



Assessment Information

[CoreTrustSeal Requirements 2017–2019](#)

Repository:	Oak Ridge National Laboratory Distributed Active Archive Center
Website:	https://daac.ornl.gov
Certification Date:	14 September 2018
This repository is owned by:	Oak Ridge National Laboratory (ORNL)



Core Trustworthy Data Repository Requirements

BACKGROUND INFORMATION

Context

R0. Please provide context for your repository.

Repository Type.

Domain or subject-based repository

National repository system; including governmental

Research project repository

Other (please describe)

Comments

ORNL DAAC archives about 1200+ diverse terrestrial ecology datasets. Archive volume is about 200TB and growing. ORNL DAAC caters to about 40,000+ unique data users each year. ORNL DAAC publishes nearly 75+ new datasets each year. The distribution volume for the ORNL DAAC is in the order of 150+TB and 29+ million data files each year.

ORNL DAAC's Goals are to:

- Serve as the primary active archive for biogeochemical dynamics data derived from NASA's field campaigns
- Provide field data to assess the accuracy and uncertainty of NASA's remote sensing products
- Work with NASA to develop best practices, tools, and training for data providers to generate terrestrial ecology and biogeochemical dynamics data for sharing and archival
- Archive and disseminate regional and global data products for modeling and analysis
- Archive and disseminate model source code to enable synthesis of results across modeling studies
- Work with NASA to develop and use the best available technology to organize and present data to users
- Facilitate interdisciplinary synthesis by providing and integrating diverse data required to address common hypothesis (across multiple scales, model-data intercomparison, etc.)



Brief Description of the Repository's Designated Community.

The Oak Ridge National Laboratory Distributed Active Archive Center (ORNL DAAC) for biogeochemical dynamics is one of the NASA Earth Observing System Data and Information System (EOSDIS) data centers managed by the Earth Science Data and Information System (ESDIS) Project, which is responsible for providing scientific and other users access to data from NASA's Earth Science Missions. ORNL DAAC is operated by the ORNL Environmental Sciences Division and is responsible for data archival, product development and distribution, and user support for biogeochemical and ecological data and models.

The ORNL DAAC is the designated archive for NASA's Terrestrial Ecology program. ORNL DAAC serves as the primary archive for biogeochemical dynamics and ecology data derived from NASA field campaigns. Additionally ORNL DAAC supports NASA's remote sensing land validation community and provides archive and dissemination of ecological model source code to enable synthesis of results across environmental modeling studies.

Level of Curation Performed.

- 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

Comments

Below is a short summary of ORNL DAAC curation activities:

Data quality review and documentation:

ORNL DAAC staff will review the submitted data using our Data Quality Review Checklist.

DAAC staff will also prepare metadata and comprehensive documentation about the datasets. Data may also be added to data distribution and visualization services.

Publication

The DAAC will publish the data package and distribute metadata to the NASA EOSDIS clearinghouse and other relevant data catalogues. The ORNL DAAC also advertises the data online through email, social media, and the DAAC website. ORNL DAAC also generates a citation and registers a DOI for the dataset.

ORNL DAAC Long-term data stewardship:

- Provides tools to explore, access, and extract data
- Provides long-term, secure archiving (back-up and recovery)
- Addresses user questions, and serves as a buffer between users and data contributors
- Provides usage & download statistics and data citation statistics



Outsource Partners. If applicable, please list them.

ORNL DAAC regularly partners with other DAACs on EOSDIS activities. In addition to the core EOSDIS partnership function, ORNL DAAC also partners with other organizations.

ESDSWG

The Earth Science Data System Working Groups (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. ORNL DAAC staff participate in ESDSWG Working Groups.

ABoVE Working Groups

The Arctic Boreal Vulnerability Experiment (ABoVE) Working Groups define standards of data management, services, models, variables, and products for ABoVE. ORNL DAAC staff participate in the Core Variables & Standards and the Geospatial Products & Standards ABoVE Working Groups.

