Assessment Information

[CoreTrustSeal Requirements 2017–2019](#)

Repository:	WDC - Oceanography, Obninsk
Website:	http://www.meteo.ru/mcd/ewdcoce.html
Certification Date:	01 December 2020

This repository is owned by: **All-Russian Research Institute of Hydrometeorological Information**

Core Trustworthy Data Repository Requirements

BACKGROUND INFORMATION

Context

R0. Please provide context for your repository.

Repository Type.

National repository system; including governmental

Reviewer 1:

Accept

Reviewer 2:

Accept

Comments

The WDC-B "Oceanography" (Obninsk) is in the Federal State Budgetary Institute «All-Russian Research Institute of Hydrometeorological Information –World Data Centre» (FSBI «RIHMI-WDC», http://meteo.ru/english/index.php). The activity WDC-B "Oceanography" is coordinating by its Director, who is appointed by the Head of RIHMI-WDC.

Despite the fact that the WDC-B "Oceanography" and WDC-B "Meteorology" use the same infrastructure of the RIHMI-WDC, the level of automation of data collection, processing and exchange in these centers differs. This is due to the fact that the support of these centers is provided by various units of FSBI RIHMII-WDC (figure 1 [see **ANNEX A**]). WDC-B "Oceanography" is part of the National Oceanographic data center.

The unified approach extends mainly to the description of all data using "the Hydrometeorological Data Description Language" (Obninsk, RIHMI-WDC, 1977), the use of a unified technical data storage medium in the form of a tape library and a data management system at the level of access to stored data.

This is due to the fact that the repository of hydrometeorological, including oceanographic, data is the State Data Fund for Hydrometeorology and Environmental Monitoring (hereinafter referred to as the State Fund), which stores environmental data from various ministries and departments of Russia.

Data sources for the repository are coastal stations; estuarine marine and hydrological stations; research vessels (RV), satellites, seawater pollution observation points, buoys, other platforms.

Data from the WDC-B "Oceanography" are part of the national oceanographic data set.

Most of this data comes from 5 government organizations: The Russian Federal Service for Hydrometeorology and Environmental Monitoring, Federal Agency for Fisheries of the Russian Federation, Russian Academy Of Sciences, Ministry of Defence of the Russian Federation, Ministry of Transport of the Russian Federation.(figure 2 [see **ANNEX B**]).

Storage users are students, graduate students, scientists, employees of various ministries and departments of Russia.

Reviewer 1:

Accept

Reviewer 2:

Accept

Brief Description of the Repository's Designated Community.

Potential users of WDC-B Oceanography are:

- World Data Centers Oceanography - A (USA) and D (China);

- National Oceanographic Data Centers of other countries (79 NODCs and designated national institutions);

- international pan-European and other projects, for example, MEDAR / MEDATLAS-2, Sea Search, SeaDataNet, SeaDataCloud, EMODNET Chemistry, EMODNET Ingestion, in which more than 110 organizations of Europe participate.

- Russian projects on the study of the World Ocean (about 300 organizations);

- individual users (marine and public organizations, private individuals) - more than 1000 registered users.

Most of these users are turning to the archives of oceanographic stations for the past 130 years and 185 marine coastal stations.

Reviewer 1:

Accept

Reviewer 2:

Accept

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

Comments

WDC-B "Oceanography" uses Oracle's database management system to store classical oceanographic stations to provide users. To store the integrated data, the PostgreSQL database management system is used.

WDC-B "Oceanography" uses a wide range of metadata (information about data sets and databases, observational platforms - research vessels, coastal stations, buoys, RVs cruises – more 34 000 national and foreign cruises, projects, organizations), which ensure that all changes in data are documented, the origin of the data is confirmed. Due to metadata, the relationship between data sets and metadata is links.

Outsource Partners. If applicable, please list them.

Russian Federal Service for Hydrometeorology and Environmental Monitoring, Federal Agency for Fisheries of the Russian Federation, Russian Academy Of Sciences, Ministry of Defence of the Russian Federation, Ministry of Transport of the Russian Federation.

Reviewer 1:

Accept

Reviewer 2:

Accept

ORGANIZATIONAL INFRASTRUCTURE

I. Mission/Scope

Compliance Level: 4

Reviewer 1:

4

Reviewer 2:

4

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

Mission of WDC-B "Oceanography» are long-term secure preservation, stewardship, and dissemination of worldwide data and products in the field of physical and chemical oceanography; provision of free and open access to oceanographic data and information (catalogues, bibliography, scientific articles and reports) upon user request and via web site (http://meteo.ru/mcd/ewdcoce.html).

The RIHMI-WDC supports the State Data Fund for hydrometeorology and Environmental Monitoring(State Fund), which is the warehouse for long time storage data, including oceanographic data. The data of the World Data Center B "Oceanography" are the separate data sets, storing the State Fund. The functions of WDC-B "Oceanography" indicated in the RIHMI-WDC Charter.

Reviewer 1:

Accept

Reviewer 2:

Accept

II. Licenses

Reviewer 1:

4

Reviewer 2:

4

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

Federal Law No. 149 «About information, information technologies and about information protection» acts as an agreement between a repository and its users [see **ANNEX C**]. It presents the main points regarding access to data and their use:

Article 24 - «Access to archival documents»;

Article 25 – «Restriction of access to archival documents»;

Article 26 – «Use of archival documents»;

Article 27 – «Responsibility for violation of legislation on archival affairs in the Russian Federation».

All data presented on the WDC-B "Oceanography" website is publicly available without any conditions imposed on users. The main thing is that the user uses these rights for any legal purpose and in any legal way. However, access to certain archival documents is limited in accordance with Article 25 "Restriction of access to archival documents" (note: archival documents with access restrictions are not presented on the WDC-B website).

Agreements between the data warehouse and data providers are governed by Federal Law No. 113 "On the Hydrometeorological Service" of July 19, 1998: Article 16 - "The procedure for providing information on the state of the environment, its pollution by legal and physical persons." [See **ANNEX D**.]

In accordance with paragraph 45 of Article 12 of the Federal Law of the Russian Federation dated May 4, 2011 No. 99- "On Licensing Certain Types of Activities", activities in the field of hydrometeorology and related fields are licensed activities.

