



Ocean Biology Distributed Active Archive Center

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:

clear

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, Institutional repository, National repository system; including governmental, Research project repository

Reviewer Entry

Reviewer 1

Comments:
Accept

Reviewer 2

Comments:
clear

Brief Description of Repository

The Ocean Biology Distributed Active Archive Center (OB.DAAC) is one of 12 DAACs within NASA Earth Observing System Data and Information System (EOSDIS). The DAACs are distributed across the United States as shown in the figure at <https://earthdata.nasa.gov/eosdis/daacs>. The Earth Science Data and Information System (ESDIS) Project, a Network Member of the World Data System, manages EOSDIS, including providing funding and requirements to all the DAACs. In operation since 1994, EOSDIS processes, archives, and distributes data from NASA's Earth observing missions. The DAACs are assigned responsibilities for processing, archiving, distributing data to users, and providing user services according to specific Earth science disciplines. The OB.DAAC processes, archives, and distributes global data about the Earth, oceans, and atmosphere from a variety of U.S. and International Earth-observing missions. The OB.DAAC processes, archives, and distributes global data about the Earth, oceans, and atmosphere from a variety of U.S. and International Earth-observing missions.

Reviewer Entry

Reviewer 1

Comments:
Accept

Reviewer 2

Comments:
clear

Brief Description of the Repository's Designated Community.

Our designated community is the Earth science community at-large including, but limited to, researchers, data producers, educators, and individuals.

Reviewer Entry

Reviewer 1

Comments:
Accept

Reviewer 2

Comments:
clear

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:
clear

Comments

The OB.DAAC is the NASA sponsored data archive center to handle satellite, airborne and in situ data sets relating to Earth, oceans, and atmosphere within NASA Earth Observing System Data and Information System (EOSDIS). EOSDIS supports NASA's Earth science program, which was established to use the advanced technology of NASA to understand and protect our home planet by using our view from space to study the Earth system and improve prediction of Earth system change. To meet this challenge, NASA promotes the full and open sharing of all data with the research and applications communities, private industry, academia, and the general public (see <https://earthdata.nasa.gov/collaborate/open-data-services-and-software/data-information-policy>). Thus, the DAACs are required to provide data to a wide variety of users. However, each of the DAACs is focused on specific Earth science disciplines and most of the users tend to be from those disciplines. The OB.DAAC supports the following user communities: Earth science community at-large including, but limited to, science team researchers, data providers, educators, application users and the general public.

Reviewer Entry**Reviewer 1**

Comments:
Accept

Reviewer 2

Comments:
clear

Insource/Outsource Partners. If applicable, please list them.

The OB.DAAC does not have any outsource partners. The relationship with the NASA ESDIS Project is regarded as "Insource Partnership" due to the close connections with the NASA ESDIS Project and the other DAACs that are part of the network. The OB.DAAC is a funded element within the ESDIS Project. Annual work plans are submitted to the ESDIS Project define the work priorities under a 5-year Planning, Programming, Budget, and Execution (PPBE) process. Certain technical capabilities that are common among DAACs are developed by the ESDIS Project and provided for use by the DAACs, while capabilities specific to a given DAAC are developed by the individual DAAC. There are also collaborations among DAACs for development of shared capabilities. The ESDIS Project is a Network Member of the WDS, while all the DAACs are Regular Members, that have been certified either via WDS or CoreTrustSeal. A close relationship is maintained among the DAACs and the ESDIS Project through regular weekly teleconferences and periodic detailed meetings to discuss technical as well as administrative/management issues.

Reviewer Entry

Reviewer 1

Comments:
Accept

Reviewer 2

Comments:
clear

Summary of Significant Changes Since Last Application (if applicable).

N/A

Reviewer Entry

Reviewer 1

Comments:

Reviewer 2

Comments:
none

Other Relevant Information.

As one of the NASA EOSDIS DAACs, the OB. DAAC complies with the guidelines established by the parent organization, the NASA 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. Further information and documentation regarding data management at the OB.DAAC can be found at <https://oceancolor.gsfc.nasa.gov/data/overview/>.

As of September 30, 2020, the OB.DAAC held 269 distinct datasets with a volume of 3,416.2 TB. During October 1, 2019 to September 30, 2020, it distributed 56.5 million files to a global user community of over 26,418 users.