ESIP

The Federation of Earth Science Information Partners (ESIP Federation) is a networked community that brings together science, data and information technology practitioners. ORNL DAAC is a long-term member of the ESIP federation and is a member of many of the working groups.

ICSU / WDS

The International Council for Science World Data System (ICSU / WDS) promotes stewardship and access to data and data services across a range of science disciplines. ORNL DAAC is a member of the World Data System.

Other Relevant Information.

ORNL DAAC also collaborates with other data centers. Below are some of the data centers that ORNL DAAC works closely with.

ARM

The Atmospheric Radiation Measurement Archive (ARM Archive) provides observations to improve our understanding of clouds and aerosols.

NGEE-A

The Next-Generation Ecosystem Experiments (NGEE-A) improve climate model predictions through advanced understanding of coupled processes in Arctic terrestrial ecosystems.

SPRUCE

The Spruce and Peatland Responses Under Climatic and Environmental Change (SPRUCE) experiment assesses the response of northern peatland ecosystems to increases in temperature and exposures to elevated atmospheric CO₂ concentrations.



USGS CSAS

USGS' Core Science Analytics, Synthesis, and Libraries (USGS CSAS) synthesize and deliver Earth system data and information. ORNL DAAC collaborates with USGS CSAS to build metadata editors and data discovery tools.

DataONE

DataONE provides access to multiple heterogeneous information collections through a centralized metadata registry and a distributed cyberinfrastructure. ORNL DAAC is a member node within the DataONE network.

Reviewer Entry

Accept or send back to applicant for modification:

Accept

Comments:

Organizations described in 'Outsource partners' are in fact partners and could appear in 'Other relevant information'. However, because of the close relationship with these partners the text can remain since it shows a closest proximity than with organizations listed in 'Other relevant information'.



ORGANIZATIONAL INFRASTRUCTURE

I. Mission/Scope

Compliance Level: 4

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

The mission of the ORNL DAAC is to assemble, distribute, and provide data services for a comprehensive archive of terrestrial biogeochemistry and ecological dynamics observations and models to facilitate research, education, and decision-making in support of NASA's Earth Science.

NASA assigns this mission to the ORNL DAAC. ORNL's Environmental Sciences Division (ESD) is host to a wide range of cutting edge terrestrial ecology research. Because of ORNL ESD's research leadership in terrestrial ecology and ORNL's capability to provide data services for diverse terrestrial ecology data products, the ORNL DAAC mission was awarded to ORNL. ORNL DAAC operates on an inter-agency agreement between US Department of Energy (DOE) and NASA. ORNL DAAC mission is granted on a five-year period. The current operating period ends in 2019 but is expected to continue for another five year term afterwards. Specific operating guidelines and requirements are provided to ORNL DAAC by the ESDIS project.

Reviewer Entry

Accept or send back to applicant for modification:

Accept

Comments:



II. Licenses

Compliance Level: 4

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

All of the ORNL DAAC data holdings are available free of charge, and each published dataset is distributed with documentation including citation information. ORNL DAAC works directly with data providers 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. ORNL DAAC does maintain a record copy of all 'original data submissions'.

To acknowledge the scientists who created and shared data products, ORNL DAAC data users are requested to provide data citation. Data citation details are provided along with each data delivery.

Reviewer Entry

Accept or send back to applicant for modification:

Accept

Comments:



III. Continuity of access

Compliance Level: 4

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

The long term stability of the organization depends on our sponsoring and funding agency, NASA. NASA has clearly stated that it believes long term stewardship of NASA collected remote sensing and field campaign data is essential. In the unlikely event that the NASA-EOSDIS ORNL DAAC is relocated to a different host institution, the ORNL DAAC will follow NASA procedure for activity transition.