Licensing requirements for the licensee in accordance with paragraph 5 of the "Regulation on licensing ...": subparagraph c) "The transfer by the licensee of information in the field of hydrometeorology and related areas to the Unified State Fund for data on the state of the environment and its pollution in accordance with

Article 16 of the Federal Law" On Hydrometeorological Service ". Non-compliance by the licensee with the requirements stipulated by subparagraph "c" of paragraph 5 is a gross violation of the licensing requirements of the Regulation (paragraph 6).

The organization of the collection, registration, storage and use of documents of the archive of information on the state of the environment and its pollution is reflected in Guidance document (GD) 52.19.568-2010.

Reviewer 1:

Accept

Reviewer 2:

Accept

III. Continuity of access

Compliance Level: 4

Reviewer 1:

4

Reviewer 2:

4

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

Since the WDC-B "Oceanography" is part of the RIHMI-WDC, than Federal Service for Hydrometeorology and Monitoring Environment of Russia (Roshydromet) provides then financing of WDC-B "Oceanography" on an ongoing basis. This activity is a function of the institute.

The work related to the operation of the WDC-B "Oceanography" is included in the annual Work Plan for the execution of state tasks Roshydromet, approved by the Head of the agency. If Russia's international obligations are not included for some reason in the annual work plan, then the Director of WDC-B "Oceanography" has the right to apply for support to the International Council of Scientific Unions.

Federal Law "On Hydrometeorological Service" of 19.07.1998 N 113-FZ (http://www.meteorf.ru/documents/6/25/) defines: the functioning of the Unified State Data Fund on the state of the environment and its pollution (Article 15); the procedure for providing information on the state of the environment, its pollution by legal and physical persons (Article 16); international cooperation of the Russian Federation in the field of hydrometeorology and related fields (Article 19). With the possible transfer of the above activities to another ministry or department, the functions of the State Fund are also transferred.

Since the activities in the field of hydrometeorology are determined by the federal law of the Russian Federation, the termination of funding is not expected. Even in the case of a change in the mission or field of RIHMI-WDC research, the continuity of access to oceanographic data remains with the institute.

In the next 3-5 years, the WDC-B Oceanography will ensure the constant availability of data through the site http://meteo.ru/mcd/ewdcoce.html. In the future (more five years), we will switch to the access to data according to the scheme for interactions of systems (M2M). This example is developed for WDC-B "Oceanography" in the pan-European projects SeaDataNet and EMODNet Ingestion.

Reviewer 1:

Accept

Reviewer 2:

Accept

IV. Confidentiality/Ethics

Compliance Level: 3

Reviewer 1:

3

Reviewer 2:

3

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

To ensure the security of personal data storage in the repository, the RF Law of July 27, 2006 N 152-FZ "On Personal Data" is applied, http://base.garant.ru/12148567/#friends. In addition, with the development of data integration systems and machine to machine interaction, the requirements of the Federal Service for Technical and Export Control of Russia are considered.

To manage data at the risk of disclosure, special procedures are used to restrict access. For example, to organize this work, the WDC-B "Oceanography" requires from data providers (sources) of data to consent to the provision of data in international exchange. This information is reflected in the information on cruises of RVs. If the agreement specifies temporal or geographical restrictions on the provision of data, the WDC-B "Oceanography" considers these limitations when WDC-B data "Oceanography" is included.

All data sets have metadata, by which help to search these data sets. Metadata are including the attributes (name, parameters, geographical region, time resolution, space resolution, period of observation, platforms, organization –platform owner, names and contact data originations, data provider, storage, etc.). This metadata are presenting data authors.

In addition, for the data stored in the system for the integration of distributed heterogeneous data, a single system of registration, authorization, and JOSSO authentication is used.

To check the risk of information disclosure in the data, procedures are applied for detecting attacks on the server, detecting infected programs on all computers on the local network, and others.

Regular training of employees in the field of data management accounting for the risk of disclosure of information is conducting. It is planned to prepare a guide to ensure the safety of potentially disclosed data.

Reviewer 1:

The link provided is in Russian only, but the response shows that the repository has a sufficient understanding of handling data with disclosure risk from a legal and ethical perspective. During its next certification, the WDC should also provide a clear summary in English such that the compliance can then be at Level 4.

Reviewer 2:

Accept

V. Organizational infrastructure

Compliance Level: 4

Reviewer 1:

4

Reviewer 2:

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.

Financing of the WDC-B Oceanography is providing by Roshydromet on an ongoing basis. The WDC-B "Oceanography" data is part of the State Fund, which provides long-term stability of data storage. The State Fund is located in a separate basement, with limited access. The basement has special protective equipment.

The long-term data storage function, including the WDC-B "Oceanography", is an integral part of the government task of RIHMI-WDC. Data warehouse service staff have many years of experience in creating and maintaining a data warehouse. Therefore, the preservation of oceanographic data in WDC-B "Oceanography" is guaranteed for a period of more than 3 years. For the next three years, funding is provided for Roshydromet's R & D plan.

Enhancing the professional experience of the WDC-B "Oceanography" staff is provided through participation in international data management courses conducted by the UNESCO IOC, as well as participation in pan-European EU projects. The WDC-B "Oceanography" currently has 5 staff.

Reviewer 1:

Accept

Reviewer 2:

Accept

VI. Expert guidance

Compliance Level: 3

Reviewer 1:

3

Reviewer 2:

3

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

For the effective management of data by the WDC-B "Oceanography" there are staff - curators of data sets for each discipline, which take into account the evolution of the development of instruments for observations, the growth of data volumes and traffic.

Issues of data collection from organizations of various departments are reviewed annually at meetings of the National Oceanographic Committee, which includes representatives of various Russian agencies. In addition, the results of data collection for the previous period are taken into account in the planning of marine expedition studies at the Ministry of Education and Science of the Russian Federation. If the data is not transferred to the repository, then a new the application on the expedition is not approved.

In Russia have the network of world data centers for disciplines - meteorology, sea ice, actinometry, marine meteorology, geophysics, geology, We have regular meetings in Russia to discuss pressing problems.

The WDC-B "Oceanography" uses consultants from Russian NODC and Russian institutions to develop its systems. Consultations are carried out both with the help of modern means of communication (e-mail, Skype, ICQ, messengers). To communicate with users, the "Feedback" service is used.