Reviewer Entry

Reviewer 1

Comments:

Reviewer 2

Comments:

clear

ORGANIZATIONAL INFRASTRUCTURE

1. 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

Accept

Reviewer 2

Comments:

4 – The guideline has been fully implemented in the repository

Accept

Response:

As one of the Distributed Active Archive Centers (DAACs) within the Earth Observing System Data and Information System (EOSDIS), the OB.DAAC's mission is to be a custodian of NASA Earth science ocean data and ensure that data will be 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>).

Each of the DAACs complies with 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.

Reviewer Entry

Reviewer 1

Comments:
Accept

Reviewer 2

Comments:
clear

2. 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
Accept

Reviewer 2

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

Response:

The OB.DAAC conforms to NASA's Earth Science Data and Information Policy (<https://earthdata.nasa.gov/collaborate/open-data-services-and-software/data-information-policy>) and provides free and open access to scientific data. The users of data are expected to comply with the Data Use Policy - <https://earthdata.nasa.gov/earth-observation-data/data-use-policy>. The OB.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. The OB.DAAC requests users to include data citations in their publications. <https://oceancolor.gsfc.nasa.gov/citations/>

The OB.DAAC informs users of EULAs associated with datasets. Users are required to accept existing EULAs before the associated data may be downloaded. <https://oceancolor.gsfc.nasa.gov/registration/>
<https://oceandata.sci.gsfc.nasa.gov/S3AOLCI/L1/2020/006/> (This is an example where a user will be redirected to register

and accept a EULA for the data linked on this site.)

Reviewer Entry

Reviewer 1

Comments:
Accept

Reviewer 2

Comments:
clear

3. 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
Accept.

Reviewer 2

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

Response:

The long-term stability of the data holdings at the OB.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 (see <https://earthdata.nasa.gov/esdis/eso/standards-and-references/preservation-content-spec>). 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 (<https://earthdata.nasa.gov/esds>) at NASA Headquarters. The ESDIS Project is responsible for all data in its collection at all DAACs under NASA Records Retention Schedules (NRRS) 1441 (<https://nodis3.gsfc.nasa.gov/displayDir.cfm?t=NPR&c=1441&s=1E>). NASA's Planning, Programming, Budgeting, and Execution (PPBE) process is used for funding the ESDIS Project and the DAACs. This process reviews and determines the funding for the five years that follow, commensurate with requirements.

Each of the DAACs complies with 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. 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. After the active use period has ended, OB.DAAC will store the data in a mission preservation area, aside from the active data archive. Any data that was publicly accessible during the active use period will remain publicly accessible in it's preservation area.

Reviewer Entry

Reviewer 1

Comments:

Reviewer 2

Comments:

clear

4. 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

Accept

Reviewer 2

Comments:

0 – Not applicable

accepted

Response:

The data archived at the OB.DAAC are primarily from passive remotes sensing (optical measurements). These data are used to infer phytoplankton (plant) biomass – and with more advanced algorithms, species composition - in the oceans, hence the “biology” part of our moniker.

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

Reviewer Entry

Reviewer 1

Comments:
Accept

Reviewer 2

Comments:
clear

5. 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
Accept

Reviewer 2

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

Response:

The OB.DAAC is housed at NASA Goddard Space Flight Center. The OB.DAAC is a funded element within the Earth Science Data and Information System (ESDIS) Project. Annual work plans are submitted to the ESDIS Project define the work priorities under a 5-year Planning, Programming, Budget, and Execution (PPBE) process. Average spending per year is approximately \$4.5M. Approximately 20 staff members support the OB.DAAC's activities. The DAAC is sufficiently funded to carry out its mission including support for staffing, IT resources, as well as any necessary training and travel. The OB.DAAC staff includes a manager, deputy manager, systems engineers, data publication coordinator, user services staff, and developers. The staff members are well qualified and have an average of over 10 years' experience in this field. Many or most of them are active in NASA's Earth Science Data System Working Groups (ESDSWG, <https://earthdata.nasa.gov/collaborate/esdswg>) as well as the Earth Science Information Partners (ESIP, <https://www.esipfed.org/>) and attend their meetings regularly.

Reviewer Entry

Reviewer 1

Comments:
Accept

Reviewer 2

Comments:
clear

6. 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
Accept.

Reviewer 2

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

Response:

ADVISORY COMMITTEE: The OB.DAAC relies on the NASA Ocean Color Research Team (OCRT) to act as an active external science domain committee. The OCRT consists of all NASA-funded investigators under the Ocean Biology and Biochemistry Program managed by NASA Headquarter. The OCRT 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 participates in an annual face-to-face meeting the OCRT.

<https://oceancolor.gsfc.nasa.gov/meetings/>

COMMUNICATION WITH COMMUNITY: The OB.DAAC hosts a user services forum where personnel directly interact with the user community served by the DAAC. The forum platform is monitored by people skilled in both Earth science and geospatial data which they use to support users with data selection, usage, and interpretation

(https://oceancolor.gsfc.nasa.gov/forum/oceancolor/forum_show.pl). Users can also provide feedback or request help using the "Feedback" button at <https://earthdata.nasa.gov/> which is the mechanism the NASA ESDIS Project uses to route enquiries to the appropriate DAAC.

The OB.DAAC participates annually in the American Customer Satisfaction Index (ACSI) survey of users of the NASA EOSDIS DAACs (<https://earthdata.nasa.gov/eosdis/system-performance/acsi-reports>). 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 OB.DAAC regularly partners with other DAACs on data management and data services related activities. The OB.DAAC also participates in expert communities such as the Earth Science Data System Working Groups (ESDSWG) and Earth Science Information Partners (ESIP). The 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 ESIP is a networked community that brings together science, data and information technology practitioners from over 160 organizations including U.S. federal agencies, universities and commercial entities. Through these partnerships OB.DAAC stays informed about the evolutions in data science and adopts new and latest technology as needed.

Various forms of feedback from experts and other users for EOSDIS and the DAACs, and how the feedback is used, are described in (Ramapriyan and Behnke, 2019) [Ramapriyan, H. and Behnke, J., 2019. Importance and Incorporation of User Feedback in Earth Science Data Stewardship. *Data Science Journal*, 18(1), p.24. DOI:

<http://doi.org/10.5334/dsj-2019-024>].

Reviewer Entry

Reviewer 1

Comments:
Accept.

Reviewer 2

Comments:

clear

DIGITAL OBJECT MANAGEMENT

7. 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

Accept

Reviewer 2

Comments:

4 – The guideline has been fully implemented in the repository

accepted

Response:

DATA INTEGRITY: Each data file has a checksum recorded in a relational database management system that allows users to verify the integrity of any download file. All data are stored on RAID-6 servers with mirror copies on separate RAID servers. The RAID servers use the ZSH file system with triple checksums. Monthly scrubs of the file system are performed to identify and mitigate any data corruption.

DATA AUTHENTICITY: The OBPG performs periodic reprocessings of the distributed data products from each supported mission when advances in algorithms or sensor calibration knowledge can be shown to significantly improve product quality or utility. This method ensures that prior information is not overwritten and that all changes implemented in later versions are documented. A complete history of data versions produced by OB.DAAC are available at <https://oceancolor.gsfc.nasa.gov/reprocessing/>

Each dataset has a landing page on the OceanColor website which tells the details of the collection and points to documentation on the mission, instrument and data access points. Datasets are registered with a digital object authority as a means of version control for datasets.

Reviewer Entry

Reviewer 1

Comments:
Accept

Reviewer 2

Comments:
clear

8. 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
Accept

Reviewer 2

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

Response:

SELECTION OF DATA FOR ARCHIVING: The datasets submitted for archiving and distribution at the OB.DAAC are produced by science teams funded by NASA as a part of a satellite or aircraft mission, a field experiment or a research project. Datasets may also be assigned for archiving and distribution at the OB.DAAC as a result of interagency or international agreements between NASA and other partners. In all cases, NASA assigns the datasets 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 datasets produced by them are assured to be relevant to the users served by the DAACs.

In some cases, science investigators may submit datasets to the DAAC directly for archiving and distribution. To cover such cases the NASA ESDIS Project has an established procedure for assessment and acceptance of the datasets. The procedure involves the DAAC, its User Working Group, the ESDIS Project and NASA Headquarters as illustrated at <https://earthdata.nasa.gov/collaborate/new-missions/adding-competitive-other> (See DAAC/User Working Group (UWG) Process Flow) under Ad hoc Requests.

CHECKS AT THE TIME OF INGEST: The data submitted to the OB.DAAC are required to have documentation of scientific quality, appropriate quality flags embedded in the data files, caveats about known issues, etc. The OB.DAAC verifies that these conditions are met. Typically, the data flows are set up from Science Investigator-led Processing Systems to the DAAC via networks, and the data are automatically ingested and archived. Automated quality checks are performed as the data flow into the DAAC, including checksums to ensure data integrity.

METADATA REQUIRED TO DISCOVER, INTERPRET, AND USE THE DATA: Data producers submitting data to the EOSDIS DAACs are required to conform to community standards for formats, interfaces, metadata, etc. These are indicated at <https://earthdata.nasa.gov/esdis/eso/standards-and-references>. The metadata standards employed have been evolving over the many years that the DAACs have been operating, and the set of acceptable standards are listed on the web page linked above. The metadata in the datasets submitted to the DAACs are verified to ensure that they meet the standards, which are sufficient for discovering, interpreting and using the data. The OB.DAAC complies with the ESDIS Metadata Requirements - Base Reference for NASA Earth Science Data Products (423-RQMT-003, https://cdn.earthdata.nasa.gov/conduit/upload/485/Metadata_Requirements_Base_Reference_Document.doc), ISO 19115 Implementation Guidance (https://cdn.earthdata.nasa.gov/conduit/upload/9661/423-ESO-035_ISO_19115_Implementation_Guidance_Original.pdf) and submits all metadata to and complies with all requirements of the NASA Common Metadata Repository (CMR) - <https://earthdata.nasa.gov/eosdis/science-system-description/eosdis-components/cmr>. The OB.DAAC uses warning and error messages received during from submission and feedback from the review board to continuously improve upon metadata.

Also, the OB.DAAC provides consultation and assistance to data producers to ensure that they meet the metadata requirements.

ENSURING THAT THE METADATA PROVIDED ARE SUFFICIENT FOR LONG-TERM PRESERVATION: Ensuring that the metadata comply with the standards indicated above will support long-term preservation as well. In addition, the documentation and other artefacts needed for long-term preservation have been called out in NASA's Earth Science Data Preservation Content Specification (<https://earthdata.nasa.gov/esdis/eso/standards-and-references/preservation-content-spec>). The specification is being applied to data from missions to ensure that such materials are collected and archived at the DAAC.

LIST OF PREFERRED FORMATS, QUALITY CONTROL CHECKS: A list of data and metadata formats is available at <https://earthdata.nasa.gov/esdis/eso/standards-and-references>. Data producers (who provide data to the DAAC for archival and distribution) are required to conform to these. The DAAC checks the data flows as they are initially set up to ensure that conformance. Periodic checks are made that the data and metadata comply with the standards.

REMOVING ITEMS FROM COLLECTION: When datasets are superseded by later versions, the older versions may be removed from the archive. An overlap period is provided during which the older and newer versions are both available,

and users are informed well in advance of the removal of older versions. The persistent identifiers (DOIs) and the related landing pages corresponding to the older versions will remain active but provide pointers to the landing pages of the later versions with new persistent identifiers.

Reviewer Entry

Reviewer 1

Comments:

Accept

Reviewer 2

Comments:

accepted

9. 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

Accept.

Reviewer 2

Comments:

4 – The guideline has been fully implemented in the repository

accepted

Response:

As one of the DAACs within the NASA ESDIS Network, the OB.DAAC complies with the Requirements for Archiving, Distribution and User Services in EOS Data and Information System (EOSDIS) (a.k.a. ADURD, <https://earthdata.nasa.gov/esdis/esdis-policy/adurd>). In addition, the OB.DAAC develops and maintains a Data Management Plan or equivalent documents that include identification of data sources, description of interfaces, and a discussion of data stewardship processes with particular attention to prevention of loss of data. Interface Control Documents and Operations Agreements with data producers govern the flow of data for archiving at the DAAC. Such documents are stored in the EOSDIS Library (<https://doclib.eosdis.nasa.gov/>).

The OB.DAAC uses both on-site and off-site backups and maintains multiple copies of datasets using state of the art backup technologies. Backup recovery is tested monthly. Since 2013, all the NASA EOSDIS DAACs, including the OB.DAAC have participated in updating a Risk Assessment Code (RAC) matrix periodically. The 5 by 5 RAC matrix shows the number of datasets at the DAAC for each pair of (data loss risk, user impact of data loss). This facilitates the DAAC to take actions for improvement in their risk-impact posture by appropriately prioritizing the datasets.