ORNL DAAC has been in operation since 1994. ESDIS plans to operate the DAACs for the long-term. If for any reason, ORNL DAAC has to cease operations, ORNL DAAC is required to transfer data to a long-term data archive to be determined by NASA. The requirement for long-term data preservation is outlined in the operating agreement for the ORNL DAAC. The decision on where to transfer data will be made by NASA-ESDIS project office. ORNL will be required to transfer data and operations before ceasing operations. A backup copy of core ORNL DAAC data is also held at a sister DAAC for contingency purposes.

These details are outlined in the NASA Requirements for Archiving, Distribution and User Services (ADURD) document. The purpose of this document is to provide common requirements for data archiving, data distribution and user services for EOSDIS-supported data. <https://earthdata.nasa.gov/about/esdis-project/esdis-policy/adurd>

Reviewer Entry

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Accept

Comments:



IV. Confidentiality/Ethics

Compliance Level: 0

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

ORNL DAAC does not archive any data that requires explicit disclosure risk. All data are available for free and is open to public. The data archived from the ORNL DAAC are information about the environment and ORNL DAAC staff are well trained to handle such data. Personal/Sensitive information are not published in the ORNL DAAC archive system.

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Accept

Comments:



V. Organizational infrastructure

Compliance Level: 4

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.

The ORNL DAAC is funded through a 5-year contract by the NASA Earth Science Data and Information System (ESDIS) Project. Average spending per year is approximately \$4,000,000. About 12–15 staff support the ORNL DAAC data publication system. The program is sufficiently funded to carry out the mission and supplemental funding is provided by NASA to handle publication of additional mission datasets. ORNL DAAC has a manager, deputy manager, chief scientist, chief architect, systems engineer, data publication coordinator, user services staff, developers, data curation experts, and student interns. The staff are well qualified and have an average of over 10 years' experience in this field.

Reviewer Entry

Accept or send back to applicant for modification:

Accept

Comments:



VI. Expert guidance

Compliance Level: 4

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

ORNL DAAC regularly partners with other DAACs on data management and data services related activities. In addition to the core DAAC partnership, ORNL DAAC also partners with the data related group 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. The Federation of Earth Science Information Partners (ESIP Federation) is a networked community that brings together science, data and information technology practitioners. Through these partnerships ORNL DAAC stays informed about the evolutions in data science and adopts new and latest technology as needed. ORNL DAAC staff are also experts in the field and are at the fore-front of leading the evolution in data management principles. In addition, ORNL DAAC includes a feedback system through which we address user questions and concerns. Technical or operational changes are initiated based on those feedback. ORNL DAAC also utilizes independent annual evaluation of its data systems and annual customer feedback to ensure continued relevance and improvement.

As noted earlier, ORNL DAAC is located in the Environmental Sciences Division (ESD). Many researchers in the ESD are leading researchers in terrestrial ecology. ORNL DAAC utilizes that expertise to gain understanding on the state of the art in terrestrial ecology research. Also, ORNL's ESD is host to Department of Energy funding ecology research that are complementary to NASA's research investments in the same field. ORNL DAAC also includes a ORNL member on its User Working Group to make sure that ORNL DAAC utilizes its internal resources effectively.

Reviewer Entry

Accept or send back to applicant for modification:

Accept

Comments:



DIGITAL OBJECT MANAGEMENT

VII. Data integrity and authenticity

Compliance Level: 4

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

ORNL DAAC goes through a rigorous quality assurance checklist

https://daac.ornl.gov/PI/qa_checklist.html

Data Files are checked for integrity as follows:

1. Check for integrity of files (Checksum, file size, number of files)
2. Filenames are descriptive and consistent, Action: Rename data files, if needed
3. Check if file format is appropriate and can be opened, Action: Modify to archive format (non-proprietary) if needed
4. File organization is consistent and appropriate
5. Table header information complete and consistent with documentation
6. Properly versioned, if needed

Documentation files are verified as follows:

1. Documentation matches files received.
2. Dataset 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

Parameter Values are checked as follows:

1. Check to ensure valid range
2. Visualize (plot, map, or both)
3. Code(s) for missing values defined and used
4. Values for coded fields defined
5. Are accuracy and precision stated and reasonable?

