# Report of the Technical Committee on Data Exchange

The meeting of the Technical Committee on Data Exchange (hereafter TCODE) was held from 18:00 to 20:00 on October 28 and 14:00 to 18:00 on October 31, 2018. All member countries were represented. Ms. Fangfang Wan attended as a representative of China on behalf Mr. Jinkun Yang. Dr. Joon-Soo Lee, Chair of TCODE, introduced new TCODE members: Ms. Jeanette Gann as a representative of the U.S.A, and Prof. Yutaka Michida as an *ex-officio* member from IODE. One member from Canada and two members from U.S.A were not present. Dr. Lee welcomed members and other participants to the meeting *(TCODE Endnote 1)*. The agenda was reviewed by members and a revised agenda was adopted *(TCODE Endnote 2)*. Ms. Jeanette Gann was appointed rapporteur by the Chair.

AGENDA ITEM 3
## Report of POMA 2018

Dr. Lee explained the procedure for selection of POMA and the responsibilities of TCODE. He reported that 11 of 14 TCODE members had replied to his request to evaluate the 2018 POMA nominations, and that "No response" was interpreted to mean that he was entrusted to recommend the POMA nomination at the 2018 Inter-sessional Science Board (ISB) meeting in May, in Sidney, Canada. As a result, TCODE recommended the International Argo Steering Team (AST) as a first priority for POMA 2018 at ISB-2018.

AGENDA ITEM 4
## Review of procedure for Best Presentation Awards

Dr. Lee explained the purpose of, and the criteria for, the Best Presentation Award. However, TCODE did not sponsor any topic sessions at PICES-2018, and there were no early career scientist posters TCODE was responsible for judging so TCODE was excused from the task by the Science Board Chair.

AGENDA ITEM 5
## Report of summary of inter-sessional workshop and supported topic sessions/workshops at PICES-2018

Dr. Lee reported the activities of PICES special project "*Building capacity for coastal monitoring by local small-scale fishers*" since ISB-2018. He described the goal of the project and gave a summary of FishGIS activities including project methods for ecosystem monitoring (HydroColor, Foldscope, FishGIS, etc). Dr. Lee is involved as a member of the Project Science Team to give data management guidance on behalf of TCODE, at the request of the Science Board Chair.

Dr. Lee also reviewed Workshop W3 on "*Development of a systematic approach to data management in PICES*" held October 25, 2018 at PICES-2018. As workshop outcomes, the PICES data inventory was updated and the PICES Data Policy was revised through advice and comments from the workshop participants.

AGENDA ITEM 6
## Summary of AP-NPCOOS meeting

Dr. Sung Yong Kim and Dr. Jack Barth, Co-Chairs of AP-NPCOOS (Advisory Panel on *North Pacific Coastal Observation Systems*), presented a summary of its meeting on October 28 and activities since

PICES-2017. They also proposed a 1-day topic session on "*Coastal ocean observing systems and how they deliver on the recent Essential Biological and Ecological Ocean Variables (EOVs)*", a 1-day workshop on "*Synthesis of bio-acoustics programs for monitoring zooplankton and fisheries in the North Pacific*" at PICES-2019, and a tentative 5-day AP-NPCOOS Summer School in 2020 to understand marine ecosystem responses to climate change.

AGENDA ITEM 7
**Review of PICES data management policy and data inventory**

Dr. Lee reviewed the progress of PICES data policy development. Following GC (Governing Council) Decision 2016/A/15, in 2017 PICES Executive Secretary, Mr. Robin Brown, drafted a Data Management Policy and an inventory of data and data products that PICES has the responsibility to manage. TCODE reviewed and revised the draft policy with the inventory at PICES-2017, but GC postponed its decision to approve the Policy until PICES-2018 to allow TCODE to incorporate the results of its Workshop (W3) that would more fully review the policy and implementation requirements (GC Decision 2017/A/8).

