Overview

The NOAA National Centers for Environmental Information (NCEI) mission is to serve as steward of the Nation's environmental information. NCEI constitutes the official NOAA data archive and is a designated NARA Agency Records Center[1]. NCEI maintains, processes, distributes, and provides long-term stewardship for most of NOAA's environmental and geospatial data, and provides a broad range of user services. NCEI is operated by NESDIS but performs data preservation and stewardship on behalf of the entire agency. NCEI supports U.S. and international environmental, societal, and economic well-being through stewardship of the Nation's treasure of weather, climate, coastal, oceanic, and geophysical information.

In addition to stewarding and preserving data generated and collected by other parts of NOAA, NCEI also creates value-added datasets and products from the archived data. In 2018, NCEI began organizing these value-added products into Product Areas. With consultation from the NESDIS Data Management Working Group, NCEI determined to document one Data Management Plan per Product Area. Currently, 29 Product Areas have been defined by NCEI's Center for Coasts, Oceans, and Geophysics (CCOG) and Center for Weather and Climate)CWC). This document is the Data Management Plan for the NCEI Paleoclimatology Product Area.

1. General Description of Data to be Managed

1.1. Name of the Data, data collection Project, or data-producing Program:

All value-added data and products created and managed by the NCEI/CWC Paleoclimatology Product Area

1.2. Summary description of the data:

The Paleoclimatology Product Area ("Paleo") operates the World Data Service for Paleoclimatology under formal agreement between NOAA and the World Data System of the International Council for Science, providing the world's primary facility for ingest, archive, and state-of-the-art search and retrieval of paleoclimate data. These products and capabilities, which include Paleo's original science research products along with those contributed by an international community of researchers, are used on an ongoing basis by thousands of professional scientists and decision makers, including NOAA's National Integrated Drought Information System and other Federal agencies, along with educators, media, and the members of the general public. Paleo has a unique and critical role in NOAA's and NCEI's missions to provide the highest quality information on climate variability. Paleoclimate information is the only source of such information prior to widespread instrumental measurements beginning in the 19th century. Paleoclimate information is the only source of understanding the baseline climate state and natural climate variability on which anthropogenic climate change is projected, and similarly is critical to evaluating the performance of climate models used to simulate future climate changes.

[1] www.archives.gov/files/foia/directives/nara1310.pdf

This product area currently includes the following products:

a) Alaska Temperature Reconstruction

b) Dynamic Characteristics of Strong Wet/Dry and Dry/Wet Transitions in California

c) Independent Validation of NOAA 20CR Using Palaeoclimatic Reconstructions

d) Multi-century reconstruction of recovery from strong precipitation deficits in California

e) North American Cool and Warm Season Drought Atlas over 2,000 years

f) Paleo / Science: Living Blended North American Drought Atlas v.2

1.3. Is this a one-time data collection, or an ongoing series of measurements?

These paleoclimate reconstructions represent one-time product developments

1.4. Actual or planned temporal coverage of the data:

Last 21,000 years for (a); last 2,000 years for (b-f)

1.5. Actual or planned geographic coverage of the data:

Alaska for (a); California for (b,d); CONUS for (e,f); Eastern Pacific Ocean for (c)

1.6. Type(s) of data: *(e.g., digital numeric data, imagery, photographs, video, audio, database, tabular data, etc.)*

Tabular data, digital numeric data

1.7. Data collection method(s): *(e.g., satellite, airplane, unmanned aerial system, radar, weather station, moored buoy, research vessel, autonomous underwater vehicle, animal tagging, manual surveys, enforcement activities, numerical model, etc.)*

Statistical calibrations (b-f); Geophysical models (a)

1.8. If data are from a NOAA Observing System of Record[2], indicate name of system(s):

NA

1.8.1. If data are from another observing system, please specify:

NA

[2] https://docs.google.com/spreadsheets/d/1uC_FxXYP9LYvY6ofhXRPplxiP9sZI3bhCpkKtwDsk3o/edit#gid=1462893252

2. Point of Contact for this Data Management Plan (author or maintainer)

2.1. Name: Eugene Wahl -- for (b-f)

2.2. Title: Physical Scientist

2.3. Affiliation or facility: NOAA National Centers for Environmental Information (NCEI)

2.4. E-mail address: eugene.r.wahl@noaa.gov

2.5. Phone number: (303) 497-6297

2.6. Name: Carrie Morrill -- for (a)

2.7. Title: Research Associate

2.8. Affiliation or facility: NOAA National Centers for Environmental Information (NCEI)

2.9. E-mail address: carrie.morrill@noaa.gov

2.10. Phone number: (303) 497-6467

3. Responsible Party for Data Management

Program Managers, or their designee, shall be responsible for assuring the proper management of the data produced by their Program. Please indicate the responsible party below.

3.1. Name: Eugene Wahl

3.2. Position Title: Physical Scientist

4. Resources

Programs must identify resources within their own budget for managing the data they produce.

4.1. Have resources for management of these data been identified?

Yes

4.2. Approximate percentage of the budget for these data devoted to data management (specify percentage or "unknown"):

5%

5. Data Lineage and Quality

NOAA has issued Information Quality Guidelines[3] for ensuring and maximizing the quality, objectivity, utility, and integrity of information which it disseminates.

5.1. Processing workflow of the data from collection or acquisition to making it publicly accessible:

These paleoclimate reconstructions are completed by the POCs listed in Section 2, as appropriate to the product. Once the scientific research is completed and published in peer-reviewed scientific literature, they are contributed to NCEI's World Data Service for

[3] http://www.cio.noaa.gov/services_programs/IQ_Guidelines_030414.html

Paleoclimatology, where they are processed according to the WDS's standard workflow for data set contributions. Metadata are fully generated and the reconstruction products are made publically available via the WDS's webservice search and retrieval capabilities. See https://www.ncdc.noaa.gov/paleo-search/

5.2. Quality control procedures employed *(describe or provide URL of description)*:

These reconstruction products follow standard quality procedures within the paleoclimatology disciplinary domain, and are published in fully peer-reviewed articles in domain-relevant journals.

6. Data Documentation

The EDMC Data Documentation Procedural Directive[4] requires that NOAA data be well documented, specifies the use of ISO 19115 and related standards for documentation of new data, and provides links to resources and tools for metadata creation and validation.

6.1. Does metadata comply with EDMC Data Documentation directive[5]?

Yes, NCEI-generated data products are represented by an ISO 19115 compliant collection-level metadata record in the NOAA OneStop catalog.

6.1.1. If metadata are non-existent or non-compliant, please explain:

NA

6.2. Name of organization or facility providing metadata hosting:

Metadata are hosted by NCEI and available through numerous mechanisms detailed below, including Web Accessible Folders (WAFS), a Geoportal Server and REST API, and the NOAA OneStop user interface and API.

6.2.1. If service is needed for metadata hosting, please indicate:

No metadata hosting service is required.

6.3. URL of metadata folder or data catalog, if known:

All NCEI metadata records are discoverable through the NOAA OneStop web interface at https://data.noaa.gov/onestop as well as the NCEI Geoportal Server web interface at https://www.ncei.noaa.gov/metadata/geoportal (will go live soon). In addition, NCEI metadata records can be browsed via the Web Accessible Folder (WAF) at https://data.nodc.noaa.gov/nodc/archive/metadata/approved/ (location to be updated to https://data.noaa.gov/wafs/NOAA/NESDIS/NCEI in near future). NCEI's metadata can also be searched via the following interoperable machine services:

Service Name	Base URL	Help
OneStop Search	https://data.noaa.gov/onestop/api/search	Web Interface:

[4] https://www.nosc.noaa.gov/EDMC/PD.DD.php
[5] https://nosc.noaa.gov/EDMC/documents/DataDocumentationPD-v2.0.0.signed.pdf

API		https://data.noaa.gov/onestop/#/help API: https://github.com/cedardevs/onestop/wiki/OneStop-Search-API
Catalog Service for the Web (CSW)	https://www.ncei.noaa.gov/metadata/geoportal/csw?service=CSW&version=3.0.0&request=GetRecords	https://www.ncei.noaa.gov/metadata/geoportal/help (These services will be publicly available soon.)
OpenSearch	https://www.ncei.noaa.gov/metadata/geoportal/opensearch	
JavaScript Object Notation (JSON)	https://www.ncei.noaa.gov/metadata/geoportal/opensearch?&f=json	
Keyhole Markup Language (KML)	https://www.ncei.noaa.gov/metadata/geoportal/opensearch?&f=kml	
Comma Separated Value (CSV) format	https://www.ncei.noaa.gov/metadata/geoportal/opensearch?&f=csv	
Really Simple Syndication (RSS)	https://www.ncei.noaa.gov/metadata/geoportal/opensearch?&f=rss	

The World Data Service for Paleoclimatology search capability is at https://www.ncdc.noaa.gov/paleo-search/

6.4. Process for producing and maintaining metadata *(describe or provide URL of description)*:

NCEI has a robust process for developing metadata. Data stewards develop standards, best practices and implementation strategies in alignment with the EDMC Procedural Directives. Technology stewards develop tools to assist in metadata development and verification. The Science stewards are trained in these best practices and tools. Both Science and Data stewards develop and maintain metadata.