Geospatial Information are checked as follows:



- Spatial Reference System is well-defined for mapped data products
- Projection, datum, resolution, etc.
- Spatial coordinates are well-defined, following standards
- lat / lon match description (geopolitical location, land vs water, correct hemisphere)

Temporal Information is verified as follows:

Date and Time (calendar, time units and temporal extent, resolution, and boundary) are defined according to standards.

ORNL DAAC staff prepare metadata for discovery and compile comprehensive documentation that is relevant for use 20 years from now. ORNL DAAC also generates citation and registers DOI for the dataset. These metadata are verified for quality as well and registered with the EOSDIS network clearing house. The ORNL DAAC infrastructure captures changes to the metadata within a database. The information is logged as well. Details on the ORNL DAAC publication and curation process are outlined in great detail in the following journal publications:

Suresh et al. A Semi-Automated Workflow Solution for Data Set Publication. ISPRS International Journal of Geo-Informatics. 2016, 5, 30 <http://dx.doi.org/10.3390/ijgi5030030>

Cook et al. Implementation of data citations and persistent identifiers at the

ORNL DAAC. Ecological Informatics <http://dx.doi.org/10.1016/j.ecoinf.2016.03.003>

Hook, L.A.; Vannan, S.K.S.; Beaty, T.W.; Cook, R.B.; Wilson, B.E. Best Practices for Preparing Environmental Data Sets to Share and Archive. Oak Ridge National Laboratory Distributed Active Archive. Available online: <http://daac.ornl.gov/PI/BestPractices-2010.pdf>.

Cook, R.B.; Olson, R.J.; Kanciruk, P.; Hook, L.A. Best practices for preparing ecological and ground-based data sets to share and archive. Bulletin of ESA 2001, 82, 138–141

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Comments:



VIII. Appraisal

Compliance Level: 4

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

The ORNL DAAC advises users on best practices for planning, collecting, and storing data and metadata, <https://daac.ornl.gov/PI/manage.shtml>

ORNL DAAC also conducts workshops on a regular basis to make sure that the community is well trained on good data management practices, <https://daac.ornl.gov/workshops/workshops.shtml>

In addition to the above efforts, ORNL DAAC also goes through a rigorous data appraisal process. ORNL DAAC's data publication can be broken down into the following high-level tasks:

- (1) Accepting the data package from the data providers, ensuring the full integrity of the transferred data files (through checksums, file counts etc.);
- (2) Identifying and fixing data quality issues;
- (3) Assembling detailed metadata and documentation, including file-level details, processing methodology, and characteristics of data files;
- (4) Developing a discovery tool that allows users to search metadata for the data sets needed;
- (5) Setting up data access mechanisms;
- (6) Re-packaging data files to better suit the end user's research/application needs
- (7) Setup of the data in data tools and services for improved data discovery and dissemination
- (8) Registering the dataset in online search and discovery catalogues;
- (9) Provide a permanent identifier through Digital Object Identifiers (DOI).

Long-term storage, data stewardship, and user support are also considered while publishing a dataset into an archive. The nine tasks described here form the critical 5-Ps of data archive: Presentation, Preservation, Persistence, Publication, and Protection . The 5-Ps are essential elements for digital repositories.

More details are available at <https://daac.ornl.gov/PI/>

Data priority and acceptance:

The ORNL DAAC archives data and model products that were generated with funding from the NASA Terrestrial Ecology program and other programs within the NASA Carbon Cycle and Ecosystems focus area.

Priority data include:

- Arctic-Boreal Vulnerability Experiment
- Carbon Monitoring System
- North American Carbon Program



- Earth Ventures-Suborbital 2 missions: ACT-America and Atom
- Other products funded by NASA Terrestrial Ecology program
- Validation of Earth Observing System data products
- Other products from Carbon Cycle and Ecosystems focus area will be accepted on a case-by-case basis

Data to accompany a journal publication

Many journals now require that data associated with a manuscript be archived before the manuscript can be published. The ORNL DAAC will work with authors to archive their data so that it will be available upon publication of the manuscript. We offer a data publication embargo period of up to three months.