Based on the workshop outcome from W3 (see Agenda Item 5) at PICES-2018, the PICES data inventory was updated. and TCODE was able to get a lot of advice and comments from the workshop participants. After the workshop, Mr. Chandler, Vice Chair of TCODE, Advice and comments from workshop participants enabled TCODE to expand the previous draft data Management Policy. At TCODE's meeting the Policy was reviewed and finalized (*TCODE Endnote 3*) as well as the PICES Data Inventory (*TCODE Endnote 4*). Terms of Reference were also updated to align with the Policy (*TCODE Endnote 5*).

AGENDA ITEM 8
**Status of FUTURE**

Dr. Ryan Rykaczewski, FUTURE SSC liaison to TCODE, reported the status of the FUTURE science program. He explained the goals and research themes of the FUTURE Science Program, and presented the outline of FUTURE synthesis paper to describe the development and implementation of the FUTURE framework.

AGENDA ITEM 9
**Relations with specific international organizations/programs**

Dr. Lee explained the ICES structure for data management and service. Since ISB-2018, he was in contact with the head of ICES Data and Information, Mr. Neil Holdsworth, to get advice on data policy. He also confirmed the contact point of ICES Data and Information Group (DIG), Dr. Jens Rasmussen, for future cooperation.

Dr. Lee provided a brief report about the work being undertaken by NOWPAP/DINRAC and NEAR-GOOS.

On behalf of Mr. Jinkun Yang, Ms. Fangfang Wan reviewed the activities of ODINWESTPAC (Ocean Data and Information Network in the Western Pacific region) project which was launched at the 24th Session of IODE. She reported many recent updates on marine scientific data, thematic products, literature resources, thematic information, and other comprehensive information.

Prof. Yutaka Michida, Co-Chair of IOC-IODE and the *ex-officio* member of TCODE, stated that IODE is

always open and ready to work with PICES, including possible participation as an IODE ADU (Associate Data Unit) or an AIU (Associate Information Unit). He encouraged TCODE members to attend the 25th Session of IODE to be held February 18–22, 2018, in Tokyo, Japan.

AGENDA ITEM 10
**Review of proposed topic sessions and workshops of PICES-2019, Victoria, Canada**

TCODE reviewed proposed topic sessions and workshops for PICES-2019. As of October 31, 2018, 17 topic sessions, 19 sessional workshops and 3 inter-sessional workshops for PICES-2019 were proposed. TCODE gave the highest priority to the following 4 topic session proposals:

- Proposal #2 - *Marine heat waves in the North Pacific: Predictions and impacts in coastal regions*;
- Proposal #5 - *Trends in ocean and coastal ecosystems and their services and its future*;
- Proposal #6 - *Identifying thresholds and potential leading indicators of ecosystem change: the role of ecosystem indicators in ecosystem-based management*;
- Proposal #11 - *Coastal Ocean Observing Systems, Essential Biological Variables, and community based monitoring*.

TCODE gave the highest priority to the following 7 sessional workshops:

- Proposal #4 - *Circulation, biogeochemistry, ecosystem, and fisheries of the western North Pacific marginal seas: Past and future of CREAMS (Circulation Research of East Asian Marginal Seas)*;
- Proposal #5 - *Celebrating two decades of North Pacific CPR sampling, and future directions*;
- Proposal #10 - *Monitoring non-indigenous species in PICES member countries: Towards Best Practices*;
- Proposal #11 - *PICES/ICES collaborative research initiative: Toward regional to global measurements and comparisons of zooplankton production using existing data sets*;
- Proposal #14 - *Common Ecosystem Reference Points*;
- Proposal #16 - *Application of machine learning to ecosystem change issues in the North Pacific*;
- Proposal #18 - *Towards an integrated approach to understanding ecosystem predictability in the North Pacific*.

Finally, TCODE gave the highest ranking for the following inter-sessional workshop:

- Proposal #2 - NPESR3 Synthesis Workshop.

AGENDA ITEM 11
**Review of progress of TCODE Workplan 2017/2018**

TCODE Workplan activities for 2017/2018 (***TCODE Endnote 6***) were reviewed by members tasked for their respective items. Details can be found under relevant Agenda Items in this report.