Checksums are used to ensure consistency across multiple copies of datasets.

The OB.DAAC performs random checks on its holdings monthly. Any identified losses are recovered from the back-up copies. Also, the storage media are refreshed on an on-going basis, to avoid technology obsolescence.

Reviewer Entry

Reviewer 1

Comments:

Reviewer 2

Comments:

clear

10. 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
Accept.

Reviewer 2

Comments:

4 – The guideline has been fully implemented in the repository
accepted

Response:

The OB.DAAC follows the preservation content specification (PCS) document provided by NASA (<https://earthdata.nasa.gov/esdis/eso/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. 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. The PCS identifies such content items in eight different categories that the DAACs and data producers work together to gather at different phases of the missions, and ensure that a complete set of items is collected and preserved before the post-mission wrap-up.

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 NASA's Earth Science Data and Information Policy as well as the NASA Earth Science Data Preservation Content Specification mentioned above. Details of data and metadata standards are worked out between the OB.DAAC and the data producers, and are compatible with those specified at <https://earthdata.nasa.gov/user-resources/standards-and-references#ed-standards>.

NASA's program management, regular reviews and reporting are used to ensure that the specified actions are taken.

Reviewer Entry

Reviewer 1

Comments:

Reviewer 2

Comments:

clear

11. 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

Accept

Reviewer 2

Comments:

4 – The guideline has been fully implemented in the repository

accepted

Response:

The metadata quality is assessed on an on-going basis by an independent team called the Analysis and Review of CMR (ARC) team. The Common Metadata Repository (CMR) is the centralized repository for NASA's Earth science metadata and serves as a key vehicle for data search and discovery. To provide a more effective and consistent experience of CMR for researchers, the ARC team conducts evaluations and recommends improvements. This metadata improvement task is an ongoing, collaborative effort between the DAACs, the CMR team, and the ARC team. The OB.DAAC participates in this effort and implements the suggested improvements.

Reviewer Entry

Reviewer 1

Comments:

Accept

Reviewer 2

Comments:

clear

12. 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
Accept

Reviewer 2

Comments:

4 – The guideline has been fully implemented in the repository
accepted

Response:

EOSDIS DAACs archive and distribute data from several types of sources – satellites, airborne instruments, field measurements, competitive programs, etc. Depending on the source, the workflows and business processes vary (See <https://earthdata.nasa.gov/collaborate/new-missions/adding-orbital-airborne> and <https://earthdata.nasa.gov/collaborate/new-missions/adding-competitive-other> for diagrams illustrating the processes). In addition, the various DAACs have had procedures and workflows for accepting, ingesting and “publishing” datasets. The OB.DAAC is co-located with NASA’s Ocean Biolog Processing Group (OBPG), the Science Investigator-led Processing System (SIPS) that generates all satellite-based ocean color data sets for NASA. The tight coupling and shared resources of the OBPG and OB.DAAC an accurate catalog of the data archived.

The DAACs are currently collaborating in a team led by NASA ESDIS Project, called Earthdata Pub. The team’s goals are to:

- Create a more consistent data publication experience across EOSDIS between DAACs and data producers. This includes, but is not limited to:
 - establishing common terminology,
 - evaluating data publication processes at DAACs,
 - developing resources for data producers about data publication,
 - defining common levels of service, and
 - defining DAAC/data provider roles and responsibilities.
- Build a reusable, cross-platform data publication workflow framework that provides a consistent cross-DAAC experience for data providers and helps DAACs to streamline internal processes in order to reduce the time required to publish data products.

Reviewer Entry

Reviewer 1

Comments:

Accept

Reviewer 2

Comments:
clear

13. 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
Accept

Reviewer 2

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

Response:

SEARCH FACILITIES: To facilitate users' search for data, the DAACs offer several methods. At the ESDIS Network level, the Earthdata Search provides search, preview, download and access capabilities for all the DAAC holdings. It also serves as a platform to feature planned EOSDIS services as they become available. (See <https://earthdata.nasa.gov/collaborate/open-data-services-and-software/api/earthdata-search-api>). In addition, the search and order tools listed at <https://earthdata.nasa.gov/earth-observation-data/tools>, many of which are DAAC-specific, are available for users with various specialized capabilities.

File Search GUI (and command line utility: https://oceandata.sci.gsfc.nasa.gov/api/file_search/)

Level-1/Level-2 Scene Browser: <https://oceancolor.gsfc.nasa.gov/cgi/browse.pl>

Level-3 Global Browser: <https://oceancolor.gsfc.nasa.gov/cgi/l3?>

Subscriptions: <https://oceandata.sci.gsfc.nasa.gov/subscriptions/>

SEARCHABLE METADATA CATALOGUE: All the DAACs within the NASA ESDIS Network provide the metadata for their respective archives to the EOSDIS Common Metadata Repository (CMR), managed by the ESDIS Project. The CMR is a high-performance, high-quality, continuously evolving metadata system that catalogues 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. (See

<https://earthdata.nasa.gov/eosdis/science-system-description/eosdis-components/cmr>).

PERSISTENT IDENTIFIER SYSTEMS: All the DAACs use Digital Object Identifiers (DOIs) as the persistent identifiers for their datasets and provide landing pages for them. The data discovery could be further facilitated by harvesting of metadata in DataCite where the DOIs are registered (see Downstream Impact section in

https://datacite.org/assets/DataCite_Brochure.pdf).

DATA CITATIONS: All the DAACs in the NASA ESDIS Network encourage data citations as indicated at

<https://earthdata.nasa.gov/earth-observation-data/data-citations-acknowledgements>. Assignment and registration of DOIs to the datasets archived and distributed by the OB.DAAC are handled by the DAAC directly with DataCite. Of the datasets held by OB.DAAC, 100% of standard datasets have been assigned DOIs. Each dataset with DOI also has a landing page that provides the recommended citation. For example, see

<https://oceancolor.gsfc.nasa.gov/data/10.5067/NIMBUS-7/CZCS/L3B/KD/2014/>

Reviewer Entry

Reviewer 1

Comments:

Accept

Reviewer 2

Comments:

clear

14. 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

Accept

Reviewer 2

Comments:

4 – The guideline has been fully implemented in the repository accepted

Response:

As indicated in R8, 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. Details of data and metadata standards are worked out between the OB.DAAC and the data producers, and are compatible with those specified at <https://earthdata.nasa.gov/esdis/eso/standards-and-references>. The ESDIS Standards Office (ESO) assists the ESDIS Project in formulating the standards policy for NASA Earth Science Data Systems (ESDS), and coordinates standards activities within ESDIS (See <https://earthdata.nasa.gov/esdis/eso>). This provides a mechanism for evolving standards with a systematic review process which involve members of the Designated Community, including data producers and end users.

The OB.DAAC develops collection- and file-level (when appropriate) metadata and supporting documentation for all datasets to enable data discovery, access and use. Also, the DAAC develops user guides in collaboration with the respective data producers to ensure that the data are understandable. The guides include information on the data structure, algorithm, and processing steps. When available, the user guides also reference peer-reviewed publications production software is available upon request through Delivered Algorithm Packages (DAPs).

Reviewer Entry

Reviewer 1

Comments:

Accept

Reviewer 2

Comments:

clear

TECHNOLOGY

15. 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
Accept.

Reviewer 2

Comments:

4 – The guideline has been fully implemented in the repository
accepted

Response:

The OB.DAAC and Ocean Data Processing system are maintained at a low security level. All data provided by the facility is publicly accessible. External access to the repository is controlled through a centralized authentication database maintained by NASA.

- **Standards:** The system's IT security plan is mandated by the Federal Information Security Management Act (FISMA) of 2002. The guidance for the requirements of the plan are derived from the U. S. National Institute of Standards and Technology (NIST) Special Publications, including SP 800-53 as the core requirement. The facility has been granted authorization to operate by NASA after review of the the security plan. These plans cover the full life cycle of the system and all aspects of its operation. The plans are reviewed every 3 years, with continuous monitoring of systems for vulnerabilities or breaches.
- **Standards Implementation:** Implementation details are reviewed by NASA for appropriate confidentiality, integrity and availability levels and compliance with Agency policy. Any deviations must be approved by the Agency after a review.
- **Infrastructure Development:** The facility has been in place for several years. Infrastructure changes are made incrementally, with new equipment and services operating side-by-side with older equipment. As equipment and software reach the end of its life cycle, the functionality is replaced with newer and generally more efficient implementations. New services are tested internally before external access is allowed.
- **Software Inventory and System Documentation:** Software used in the generation and distribution of data products is public domain as required by the U. S. Government. Basic documentation is available on the system, but sensitive items such as security control implementation is limited to NASA internal access.
- **Community-supported Software:** Community supported software including development tools, web and distribution services, databases and support software are in use at the facility. There is also custom software developed specifically for the processing, distribution and analysis functions at the facility
- **Availability, Bandwidth and Connectivity:** The facility maintains high availability configurations for key hardware and service functions, as well as duplicate copies of critical datasets. Data distribution is done via network. Bandwidth for the facility is currently 10 Gigabit, and a connection to Internet 2 allows for high speed transfer to capable clients..
- **Disaster Plan and Business Continuity Plan:** The facility maintains both Disaster Plan and Business Continuity Plans as part of its overall IT security plan. Details of that security plan are considered sensitive by NASA and may not be

distributed outside of the Agency.

Reviewer Entry

Reviewer 1

Comments:

Reviewer 2

Comments:

clear

16. 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

Accept

Reviewer 2

Comments:

4 – The guideline has been fully implemented in the repository

accepted

Response:

The analysis, controls, processes and countermeasures mentioned are implemented as part of an active NASA IT Security plan. The plan is mandated by the U. S. Federal Information Security Management Act (FISMA) of 2002. The guidance for the requirements of the plan are derived from the U. S. National Institute of Standards and Technology (NIST) Special Publications, including SP 800-53 as the core requirement. The facility has been granted authorization to operate by NASA after review of the the security plan.

Unfortunately for this response, NASA considers the details of its IT security plans as sensitive information and may not be distributed outside of the Agency.

- Security Roles: The facility maintains the security roles as indicated in NIST 800-53, and those roles are integrated with

an Agency-wide security infrastructure. Details on staff may be considered Personally Identifiable Information and are restricted to the Agency. Commercial tools are used for risk analysis, monitoring and vulnerability mitigation.

- Levels of Security: The OB.DAAC and Ocean Data Processing system are maintained at a low security level. All data provided by the facility is considered public domain.

- Authentication and Authorization Procedures: External access to the repository is controlled through a centralized authentication database maintained by NASA. Users must sign up for access to the repository.

Reviewer Entry

Reviewer 1

Comments:

Reviewer 2

Comments:

I understand OB.DAAC cannot provide the technical detail on data protection. However, the contain is enough already. Thanks

APPLICANT FEEDBACK

Comments/feedback

These Requirements are not seen as final, and we value your input to improve the CoreTrustSeal certification procedure. Any comments on the quality of the Requirements, their relevance to your organization, or any other contribution, will be considered as part of future iterations.

Response:

For Background Information - Context: The current breakdown of U.S./International missions is 60/40 percent. This ratio varies over time.

Question #2: The URL referenced in this question changed. It has been updated in response above.

Question #4: response revised above.

For Question #6: I am not sure why Reviewer #1 feels ACSI is "NASA-funded". CSI is, as stated in response above, and independent, external organization with various customers--government and commercial. NASA has *enlisted* their services over the past several years so that we could gauge our customers' degree of satisfaction with our offerings and services and move in the direction of improvement on any areas they found insufficient for their (the customers') use of our sites and and data products. The survey is sent to all data users. We cannot control who responses to the survey and the

breakdown of responses is unknown since ACSI does not share that information with us. What I can offer is the Customer Satisfaction Presentation for 2020. This file is available using the link in the response above to "American Customer Satisfaction Index (ACSI)". The reviewers can find statistics for OB.DAAC within this presentation and find that we have continually made improvements that positively impacted our customers and respond to their concerns.

For Questions #8 and #9: Please review attached OBPG Data Management Plan (see attached file, obpg_dmp.pdf).

For Question #15: This question was answered based on the title and the points to consider. From our perspective, Disaster Plan and Business Continuity are based on hardware and equipment while preservation (which I think you may actually be referring to) refers to processes for maintaining data availability. These are different questions and nothing is missing from this response nor does anything feel inconsistently stated. Is there anything we can include to improve our reply and make you more comfortable with our repository?

Reviewer Entry

Reviewer 1

Comments:

Links and evidences are provided. Data held are Earth science data from sensors following "institutional" workflows (no data provider from outside). Perimeter of the data repository appears clear.

I think this data repository can be certified.

Reviewer 2

Comments:

none