Data acceptance

All submitted data are reviewed based on the priority areas listed above, the scientific impact and community need, and appropriate use of DAAC resources before being accepted into the archive. The ORNL DAAC User Working Group, ESDIS , and DAAC staff review may recommend a different data archive center if the data is not completely suitable for the ORNL DAAC.

Reviewer Entry

Accept or send back to applicant for modification:

Accept

Comments:



IX. Documented storage procedures

Compliance Level: 4

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

A key activity every year for the ORNL DAAC is sustaining operations in a stable and reliable fashion. While ORNL DAAC staff work a typical business day schedule, ORNL DAAC systems are in a 24x7 monitored machine room with backup power and active systems monitoring. We provide our users with at least two business days' advance notice of scheduled downtime and have a target of 99% uptime for ORNL DAAC systems. As part of data systems operations, we maintain and review data pool area and we are making improvements to our tools to reduce labor costs and improve our ability to monitor systems for changes. The ORNL DAAC archive also uses state of the art backup technologies to ensure that long term archival remains constant. ORNL DAAC operates multiple on-site backups and also runs an off-site backups (through dropbox). Backup recovery testing is done at least twice each year.

Scheduled periodic reviews for 'data life cycle' are performed on archive contents and maintenance performed as necessary. ORNL DAAC also has a formal contingency plan for data recovery provisions that cover issues from cyber attacks to hardware crashes.

Reviewer Entry

Accept or send back to applicant for modification:

Accept

Comments:



X. Preservation plan

Compliance Level: 4

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

ORNL DAAC staff also prepare the dataset and metadata for discovery and compile comprehensive documentation that is relevant for future users; we use the 20-years rule, a time far enough into the future to be useful for preparing documentation for both sharing and archiving data. Compiling descriptive data set documentation for future users is a time consuming but critical curation process that the ORNL DAAC performs. Data are preserved for the future following NASA EOSDIS's data preservation guideline.

See Details Here: <https://earthdata.nasa.gov/user-resources/standards-and-references/preservation-content-spec>, this updated document is valid from 2018–2022. Preservation content specification remains the same, no changes in the information presented.

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.

Reviewer Entry

Accept or send back to applicant for modification:

Accept

Comments:



XI. Data quality

Compliance Level: 4

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.

As indicated earlier ORNL DAAC goes through a rigorous data quality checklist, https://daac.ornl.gov/PI/qa_checklist.html

Periodically, ORNL DAAC metadata are reviewed and changes are made to ensure quality. In addition, each dataset is sent to the data provider for review before publication. The review allows the data provider to check the curation and value additions provided by the ORNL DAAC. All published datasets have a data citation that includes a DOI.

To acknowledge the scientists who have provided products, we include a bibliographic citation to all ORNL DAAC products that you use in your publications. Such citations will help others find the products and see how they have been used.

The content of a data product citation includes the following information:

- contributing investigators/authors
- year of release
- product title
- publisher and publisher location (ORNL DAAC, Oak Ridge, Tennessee, USA)
- date accessed
- temporal and spatial subset (as appropriate)
- digital object identifier

See paper for more details: Cook et al. Implementation of data citations and persistent identifiers at the ORNL DAAC. Ecological Informatics <http://dx.doi.org/10.1016/j.ecoinf.2016.03.003>

Metadata Curation:

The metadata created by ORNL DAAC is reviewed by ESDIS. An external team funded by ESDIS has reviewed ORNL DAAC metadata for consistency and completeness and has provided feedback. The ORNL DAAC metadata were updated based on the recommendations provided by the review team. Changes to the metadata are not tracked by the ORNL DAAC, although rigorous quality checking and testing is done before updates are moved to production. Changes to ORNL DAAC metadata are also initiated by changes to the CMR metadata model. ORNL DAAC updates its metadata based on the evolution of the CMR model. The updates are not tracked but changes are usually schema driven and the content usually doesn't change. New



content gets added and some content gets deleted which are usually tracked within the ORNL DAAC database.