7. Data Access

NAO 212-15[6] states that access to environmental data may only be restricted when distribution is explicitly limited by law, regulation, policy (such as those applicable to personally identifiable information or protected critical infrastructure information or proprietary trade information) or by security requirements. The EDMC Data Access Procedural Directive[7] contains specific guidance, recommends the use of open-standard, interoperable, non-proprietary web services, provides

[6] https://nosc.noaa.gov/EDMC/documents/NAO_212-15_Signed_4pg.pdf
[7] https://nosc.noaa.gov/EDMC/documents/EDMC-DataAccess-PD.v1.0.pdf

information about resources and tools to enable data access, and includes a Waiver to be submitted to justify any approach other than full, unrestricted public access.

7.1. Do these data comply with the Data Access directive?

Yes. As part of NCEI's basic data stewardship services, access is provided to the data it archives, except in cases where such access is precluded by agreement with the provider (as might be the case for some commercial or international data), contains Personally Identifiable Information, or is otherwise procedurally restricted, as might be the case during test phases of new observing systems or satellites. These situations are relatively rare, and the vast majority of the NCEI archives are freely and openly accessible without restriction.

All data products in the Paleoclimatology Product Area are publically available without restriction.

7.1.1. If the data are not to be made available to the public at all, or with limitations, has a Waiver (Appendix A of Data Access directive) been filed?

Not Applicable

7.1.2. If there are limitations to public data access, describe how data are protected from unauthorized access or disclosure:

Not Applicable

7.2. Name of organization of facility providing data access: NCEI

7.2.1. If data hosting service is needed, please indicate: No data hosting service is needed.

7.2.2. URL of data access service, if known:

All NCEI data access services are available from https://www.ncei.noaa.gov.

Paleoclimatology data are available from https://www.ncdc.noaa.gov/paleo-search/

7.3. Data access methods or services offered:

NCEI offers HTTPS, THREDDS, LAS, ArcGIS Server, OPeNDAP Hyrax Server, ERDDAP, FTP download, project-specific interfaces, and Customer Support services. Not all datasets are available through all services. The datasets in this product area are available through the following access services:

Paleoclimatology data are available via FTP links that are discoverable at https://www.ncdc.noaa.gov/paleo-search/

7.4. Approximate delay between data collection/production and dissemination:

Product metadata are evaluated and corrected as needed upon journal publication (see section 5). As soon as metadata processing/generation is completed the data are retrievable. Latency is as short as possible given staff availability for metadata processing, as specified below.

7.4.1. If delay is longer than latency of automated processing, indicate under what authority data access is delayed:

All NCEI-generated value-added products are made available upon completion of automated and/or manual processing and review workflow steps. No additional delays are introduced.

8. **Data Preservation and Protection**
The NOAA Procedure for Scientific Records Appraisal and Archive Approval[8] describes how to identify, appraise and decide what scientific records are to be preserved in a NOAA archive.

8.1. Actual or planned long-term data archive location:

All NCEI-generated value-added products are archived at NCEI, including the products from this Product Area.

8.1.1. If World Data Center or Other, specify:

NCEI is an ICSU World Data System for Oceanography, Geophysics, Meteorology, and Paleoclimatology. Products are made available via the WDS for Paleoclimatology, at https://www.ncdc.noaa.gov/paleo-search/

8.2. Data storage facility prior to being sent to an archive facility (if any):

All NCEI-generated value-added products are developed and stored at NCEI, including the products from this Product Area.

8.3. Approximate delay between data collection and submission to an archive facility:

All NCEI-generated value-added products are submitted to the NCEI archival process upon completion of automated and/or manual processing and review workflow steps. No additional delays are introduced.

8.4. How will the data be protected from accidental or malicious modification or deletion prior to receipt by the archive? Discuss data back-up, disaster recovery/contingency planning, and off-site data storage relevant to the data collection:

All NCEI-generated value-added products are produced and processed on FISMA-compliant systems with current system security measures and monitoring in place. Data processing systems are backed-up in order to support disaster recovery.

9. **Additional Line Office or Staff Office Questions**
Line and Staff Offices may extend this template by inserting additional questions in this section.

[8] https://nosc.noaa.gov/EDMC/documents/NOAA_Procedure_document_final_12-16-1.pdf