Reviewer 1:

Accept

Reviewer 2:

Accept

DIGITAL OBJECT MANAGEMENT

VII. Data integrity and authenticity

Compliance Level: 4

Reviewer 1:

4

Reviewer 2:

4

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

The magnetic cartridges are stored in three copies (etaloning, controlling, and working version). The availability of data copies allows to restore data from other copies in the event of a failure, and also allow to check the data in situations where there is doubt about the data. In this case, the WDC-B "Oceanography employees receive a digital version of the control and working file and compares these file versions. They also refer to paper cruise reports.

Data recorded on magnetic cartridges is presented in national format (OCEANPC). This format is a set of records for various types of data. Each record has a record integrity control identifier. This identifier can be used to determine if a record is damaged or modified.

WDC-B "Oceanography" uses a wide range of metadata (information about data sets and databases$ information on observational platforms - RVs, coastal stations, buoys; information on RVs cruises – more 34,000 national and foreign cruises; information on 200 projects, one thousand organizations), which ensure that all changes in data are documented, the origin of the data confirm. The relationship between data sets and metadata is links.

The completeness of the data is providing by the procedure for controlling the update (the relevance of the data) declared in the metadata. The completeness of the metadata is providing by controlling the filling of mandatory attributes and calculating the completeness of filling all attributes. When filling less than 70% of the attributes, the warning information has been given to the author of the description.

Oceanographic data in the repository practically does not change, but only replenish. When replenishing transformed data sets (time series, data sets for Marsden squares), a record is kept of the replenishment time and the list of cruises included in the transformed data set.

The author of oceanographic data is recording in metadata - information about the RVs cruises, information on the status of coastal stations.

Version control is providing by the availability of separate descriptions of metadata for data sets stored in the State Fund, in a working data set in, a national data storage format (OCEANPC), and in a database.

When creating metadata, the ISO 19115 2003 Metadata standard is used. For the attributes (country, date, location coordinates) the relevant standards are also used (ISO 19111: 2007, ISO 8601: 2000, ISO 3166, others). Open Geospatial Consortium standards are using to visualize spatial data.

Since oceanographic data do not change over time, but only complement each other, data change strategies do not exist. There is a requirement - the data received from the data provider is not changed, but only identified by quality flags (the value is correct, doubtful, defective, missing, etc.).

The metadata elements enable to identify type and origin of data, their spatial and temporal coverage, and other characteristics necessary to ensure authenticity of data sets. Metadata are using to prepare published and electronic WDC Catalogues. Updating of metadata is made annually. If the update does not occur, the metadata management system indicates on this and, when viewed, the needing attributes are highlighted in red. Changes in the data are reflected in the metadata by the authors of the data.

In the information resources with the oceanographic data of the research vessels, there are links to information on cruises, in cruises descriptions are links to detailed descriptions of organizations - data providers and detailed information about research vessels. The main communication identifier is the archival number of cruise. It is present in both data and metadata.

The metadata base contains many metadata objects (cruises, RVs, coastal stations, organizations, instruments, information on parameters, projects, etc.). The data includes references to information about observational platforms.

The archival number can identify the duplicate of cruises; unfortunately, the essential properties of different versions of the same file are not identifying. While interacting with other systems (for example, SeaDataNet) such a need has emerged. Since the inclusion of oceanographic stations in SeaDataNet, additional monitoring, correction, and deletion of some oceanographic stations in ODV format is carrying out. As a result, the number of stations in the original files and files in the ODV format differs. Due to the fact that most data depositors are well-known scientists in Russia (leaders of expeditions), there are no checks of the personalities of depositors. Most data providers are identified, even those that have changed their status (another country, a different name).

Reviewer 1:

Accept

Reviewer 2:

Accept

VIII. Appraisal

Compliance Level: 4

Reviewer 1:

4

Reviewer 2:

4

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

State Fund regularly carries out joint work for assessment of the completeness and quality of the data with the leading marine organizations of Russia (Roshydromet: State oceanographic Institute, Arctic and Antarctic research Institute, Far East Research Institute for Hydrometeorological Information; Russian Academy of Sciences (RAS): Shirshov institute for oceanology, Pacific oceanographic Institute of Far East Department RAS, etc.).

The WDC-B «Oceanography» has data quality control procedures to ensure the completeness and comprehensibility of the collected data. The main methods of quality control are presented in chapter 12 of GD 52.10.777-2012«Internal quality control of information about the state and pollution of the marine environment».

All data are checking and validating using a set of visual and automatic QC procedures in accordance with IOC Manual of quality control procedures for validation of oceanographic data. No.26, 1993, http://unesdoc.unesco.org/images/0013/001388/138825eo.pdf; and Ocean Data Standards IOC Manuals and Guides, 54, Volume 3, Version 1, 18 April 2013.

The specialists of WDC-B "Oceanography" use well-known programs for international formats or their own developments for data presented in the national data storage format. Active work is underway to increase the level of automation of data quality control.

The limit values used in quality control procedures are updated based on climate studies of oceans and seas. To prevent duplication of data, an improved procedure for checking duplicates was developed and applied.

If the data comes in unusual formats (for example, SeaDataNet Data Transport Format: https://archimer.ifremer.fr/doc/00454/56547/67033.pdf), converters are developed for them. In data integration technology, there are opportunities to assimilate data in any format of a simple structure. When processing them, it is possible to combine data from one discipline for different data sets.

It is recommended to use a national format for storing oceanographic files (OCEANPC) or international formats for storing oceanographic files. This speeds up the period of receiving data in the warehouse and reduces the number of questions to the data provider. But the data provider can transfer data to storage in any format. In this case, documentation is provided for working with this format.

Data is returned to the owner to correct errors, as a rule, if errors are detected when receiving data from the owner for storage. If the data has already been accepted, then when problems are detected, the necessary data quality flags are set for this data.

Data is stored in the national oceanographic data storage format (OCEANPC). In this format, a quality mark is provided for each parameter value entered (http://rus.ferhri.ru/esimo/Data/Format/Structure/ocean.txt).

In the framework of cooperation with the SeaDataCloud project, data transmitted as part of an international exchange is regularly checked. If errors are found, they send us a verification report with the errors found. Based on this report, our experts check the problematic values and correct errors or change the quality mark (both in the transmitted data and in the source data). Description of quality control procedures in the SeaDataCloud project can be found at the following link:

https://www.seadatanet.org/content/download/596/file/SeaDataNet_QC_procedures_V2_%28May_2010%29.pdf

For the data presented in the national data storage format, we use the separation of data by type (hydrochemistry, meteorology, pollution, BT, CTD).

If the provided metadata is not sufficient for long-term storage, then the WDC-B "Oceanography" requests them from the Data Provider. The WDC-B "Oceanography" has facilities for remote metadata input.

Reviewer 1:

Accept

Reviewer 2:

Accept

IX. Documented storage procedures

Compliance Level: 3

Reviewer 1:

3

Reviewer 2:

3

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

All procedures for working with data and metadata from the ingest point to the access point are documented. They are presented in GD 52.19.568 - 2010«Organization of the collection, recording, storage and use of documents of the archive fund of data on environmental pollution» [see **ANNEX E**]. This guidance document serves the purpose of organizing the acquisition, storage and replenishment of the State Fund.

Data saving is ensured by the implementation of the relevant planned procedures (verification of the physical state of the medium, control of data reading, verification of duplicate media, etc.). These procedures are carried out by permanent staff of the State Fund.

At the server and database level, daily and weekly backups of the databases and software are applied. The magnetic cartridges are stored in three copies (etaloning, controlling, and working version). The availability of data copies allows to restore data from other copies in the event of a failure, and also allow to check the data in situations where there is doubt about the data.

In GD 52.19.568 – 2010 «Organization of the collection, recording, storage and use of documents of the archive fund of data on environmental pollution» (chapter 7, paragraph 6) methods of Restoration (restoration) of the original or close to the original properties and external signs of archival documents that have been damaged or destroyed are indicated.

Consistency of archival copies of data is ensured at the level of quantitative assessment of the characteristics of the copied databases, cruises and the number of oceanographic stations in each copy.

Actual security threats are:

- Getting unauthorized access to data;
- Information distortion;
- Violation of authenticity and integrity;
- Violation of access to data.

Accordingly, there are four levels of security:

- device security;
- data security;
- network connection security;
- Safety of management and control.

The security of the devices is ensured by the lack of remote access to it and triple copying of removable media.

Data security is ensured by three-level data duplication (blade server, regular backup of all databases, as well as the availability of backup storage in other buildings).

The technology for storing data in the DBMS supports the appropriate security levels at the level of access to the database, records and attributes. It provides safety management and control.

Security of network interaction is ensured by a firewall system designed to ensure safe user access through the Internet to an operational database and other information resources.

Reviewer 1:

Accept

Reviewer 2:

Accept

X. Preservation plan

Compliance Level: 3

Reviewer 1:

3

Reviewer 2:

3

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

Information on the state of the environment and its pollution is stored in accordance with Federal Law No. 125 «On Archiving in the Russian Federation». Responsibilities of state bodies to ensure the preservation of archival documents are specified in article 17 «Duties of state bodies, local self-government bodies, organizations and citizens engaged in entrepreneurial activity without the formation of a legal entity, to ensure the preservation of archival documents».

Between RIHMI-WDC and the Archival Fund of the Russian Federation signed an agreement "On the conditions and conditions of depository storage of documents of the Archival Fund of the Russian Federation and the use of accessible documents owned by the federal government."

For the preservation of documents, the following measures are carried out:

1. First of all, a special set of measures to ensure storage is taken into account, which provides for the creation of material and technical facilities.
2. A set of measures is taken to create and comply with regulatory conditions, that is, temperature and humidity conditions are taken into account.

According to the decree of the Government of the Russian Federation of December 21, 1999 No. 1410 (paragraph 7): « Participants in hydrometeorology and related fields are required to submit general information to World Data Centers».

Article 4 of the Federal Law of October 22, 2004 N 125 "On Archival Affairs in the Russian Federation" states that the powers of the constituent entities of the Russian Federation in the field of archiving include: storage, acquisition, accounting and use of archival documents and archival funds.

To help organizations outside the Roshydromet, Methodological recommendations on the formation of the State Fund have been developed. [see **ANNEX F**]

Reviewer 1:

The response addresses an organized approach to continued access and an organized approach to long-term preservation, but a public preservation plan is missing. An evidence document is needed at your next recertification to attain Compliance Level 4.

Reviewer 2:

While the table in Annex F is easy to understand, other parts are difficult to understand. There are probably many documents/sections that treat the points, and it may not be easy to answer more simply, but please try to explain clearly for the next recertification.

XI. Data quality

Compliance Level: 3

Reviewer 1:

3

Reviewer 2:

3

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.

Oceanographic data is checked using the following algorithms:

- to check the general limits for each parameter;

- to check the water temperature and salinity values for increasing the water density with a depth of >0.05;

- checking station coordinates by distance traveled with the maximum speed of the vessel for a period of time between two stations.

The quality of metadata is checked for completing the required attributes and completeness of completing additional attributes (at least 70%).

In addition, for metadata presented in xml format, the compliance with the specified scheme is automatically checked (for example, ISO 19115).

Users have the opportunity to comment on the quality of data and metadata through a feedback application. Users cite in their publications the link "Data obtain from the WDC-B "Oceanography".

If the data is not updated for a certain period of time (different data sets have different update periods), metadata indicates that the data is not updated.

When using data, errors that can be fixed in the latest version of the original data set can be detected. Corrections in transformed and calculated data sets are made after the accumulation of a certain volume of replenishment and corrections, as a rule, once every three years.

Reviewer 1:

For your next recertification, a description of 'appropriate expertise' for quality checking must be added. The repository must certainly have some professional expertise on oceanographic data.

Reviewer 2:

Accept

XII. Workflows

Compliance Level: 3

Reviewer 1:

3

Reviewer 2:

3

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

The process of working with data and metadata from a data ingestion point to access points can be represented in the form of 6 functions:

1. Data Ingestion: includes receiving information from owners data, verification and preparation for storage. Connection with depositors is provided in the offline mode. The author of the archive prepares the documentation for the description of the data set, including the methods of their control, the description of the data storage structure.

Currently, the issue of data collection using remote data input with the help developed of the content management system is being considered. The issue of data collection from data providers is being considering using the integrated, distributed, heterogeneous data too.

2. Archival storage: supports stored in the archive data. It includes transferring data to a long-term storage, checking for errors and providing the requested archive data using the access function. The functions of data loading and archival storage are performed by the State Fund. Workflows of archiving are documenting in accordance with standards, adopted in the WDC-B "Oceanography". GD 52.19.568– 2010 «Organization of the collection, recording, storage and use of documents of archival fund of data on environmental pollution» [see **ANNEX E**] provide procedures for receiving data, for storage and their use by potential users.

3. Data management includes:

a) a database in which data and metadata are stored, as well as other information resources (for example, information about expeditions completed);

b) an information system involved in the cataloging, transformation, processing and visualization of data.

4 Access: includes a user interface (website), which allows users to receive information from the repository. Link: http://meteo.ru/mcd/ewdcoce.html

Detailed information on the organization of work of the State Fund is presented in the following normative documents:

- GD 52.19.108-2009. Regulations on the formation of the archive data fund on the state of the environment, its pollution of the Federal Service for Hydrometeorology and Environmental Monitoring. - Approved. Roshydromet on 03.07.2009, http://meteo.ru/index.php?option=com_docman&task=doc_download&gid=193&Itemid=;
- GD 52.19.143-2010. List of documents of the archive data fund on the state of the environment, its contamination. - 2010. Approved. Roshydromet on 30.06.2010, http://www.pfo.meteorf.ru/assets/files/771/rd%2052.19.143-2010.pdf;
- GD 52.19.568-2010. Organization of the collection, registration, storage and use of documents of the archive data fund on the state of the environment, its pollution. - Approved. Roshydromet on 28.12.2010, http://elib.rshu.ru/files_books/pdf/img-55526.pdf.
- Guidance on the preparation of a scientific and technical report on expeditionary research of the oceans [see **ANNEX G**].

Reviewer 1:

Accept

Reviewer 2:

Accept

XIII. Data discovery and identification

Compliance Level: 3

Reviewer 1:

3

Reviewer 2:

3

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

WDC-B "Oceanography" provides ample search capabilities both among other data sets and within specific data sets by time and spatial characteristics, country, organization, scientific research vessels that completed cruises.

The WDC-B website "Oceanography" (http://meteo.ru/mcd/ewdcoce.html) contains a catalog of RVs cruises, a catalog of information on RVs, the application for access to the initial oceanographic data and climatic generalizations.

The metadata catalog supports the relevant (internationally agreed) standards for the description of data sets (ISO 19115), the description of the cruises - Cruse Summary Report. The data store adds new attributes to the cruise descriptions.

The metadata of each resource is available through a unique link. The application of data set description standards, and the use of unique references should facilitate the machine collection of metadata.

With the help of metadata, the users can find the necessary expeditions, and visualize them with the available means on the site in the form of a table, maps and graphics. If necessary, it can download the selected data to the user's computer in CSV format.

All data sets have permanent identifiers, which allows them to be used in data management tasks, combining resources - information about sources of data and itself data. For example, oceanographic data coming through the channels from the global system of telecommunication(GTS) from research vessels have an identifying attribute - the call sign of the vessel. Combining these data with information about RVs gets a more complete set of identifying attributes (country, vessel name, ship-owner organization, etc.).

Reviewer 1:

Accept

Reviewer 2:

Accept

XIV. Data reuse

Compliance Level: 3

Reviewer 1:

3

Reviewer 2:

3

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.

In order to organize the reuse of oceanographic data, various content-oriented metadata widely used (information on data sets in the ISO 19115 standard, observational platforms, methods, formats, software, projects, organizations, cruises, parameters, etc.). Own implementations of attribute names are using - dictionary of parameters. In addition, two new attributes were introduced (data type - analysis, forecast, climate; data hierarchy) that are not available in the ISO 19115 standard.

The data must be presented in the formats (OCEANPC)or universal data exchange format) adopted to collect and store data. Expanding the scope of the universal data exchange format will significantly simplify the technology of data collection, as well as accelerate the process of including new data in the database of integrated data.

Digitized oceanographic data is also converted to single format including the following types of records (identification, meteorology, hydrochemistry, pollution, bathythermographic data, STD-measurements) and are uploaded to the integrated oceanographic base data to provide quick access to users.

Potential users have the opportunity to obtain data from the repository in OCEANPC format, and using web technologies - in the CSV format. This service option is designed for users of scientists.

In the coming years, WDC-B "Oceanography" is not planning to migrate data to new media and new storage systems. At present, the issues of the long-term preservation of WDC-B data "Oceanography" have been solved in full. There are not only operational copies of data (a weekly backup), but the data in the repository are preserved both on paper and magnetic cartridges.

To provide access in the future, WDC-B «Oceanography» is developing means of access to oceanographic data using web-services (using standards WSDL, SOAP), application program interface (API) and web map services (WMS, WFS, etc.). For the organization of continuous access to oceanographic data, the means for data integration existing in RIHMI-WDC are used.

The evolution of the composition of data attributes is taken into account using metadata and the availability of tools for converting data from various data structures into data integration technologies, taking into account their possible extension by attributes.

Due to the description of all oceanographic data in the national format(OCEANPC), the availability of metadata for each data set, the use of a single dictionary of parameters, mapping of names and codes, users, the data management system easily understand the composition and content of the data used.

Reviewer 1:

Accept

Reviewer 2:

Accept

TECHNOLOGY

XV. Technical infrastructure

Compliance Level: 4

Reviewer 1:

4

Reviewer 2:

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.

The operational data storage NODC of Russia operates on a blade server with virtual machines, which provides hardware redundancy and data duplication, which significantly increases the reliability of the hardware and software.

When creating the infrastructure, international standards for spatial data - SDI, OGC, INSPIRE, IHB; web – technologies - W3C, ISO standards (19115 and 19139 for metadata) for web services are widely used.

When creating metadata, the ISO 19115 2003 Metadata standard is used. Own implementations of attribute names have been introduced, as the beginning of the national system development coincided with the development of this standard (2002). In addition, two new attributes were introduced (data type - analysis, forecast, climate; data hierarchy) that are not available in the ISO 19115 standard.

In cooperation with international projects (SeaDataCloud, EMODnet), community-supported software (NEMO, MIKADO, Octopus programs) is used.

Nemo allows to convert data from ASCII to one of the following formats: ODV, ASCII, and NetCDF. Mikado is a software tool that allows to prepare metadata XML files: EDMED, EDMERP, CDI, and EDIOS.

Octopus is a multi-format tool for checking, converting and splitting or combining data. It is used for:

• checking compliance of ODV, NetCDF files with standard format;

• converting files in a given format to another format (for example, from ODV to NetCDF, from NetCDF to ODV).

WDC-B "Oceanography" receives data (BATY, TESAC, Buy, SHIP, Sea) from the global WMO telecommunication system in real time. For this, there is a broadband Internet channel with a bandwidth of up to 50 MBits. Since the function of supporting the repository is a state task, the technical support of the infrastructure is carried out by the corresponding units of RIHMI-WDC. A software inventory is underway. All documentation is also archived.

The list of using software are next: Linux CentOS 6 x86_64, ESXi 5.5, Sun JDK 1.7; JBoss Portal Platform 6.1; GateIn 3.6; SSO JOSSO 1.8.3; PostgreSQL 9.3; Zabbix 2.4; GIS server.

All data and information submitted to WDC are permanently archiving. Procedures used in RIHMI--WDC for the long-term data storage (periodical check and recovery as necessary) are applying to WDC data and information along with national data and information.

To ensure the long-term and safe storage all data are archived within two robotic IBM System Storage 3500 Tape Libraries. Full Disk Encryption with local key management provides relentless data security. One of these is the Main library and the other one is a Mirror library used for data backup and recovery. The libraries are located in two buildings detached. The direct access of external user to the library is impossible.

Technological schema of backup and long-term storage is basing on I IBM Tivoli Storage Manager software, and Content Manager on Demand. This solution provides cost-effective functionality, scalability and ease of use for the entry level storage user. Since the function of supporting the repository is a state task, the relevant departments of RIHMI-WDC perform the technical support of the infrastructure.

The technical infrastructure of the repository includes the following hardware and software. The Institute has an automated data transmission system that allows receiving operational data from the WMO Global Telecommunication Network, a unit that supports various servers, workstations, mail servers, network security, common software tools (DBMS, GIS and others that support applied technologies).

Reviewer 1:

Accept

Reviewer 2:

Accept

XVI. Security

Compliance Level: 3

Reviewer 1:

4

Reviewer 2:

4

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

The WDC-B "Oceanography" repository is located at the all-Russian research Institute for hydro meteorological information– World data center (RIHMI-WDC), where it takes advantage of the Institute's existing infrastructure to ensure security and proper access control. The computer center and server rooms are protected from unauthorized access by an access control system. Only certain RIHMI-WDC employees have physical access to data warehouses. The main approach to ensuring data security in the state Fund (section "Oceanography"), which is responsible for long-term data storage, is the lack of remote access to them and triple copying of removable media.

At the server and database level, there are daily and weekly database and software backups. For each created information system, a separate document "Data backup and recovery" is drawn up or there is a corresponding section in the system and database administrator's manuals.

Developer workstations are reserved. Employees save all the results of their work on network file resources that are backed up.

Data security policy is providing by three-level duplication of data (blade server, regular backup of all databases, and the availability of backup copies storage in another buildings) . Therefore, data can be restored even after unforeseen circumstances.

The firewall system is maintaining to secure user access via Internet to the operational database and other information resources.

Currently, no external upload of content directly to the data warehouse is allowed. However, there is a document on the organization of work for transferring data to the storage. Content uploaded by users is placed in a specially designated place available to specialists during the evaluation stage.

Data storage technology in the DBMS supports appropriate security levels at the level of access to the database, records and attributes. From the logical point of view, in the information on cruises of ships there is the attribute "the possibility of providing data to international exchange".

To ensure the continuity of the servers and applications, the online data warehouse is connecting to a system for monitoring resources and services, which allows monitoring the servers and software, the relevance and availability of resources. In addition, the monitoring system provides notification of any potential threats.

If there is a problem with the power supply, all the infrastructure remains available thanks to the UPS system. All server rooms are equipped with smoke and water detectors, as well as temperature sensors.

WDC-B " Oceanography" with NODC Russia every few years conduct an analysis of potential threats, assess risks and clarify the security policy. The security policy describes damage scenarios based on malicious actions, human errors, or technical failures that pose a threat to the storage and its data, products, services, and users. Completed work:

- Justification of the security class of the system in accordance with the Federal Law No. 149-FZ of July 27, 2006 "On Information, Information Technologies and Information Protection" (http://www.consultant.ru/document/cons_doc_LAW_61798/) and the order of the Russian Federal Service for Technical and Export Control from 11.02.2013 No. 17 (https://fstec.ru/normotvorcheskaya/akty/53-prikazy/702);

- Preparation of solutions for improving information security tools, taking into account recommendations for correcting structural and functional characteristics aimed at blocking (neutralizing) information security threats;

- Definition of requirements for a set of organizational and technical measures to protect information aimed at blocking (neutralizing) information security threats;

- Development of the Technical specification for the creation of an information security subsystem.

The RIHMI-WDC documents describe in more detail the procedures and mechanisms used for data backup and rapid recovery in the event of a failure. These documents are not public and cannot be published.
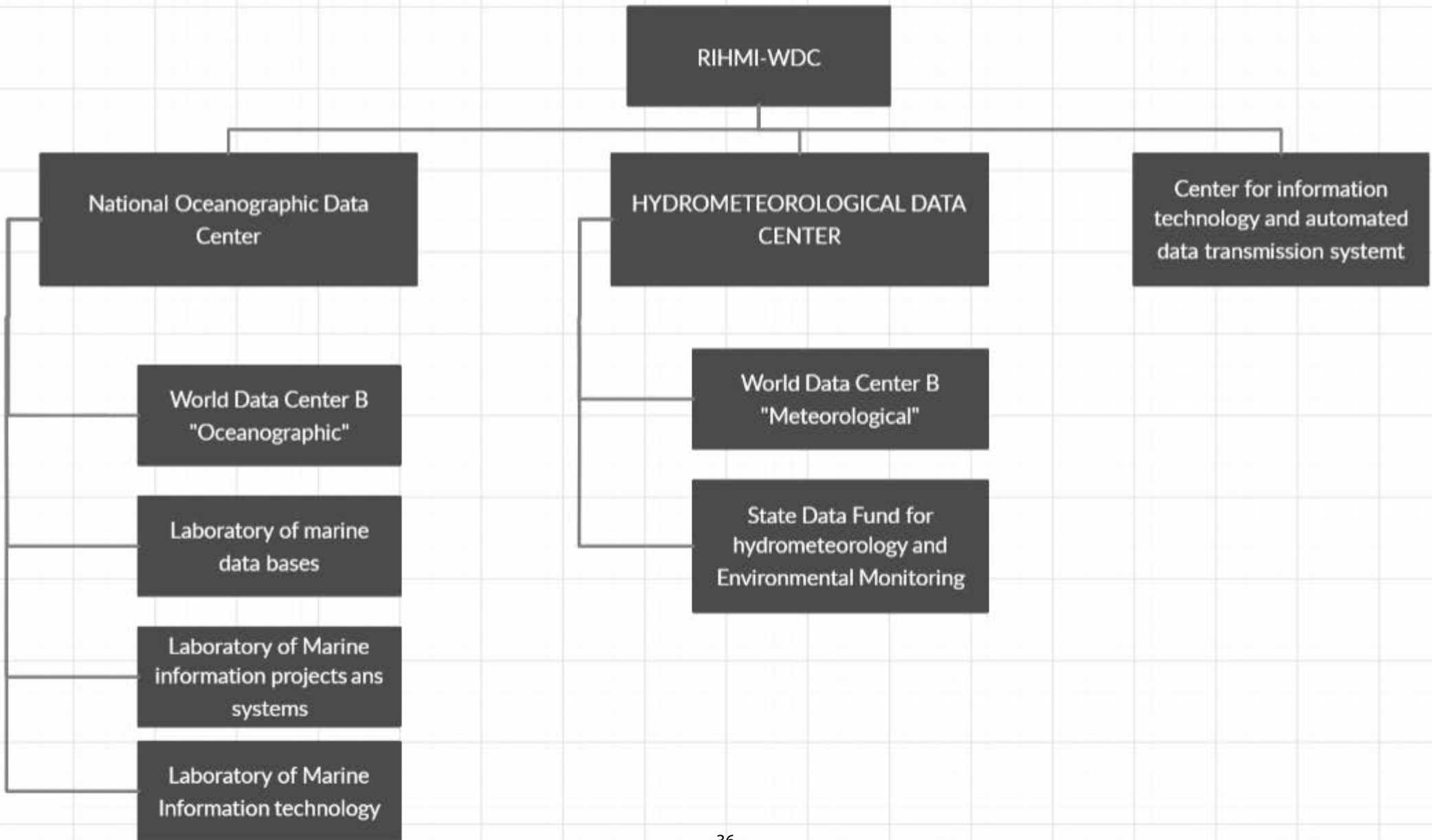
Reviewer 1:

Accept

Reviewer 2:

Accept

APPLICANT FEEDBACK

Comments/feedback

Sources of data

37

Federal law No. 149 «About information, information technologies and about information protection»

Article 24. Access to archival documents

1 The user of archival documents has the right to freely search and receive archival documents for study.

1_1. Access to archival documents is provided:

- by providing the user with archival documents of reference and search tools and information about these tools, including in the form of an electronic document;

- by providing originals and (or) copies of the documents he needs, including in the form of electronic documents;

- by using public information and telecommunication networks, including the Internet, with the possibility of copying them.

2 The conditions for access to archival documents in private ownership, with the exception of archival documents, access to which is regulated by the legislation of the Russian Federation, are established by the owner or owner of archival documents.

Article 25. Restriction of access to archival documents

1. Access to archival documents may be limited in accordance with the international treaty of the Russian Federation, the legislation of the Russian Federation, as well as in accordance with the order of the owner or owner of archival documents in private ownership.

2. Access to archival documents containing information constituting state secrets and other secrets protected by the legislation of the Russian Federation is restricted, as well as to originals of especially valuable documents, including unique documents, and documents of the Archival Fund of the Russian Federation recognized in the manner established by the authorized federal executive body in the field of archiving and office work, which are in unsatisfactory physical condition. The abolition of restrictions on access to archival documents containing information constituting state and other secret protected by the legislation of the Russian Federation shall be carried out in accordance with the legislation of the Russian Federation.

Article 26. Use of archival documents

1. The user of archival documents has the right to use, transmit, distribute the information contained in the archival documents provided to him, as well as copies of archival documents for any lawful purposes and in any lawful way

2. State and municipal archives, museums, libraries, scientific organizations included in the list, which is approved by the Government of the Russian Federation, provide the user with archival documents the conditions necessary for searching and studying archival documents.

4. In accordance with the legislation of the Russian Federation, state and municipal archives can provide paid information services to the user of archival documents on the basis of their archival documents and reference and search tools, conclude agreements with him on the use of archive documents and reference and search tools.

5. The procedure for using archival documents in state and municipal archives, including restrictions on the volume, terms, used technical means of copying, issuing and copying archival documents on a reimbursable or free basis, is established by the authorized federal executive body in the field of archiving and office work.

6. The procedure for using archival documents in state bodies, local governments, state and municipal organizations, state and municipal museums, libraries, as well as in scientific organizations included in the list, which is approved by the Government of the Russian Federation, is determined in accordance with the legislation of the Russian Federation, in in accordance with the procedure established by the authorized federal executive body in the field of archiving and record keeping.

7. State and municipal archives, archives of state bodies, local self-government bodies, state and municipal organizations provide state bodies and local self-government bodies with the necessary archival information and copies of archival documents necessary for the exercise of their powers, including in the form of electronic documents, publish and exhibit archival documents , prepare reference and informational publications on the composition and content of documents stored in them.

8. Archival documents seized as material evidence in accordance with the legislation of the Russian Federation shall be returned to the owner or owner of archival documents.

Article 27. Responsibility for violation of legislation on archival affairs in the Russian Federation

Legal entities, as well as officials and citizens who are guilty of violating the legislation on archival affairs in the Russian Federation, bear responsibility established by the legislation of the Russian Federation.

ANNEX D

Federal law No. 113 «On the Hydrometeorological Service»

Article 16. The procedure for providing information on the state of the environment, its pollution by legal entities and individuals

1. Legal entities, regardless of legal form, and individuals collecting information on the state of the environment and its pollution, are required to provide this information to the federal executive body in the field of hydrometeorology and related areas in the manner established by the authorized federal government of the Russian Federation executive power.

2. Legal entities, regardless of legal form, and individuals collecting information on the state of the environment and its pollution, are obliged, in the manner established by the federal executive authority authorized by the Government of the Russian Federation, to immediately submit to the federal executive authority in the field of hydrometeorology and related areas of information on technological emergencies that have, are, are likely to have a negative impact and the environment.

ANNEX E

Guidance document 52.19.568 «Organization of the collection, recording, storage and use of documents of archival fund of data on environmental pollution»

This guidance document serves the purpose of organizing the acquisition, storage and replenishment of the Archival Fund of the Russian Federation.