Reviewer Entry

Accept or send back to applicant for modification:

Accept

Comments:



XII. Workflows

Compliance Level: 4

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

Until the early 1990s, terrestrial ecology data publication comprised primarily of graphs, tables, and figures included in published manuscripts. Data created during the process of research was often lost in the highly derived visual representations included in peer-reviewed literature. Furthermore, the data summarized in publications could not be readily extracted for further analysis, let alone be integrated with other data to address new research. Beginning in the early 2000s, research communities, funding agencies, and data users realized the need for sharing investigator-generated data. A workflow for data ingest of research data is used by the ORNL DAAC that formalizes interactions with users, compiles information, data files, and metadata, and releases the product to the public.

Details of the workflow are published at the following locations:

1. Suresh et al. A Semi-Automated Workflow Solution for Data Set Publication. ISPRS International Journal of Geo-Informatics. 2016, 5, 30. <http://dx.doi.org/10.3390/ijgi5030030>
2. <https://daac.ornl.gov/PI/curation.shtml>

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Accept

Comments:



XIII. Data discovery and identification

Compliance Level: 4

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

ORNL DAAC datasets are available for search and discovery in a number of ways:

- Find and download data through ORNL DAAC's website <https://daac.ornl.gov>
- DOI landing pages
- Integrated search bar on the ORNL DAAC home page
- Metadata registered and searchable through the federation's (ESDIS) search tool Earthdata search: <https://earthdata.nasa.gov/introducing-earthdata-search-beta>

API are also offered and described at multiple locations.

ORNL DAAC's metadata can be harvested at the EOSDIS's metadata system CMR (Common Metadata Repository). The Common Metadata Repository (CMR) is a high-performance, high-quality, continuously evolving metadata system that catalogs all data and service metadata records for the EOSDIS system and will be 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.

Reviewer Entry

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Accept

Comments:



XIV. Data reuse

Compliance Level: 4

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.

As indicated earlier the repository is setup for evolution. Details and relevant links have been provided in the earlier sections. ORNL DAAC in general operates under a 20-year rule that data is published to ensure that it can be usable at least 20 years in the future.

Reviewer Entry

Accept or send back to applicant for modification:

Accept

Comments:



TECHNOLOGY

XV. Technical infrastructure

Compliance Level: 4

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.

ORNL DAAC operates a state of the art data publication IT infrastructure. ORNL DAAC tools and services follow community standards such as OGC, OpenAPI, OpenDAP, REST, SOAP etc.

Details are available at: <https://daac.ornl.gov/tools/>

Open source and community developed tools and standards are widely adopted at the ORNL DAAC. No deviations from the standards are included.

ORNL DAAC storage is on expandable nexenta storage. Network and cybersecurity is handled by ORNL's information technology division. The software stack is primarily open source. Linux is the primary operating system used. The servers are all setup on a virtual environment using VMWare.

Reviewer Entry

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Accept

Comments:



XVI. Security

Compliance Level: 0

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

The security of the ORNL DAAC systems is maintained by ORNL cyber security. They monitor the network and access and protect the systems. ORNL provides enclaves that have firewall and other access restrictions that protect ORNL DAAC systems from intrusions and provide a safe operating environment. ORNL DAAC is situated at the United States Department of Energy facility and rigorous monitoring of network traffic is used to ensure safe and secure network operations. The power for the data center is operated with multiple redundancies. Backup and contingency plans have been discussed earlier but in general ORNL DAAC has a defined and elaborate contingency plan in place.

Reviewer Entry

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Accept

Comments:



APPLICANT FEEDBACK

Comments/feedback

Thanks much for the valuable review comments. I have tried to address all the concerns raised during the review. Please let us know if any additional clarifications have to be provided.

Reviewer Entry

Accept or send back to applicant for modification:

Accept

Comments: