*

## **Reviewer 1**

Comments:

4 – The guideline has been fully implemented in the repository

## **Reviewer 2**

Comments:

4 – The guideline has been fully implemented in the repository

## ***Response:***

The NSIDC DAAC complies with the "Requirements for Archiving, Distribution and User Services in EOS Data and Information System (EOSDIS)" which states that the DAAC shall comply with all of NASA's information technology and information security requirements as in NASA Procedural Requirement (NPR) 2810.1A (Security of Information Technology (Revalidated with Change 1, dated May 19, 2011)) and NASA Policy Directive (NPD) 2810.1E (NASA Information Security Policy, 7/14/2020). The DAAC shall provide copies of security documentation to appropriate NASA officials and the ESDIS office.

The security of the NSIDC DAAC systems is monitored and maintained by NSIDC, the University of Colorado Boulder (UCB), and NASA security personnel. The NASA EOSDIS Core System (ECS) IT security system:

1. Has a designated security officer
2. Utilizes a dedicated firewall appliance
3. Successfully passes audits by a federal government agency
4. Has Federal Information Security Management Act (FISMA) compliant:
  - a. System Security Plan
  - b. Risk Management Assessment - Is rated FIPS-199 'low' in risk
  - c. Contingency Management Plan - Annual contingency exercise results reported to a federal government agency

The physical infrastructure of the NSIDC DAAC data center is located in a modern, secure facility on the UCB campus. Access to the facility is limited to authorized individuals by a key card entry system. Additionally, server and data storage systems are installed inside locked computer cabinets with access limited to specific NSIDC and university personnel.

The NSIDC DAAC has the ability to restore data and operational systems through:

1. On-site tape backup of data sets, web content, databases, server configuration, and operational documentation - 6 month retention period.
2. Off-site replica of unique data sets, web content, databases, server configuration, and operational documentation through synchronous backups that mirror current data. Off-site systems are located within a secure room at the University of Colorado Denver. Access is controlled by a key card entry system.
3. An integrated virtual server backup system that can be used to recreate all production virtual machines including their software applications and application content.

The NASA ECS and UCB intranets share certain IT security system functions, including:

1. University campus firewalls filter some generic attack vectors
  - a. NSIDC-specific campus firewall rules further limit attack vectors NSIDC servers
2. University campus intrusion detection systems analyze inbound traffic using generic rules
3. University campus network scans identify Internet-visible vulnerabilities for impact analysis and possible remediation
4. The University campus data center has two factor authentication for physical entry and FISMA approved environmental controls and alarms
5. Additional layers of IT security protection are provided by:
  - a. A NSIDC-specific intrusion detection system that analyzes inbound and outbound traffic using NSIDC-specific rules and industry accepted rules
  - b. A historical repository of NSIDC-specific netflow data for forensic analysis is stored locally and also at an off-site government agency location
  - c. A short term repository of select network packets for forensic analysis
  - d. Honeypots that improve intrusion detection probabilities
  - e. Periodic local network scans are used to identify local vulnerabilities for impact analysis and possible remediation

Refer to R7 for Data integrity and authenticity, R9 for Documented Storage Procedure and R15 for Technical infrastructure.

#### *Reviewer Entry*

##### **Reviewer 1**

Comments:  
Accept

##### **Reviewer 2**

Comments:  
Accept

## **APPLICANT FEEDBACK**

### **Comments/feedback**

*These requirements are not seen as final, and we value your input to improve the core certification procedure. To this end, please leave any comments you wish to make on both the quality of the Catalogue and its relevance to your organization, as well as any other related thoughts.*

#### **Response:**

*Reviewer Entry*

**Reviewer 1**

Comments:

**Reviewer 2**

Comments:

ANNEX A

NATIONAL SNOW AND ICE DATA CENTER DISTRIBUTED ACTIVE ARCHIVE CENTER  
(NSIDC DAAC)

# Data Acceptance Plan

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Author: Donna J. Scott<sup>1</sup>  
Original Authors: Ronald Weaver<sup>1</sup>, Ruth Duerr<sup>2</sup>  
Last Updated: May 4, 2015



NASA NSIDC DAAC<sup>1</sup>  
National Snow and Ice Data Center<sup>2</sup>  
Boulder, CO

# ANNEX A

<b>CHANGE LOG.....</b>	<b>2</b>
<b>1.0 INTRODUCTION .....</b>	<b>3</b>
Purpose and Scope.....	3
Data Considerations .....	3
<b>2.0 DATA ACCEPTANCE PROCEDURE FOR EOS APPROVED MISSION DATA.....</b>	<b>4</b>
<b>3.0 DATA ACCEPTANCE PROCEDURE FOR PRINCIPAL INVESTIGATOR, NON-EOS MISSION, AND NSIDC INTERNAL DATA .....</b>	<b>4</b>
Levels of Service .....	5
Data Acceptance Process .....	5
<b>4.0 DATA ACCEPTANCE PROCEDURE FOR INTERNALLY GENERATED NSIDC DAAC DATA .....</b>	<b>7</b>
<b>APPENDIX A: PROCESS FLOW DIAGRAM.....</b>	<b>8</b>
<b>APPENDIX B: CONTROL DOCUMENTS .....</b>	<b>8</b>
<b>APPENDIX C: LIST OF ACRONYMS .....</b>	<b>9</b>

# ANNEX A

## CHANGE LOG

Revision	Date	Description	Author
1.0	9/15/2008	Original draft	Weaver
1.1		Revisions	Weaver, Duerr
2.0	2/15/09	Revisions, distributed to UWG	Weaver, Duerr
3.0	4/6/09	Revisions, internal to NSIDC	Weaver, Duerr
4.0	4/9/09	Revisions, distributed to UWG 4/15/09	Weaver, Duerr, Leon, Miller
5.0	7/30/09	Split Levels of Service section into its own document and updated examples tables	Duerr
6.0	3/19/10	Updated Appendix A so it's contents can be used as the data documentation (at lowest level of documentation support)	Duerr, Leon, Miller
7.0	10/1/10	Changed the data accession process to also include an executive session for the UWG once the material is presented and a decision is needed. Revisions accepted, distributed to UWG via Web site	Weaver, Duerr
8.0	03/04/10	Unknown	Unknown
9.0	05/04/15	Major revisions, removed areas of the plan that were out of date. Linked to more maintained and updated NSIDC and NASA related documents. Removed Appendix A.	Scott

## 1.0 Introduction

### *Purpose and Scope*

The purpose of this Data Acceptance Plan is to ensure that non-EOSDIS approved<sup>1</sup> data submitted to the NASA National Snow and Ice Data Center Distributed Active Archive Center (NSIDC DAAC) for archive and/or distribution are vetted and reviewed to be scientifically valid and viable for research applications. The scope of this process is limited to the NSIDC DAAC and does not set policy outside of the NSIDC DAAC, but references those policies that apply to the NSIDC DAAC as a NSIDC managed and a NASA EOSDIS direct-funded task.

This plan ensures that a NASA approved data review process is used to recommend data sets for inclusion into the EOSDIS supported collection of NSIDC DAAC standard data sets. This plan applies to all NASA approved non-EOS missions and projects, and all PI-Provided or NSIDC DAAC internally generated data.

This document describes the procedures and processes for the introduction of new, non-EOS data sets into the NSIDC DAAC collection of standard data sets.

### *Data Considerations*

The following types of data are considered for management and distribution:

#### *EOS Approved Mission data*

NASA Science Mission Directorate (SMD) and EOSDIS approved mission data are accepted as part of the NSIDC DAAC core data sets upon release by the Mission. Acceptance and public release of data is determined by the Mission Science Calibration and Validation team and declared for public release by the Mission Scientist. This process is documented within Mission and NSIDC DAAC shared Interface Control Document (ICD) and the NSIDC DAAC Annual Workplan. Likewise, data received by NSIDC DAAC from NASA and EOSDIS approved data production projects, which are vetted by a Science Team prior to arrival at NSIDC DAAC, are by virtue of the agreement with NASA HQ and EOSDIS, accepted as NSIDC DAAC core data upon receipt from the provider.

#### *NASA Data Recommendations*

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<sup>1</sup> EOS Mission data assigned to the NSIDC DAAC are not subject to this process.

NASA ESDIS Management and/or the NASA Program Scientist for Cryosphere may request the NSIDC DAAC to accept data sets that compliment NASA missions. For these instances, the acceptance requires a shortened version of the data acceptance process as outlined in section 3.0.

*Non-EOS Mission data*

*NASA Principal Investigator provided data*

*Internal data generated by the NSIDC DAAC*

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These data categories will follow acceptance procedures as outlined in section 3.0.

## **2.0 Data Acceptance Procedure for EOS Approved Mission Data**

Agreements between the mission and NSIDC DAAC are completed and signed prior to mission launch and include the Interface Control Document and the Data Management Plan. Within these documents it is agreed that final responsibility for the quality of the data and the authority for acceptance (i.e. introduction and public release) of NASA and EOSDIS approved mission data into the NSIDC DAAC collection of standard data set rests entirely with the mission project scientist. Cognizant NSIDC DAAC Product Team staff (see inset Section 3) then incorporate these mission data into the NSIDC DAAC for archive, distribution, and operational support once the Mission delivers the data.

## **3.0 Data Acceptance Procedure for Principal Investigator, non-EOS Mission, and NSIDC Internal Data**

Several factors are used to evaluate a data set including scientific merit, uniqueness, cost to archive and distribute, etc. A major criterion to determine the resources needed is considering the [Level of Service \(LoS\)](#) to be provided.

## *Levels of Service*

NSIDC supports a range of services, broadly categorized as providing service to the user or for the data. Levels of Service for the user include the level of user support, data set software development, and data set documentation provided. Services for the data include ingest of the data, regular or on-demand processing, data archival, and data distribution to users. Within each category, the levels of service are generally described in order of increasing cost. In addition, depending on the needs of the data provider or user community, a wide range of value-added data or services may be considered for developed as warranted. As part of the Data Acceptance process, each data set will be assigned levels of service in each category.

## *Data Acceptance Process*

The general workflow steps are typical of a data submission request. An initial review by the NSIDC DAAC Data Accession (DA) Lead determines the degree to which the data set is scrutinized prior to the final decision by NASA EOSDIS Management. An overview of the process is depicted in Appendix A.

### *Step 1: Intake and Initial Review*

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1. An [online submission](#) request is made to NSIDC DAAC for consideration of archival and/or distribution of data. The PI provides the data related documentation and data specific requirements.
2. The DA Lead initiates the review process, making contact with the submitter, insuring the integrity of the material received, and determining the NSIDC subject matter experts for the assessment.

### *Step 2: Initial assessment*

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1. The submission package is vetted for science and resource requirements by relevant NSIDC DAAC Product Teams and NSIDC Scientists. A recommendation based on the science value of the data and desired LoS is captured.
2. The DA Lead reviews the NSIDC recommendations. A recommendation to

#### *NSIDC Product Teams*

*Most of the data activities in the DAAC are handled through Product Teams, which typically include representatives from each of the specialty areas at NSIDC. In general a product team will include a technical writer, a user services representative, a scientist, a scientific programmer, a data operations representative, a product team lead, and other technical personnel as needed.*

## ANNEX A

archive/distribute initiates the UWG review.

3. If additional information is requested of the PI, the DA Lead facilitates gathering that information. Satisfactory response leading to a recommendation to archive/distribute initiates the UWG review.
4. Concerns related to the data quality, data fit, and/or science relevance, resulting in a rejection, initiates a report to the DAAC Manager for a formal rejection statement. The DA Lead will contact the PI explaining why the data set has been rejected. The DA Lead may provide the PI with other archival center options, or provide the option to correct the concerns and resubmit the data request.

### *Step 3: UWG review*

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1. The submission package, which now includes the NSIDC DAAC recommendation is provided to and vetted by the UWG for community-wide science value. A recommendation based on the science value of the data is captured. A recommendation on behalf of the UWG is provided by the UWG Chair.
2. The DA Lead reviews the UWG recommendations. A recommendation to archive/distribute initiates the EOSDIS review. If additional information is requested of the PI, the DA Lead facilitates gathering that information. A satisfactory response leading to a recommendation to archive/distribute initiates the EOSDIS review.
3. Concerns related to the data quality, data fit, and/or science relevance, resulting in a rejection, initiates a report to the DAAC Manager for formal rejection statement. The DA Lead will contact the PI explaining why the data set has been rejected. The DA Lead may provide the PI with other archival center options, or provide the option to correct the concerns and resubmit the data request.

### *Step 4: NASA ESDIS Action*

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1. The submission package, including the DAAC and UWG recommendations to archive/distribute the data is delivered to ESDIS Management. ESDIS may choose to work with the NASA HQ Program Scientist to receive further input on the submission request. If ESDIS accepts the recommendations to archive/distribute the data, the DA Lead informs the PI that the data have been accepted for inclusion with the NSIDC DAAC's standard data sets, and introduces the PI to the assigned Product Team Lead.

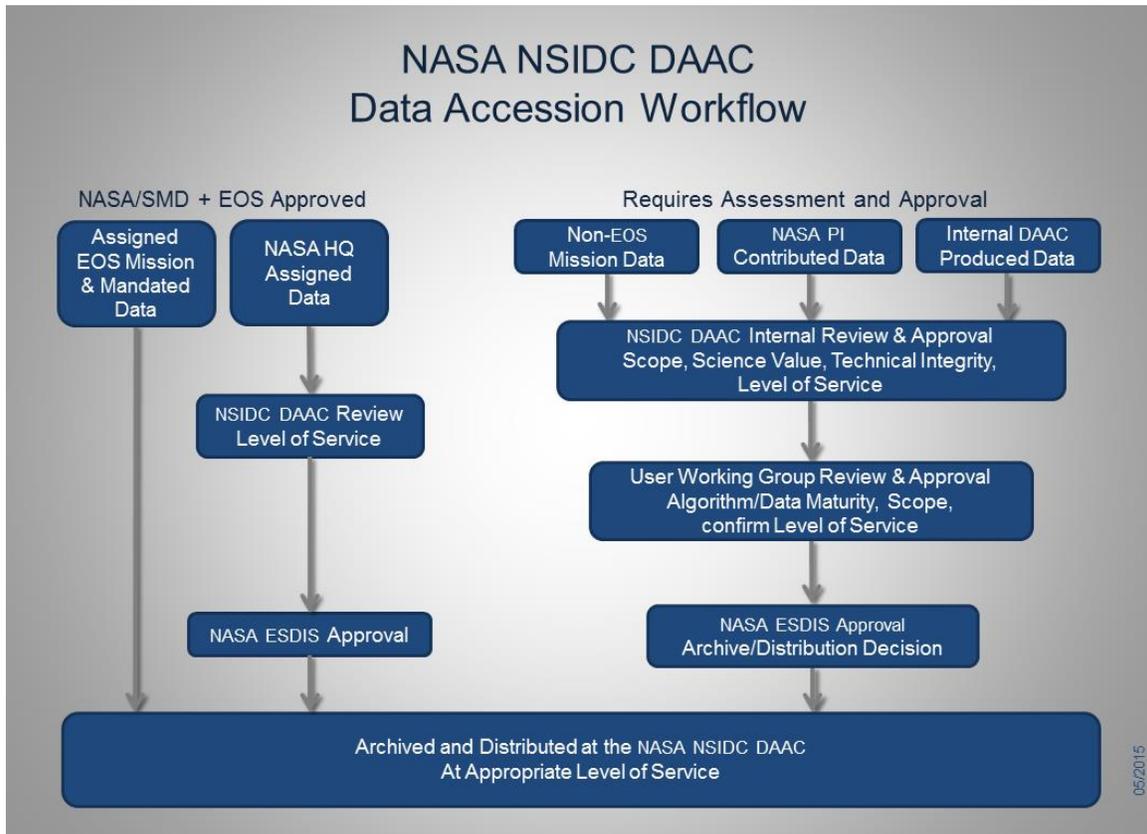
## ANNEX A

2. If ESDIS rejects the recommendation for the NSIDC DAAC to archive/distribute the data, the DA Lead informs the PI of the decision and may provide the PI with other archival center options if applicable.

### **4.0 Data Acceptance Procedure for internally generated NSIDC DAAC data**

Data acceptance procedures for internally generated NSIDC DAAC data are the same as in section 3.0. The distinction is that a NSIDC DAAC product team lead may act as the submitter in collaboration with a NSIDC scientist.

## Appendix A: Process Flow Diagram



## Appendix B: Control Documents

NASA HQ and ESDIS directives  
 NSIDC DAAC and Mission Interface Control Documents  
 NSIDC DAAC Annual Work plan  
 NSIDC Levels of Service (LoS) Document  
 NSIDC Policy Documents

## Appendix C: List of Acronyms

DA	Data Accession
DAAC	Distributed Active Archive Center
EOS	Earth Observing System
EOSDIS	EOS Data and Information System
ESDIS	Earth Science Data and Information System
ICD	Interface Control Document
NASA	National Aeronautics and Space Administration
NASA HQ	NASA Head Quarters
NSIDC	National Snow and Ice Data Center
PI	Principal Investigator
SMD	Science Mission Directorate
UWG	User Working Group