Preservation of archival documents of the State Fund of data on Hydrometeorology and environmental monitoring (state Fund) is provided by a complex of actions for creation of optimum (standard) fire-prevention, security, temperature-humidity, light and sanitary-hygienic modes and the proper organization of storage of the archival documents excluding their theft or loss and providing their maintenance in a normal physical condition.

In the section «Organization of the acquisition of the State Fund» reviewed:

- Procedures for determining sources, compiling a list and a plan for the State Fund;
- The process of receiving and transmitting documents of the State Fund;
- Procedure for examination of the cost of documents.

In the section "Organization of accounting documents of the state Fund" reviewed:

- Accounting for the receipt and disposal of documents and files;
- Technical processing of cases (includes stamping, affixing of numbers, execution of the spine and affixing of an index of cases);
- Scientific-reference apparatus for documents of the State Fund.

In the section «Organization of storage of documents of the state Fund» reviewed:

- Requirements for the building and the premises of the archive;
- Regulatory regimes for storing documents of the State Fund and requirements for archival storage (fire safety requirements, security mode, temperature and humidity regime, light mode, sanitary and hygienic regime);
- Rational placement of documents of the State Fund in the archive;
- Monitoring the movement and physical condition of documents of the State Fund;
- Restoration (restoration) of the original or properties close to the original and external signs of archival documents that have been damaged or destroyed.

In the section «Organization of the use of documents of the State Fund» reviewed:

- user access to documents of the State Fund
- Use of documents of the State Fund;
- Procedure for provision of documents of the State Fund users.

The appendices contain the forms of documents necessary to ensure the documentation of all work processes.

ANNEX E

7.6 Restoration (restoration) of the original or close to the original properties and external signs of archival documents that have been damaged or destroyed

Processing of archival documents on a paper basis includes:

- set of measures for bioprophylaxis, bioprotection and destruction of biological pests on archival documents;
- restoration (restoration and conservation processing) as a set of works and technological operations to restore the properties and long-term originals of archival documents;
- photo restoration of archival documents with faded and low contrast text;
- replace originals with short-lived or damaged media with copies to preserve documented information, etc.;
- binding of archival documents;
- dust removal of archival documents;
- processing of archival documents in emergency rescue operations, including using means, disinfection, disinsection, freezing, restoration, reproduction, decontamination and other types of processing.

Electronic documents, depending on the physical nature of the medium, undergo restoration and conservation work. Archival documents on magnetic tape are subjected to:

- cleaning the surface from dust and dirt particles on special cleaning equipment;
- magnetic tape rolls design with protective tape on two sides 2-2. 5 m;
- rewinding in order to relieve internal stresses in the rolls of magnetic tapes that arose due to changes in temperature and humidity during storage and transportation of archival documents.

Archival documents on disk media are subjected to:

- dust removal;
- wiping with an antistatic agent.

SUMMARY – Excerpts from the contract «On the conditions of depository storage of documents of the Archival Fund of the Russian Federation and the use of these documents in federal ownership»

In accordance with paragraph 2 of Article 18 of the Federal Law of October 22, 2004 No. 125- "On Archival Affairs in the Russian Federation" and in accordance with the Decree of the Government of the Russian Federation of December 27, 2006 No. 808 "List of federal executive bodies and organizations that depository documents of the Archival Fund of the Russian Federation, in federal ownership", between the Federal Archival Agency and the FSBI "RIHMI-WDC concluded Agreement No. 4/3-D of 09/14/2007. "On the terms and conditions of the custody of documents of the Archival Fund of the Russian Federation and the use of these documents in federal ownership."

In particular, in clause 3.1. It is noted that the storage period for the following documents has been established in the storage of the Archival Fund of the Russian Federation:

№	Categories and types of documents	Storage time
1	Meteorological, aerological, SYNOPTIC, agrometeorological, hydrological, marine, hydrometeorological, Oceanographic seas and oceans, geophysical observation documents	350 years
2	Documents of observations of artificial earth satellites	150 years
3	Environmental Observation Documents	250 years
4	Research reports containing observational data and materials	180 years

In clause 3.2. The agreement states that "the terms of depository storage of documents of the Archival Fund of the Russian Federation, to be stored and delivered for storage at the FSBI "RIHMI-WDC ", may be changed by the Federal Archives in agreement with the FSBI" RIHMI-WDC ". Changing the terms of custody of documents is made out in the form of an addendum to this Agreement. "

Clause 5 of the Agreement defines the term of its validity: «This Agreement shall enter into force upon signature by both parties and is unlimited. The agreement may be amended by agreement of the parties».

ANNEX G

«Guidance on the preparation of a scientific and technical report on expeditionary research of the World Ocean »

In 1976, at the RIHMI-WDC Center for Oceanographic Data, a Plan of the scientific and technical report on the voyage of a research vessel was developed, which established the requirements for materials of expeditionary research of the World Ocean. In 1979 in addition to it the Layout of the report on cruises of small vessels is developed.

Layouts made it possible to standardize the reporting form within an interdepartmental and partially interdepartmental structure, which greatly simplified and improved the system of data collection, accounting, storage and processing.

This guidance has been prepared based on experience with the use of breadboard models and is intended to replace them. This is dictated by the changing conditions for the production of observations and the advent of new types of instruments.

The guidance is a single regulatory and methodological document for all types of research vessels of large capacity (more than 500 tons) and small capacity.

Large research vessels, after the completion of each voyage, provide a voyage report for the captain and assistant captain for research, a general description of cruise and a scientific and technical cruise report.

Scientific and technical reports on cruises announced for international exchange should be sent with certificates of expertise.

Small-tonnage research vessels provide reporting information in a reduced volume, summing up materials for a six-month period.

Part 1 of the guidance consists of 5 chapters. Chapter 1, «Captain and Researcher Cruise Reports», discusses the structure and composition of the cruise report.

Chapter 2, "General description of cruise" provides a sample form in Russian and English, as well as the timing of its submission and mailing addresses

Chapter 3 discusses the structure and composition of the scientific and technical report.

Chapter 4 discusses the requirements for providing data, provides a list of supporting documentation, a description of the formats and tables necessary for encoding hydrophysical and meteorological parameters.

Chapter 5 sets out reporting requirements.

ANNEX G

The second part discusses the structure and composition of the semi-annual report on the cruises of small research vessels, indicates the time for preparing reports in RIHMI-WDC.

The appendices contain samples of the title page of the map of regions, description forms, code tables, etc.

The forms in this manual are checked using syntax control and internal format translation programs.