AGENDA ITEM 12
**Discussion of TCODE Workplan 2018/2019**

Following discussion in previous Agenda Items, TCODE adopted a revised Workplan 2018/2019 (see ***TCODE Endnote 7***).

AGENDA ITEM 13
**Presentation of country reports**

See ***TCODE Endnote 8***.

AGENDA ITEM 14
**Other business**

Dr. Lee expressed his intention to step down as TCODE Chair at PICES-2019, ending his first term as the Chair, and informed members on the PICES Rules of Procedure for Elections (Rule 5. ii):
"Nominations of candidates for elections in the Council shall be sent in writing to the Executive Secretary at least 60 days prior to the start of the Annual Meeting at which the election will occur."

AGENDA ITEM 15
**Closing**

Dr. Lee closed the meeting at 17:00.

*TCODE Endnote 1*

**TCODE participation list**

Members unable to attend

Canada: Bruce Patten
China: Jinkun Yang
USA: Lynn M. deWitt, Hernan Eduardo Garcia

Members

Daisuke Ambe (Japan)
Peter Chandler (Canada, Vice-Chair)
Manchun Chen (China)
Sang-Hwa Choi (Korea)
Jeanette C. Gann (USA)
Jung No Kwon (Korea)
Joon-Soo Lee (Korea, Chair)
Yutaka Michida (*ex-officio*, represents IODE)
Georgiy S. Moiseenko (Russia)
Igor I. Shevchenko (Russia)
Toru Suzuki (Japan)
Fangfang Wan (China, on behalf of Jinkun Yang)
Tomowo Watanabe (Japan)

Observers

Jack A. Barth (AP-NPCOOS Co-Chair)
Sonia Batten (Canada)
Sung Yong Kim (AP-NPCOOS Co-Chair)
Hideaki Maki (Japan)
Thomas Therriault (Canada)
Ryan R. Rykaczewski (liaison of FUTURE SSC)

PICES

Robin Brown (Executive Secretary)

*TCODE Endnote 2*

**TCODE meeting agenda**

*Day 1: Sunday, October 28*

1. Welcome and introduction of members (All)
2. Adoption of agenda (All)
3. Report of POMA 2018 (Lee)
4. Review of procedure for Best Presentation Awards (Lee)
5. Report of summary of inter-sessional workshop and supported topic sessions/workshops at PICES-2018
   – PICES special project "*Building capacity for coastal monitoring by local small-scale fishers*" (Lee)
   – W3 on "*Development of a systematic approach to data management in PICES*" (Lee)
6. Summary of AP-NPCOOS meeting (co-chairs of AP-NPCOOS)
7. Review of PICES data management policy and data inventory (Shevchenko, Brown, Lee)

*Day 2: Wednesday, October 31*

8. Status of FUTURE (Rykaczewski, liaison for FUTURE SSC)
9. Relations with specific international organizations/programs
   – ICES DIG (Lee)
   – NOWPAP/DINRAC, NEAR-GOOS (Lee)
   – ODINWESTPAC (Wan)
   – IOC/IODE (Michida, *ex-officio* member)
   – Others
10. Review of proposed topic sessions and workshops of PICES-2019 (All)
11. Review of progress of TCODE Workplan 2017/2018 (All)
12. Discussion of TCODE Workplan 2018/2019 (All)
13. Presentation of country report (representative of member countries)
14. Other business
15. Closing

*TCODE Endnote 3*

**PICES Data Policy**

**Principles and Definitions**

As stated in Article III of the Convention for the North Pacific Marine Science Organization (PICES) the Organization is to promote the collection and exchange of information and data related to marine scientific research in the North Pacific Ocean and its adjacent seas.

The PICES strategy on capacity development identifies TCODE as the committee responsible for the development of communication networks for exchange of data and information.

Data gathered as a result of PICES activities will be responsibly managed to guard against loss and to ensure continued accessibility. The management of data using external data management systems is preferred to using internal PICES resources.

For any data provided to PICES, PICES will respect the ownership rights and any restrictions placed on these data by the provider.

Data include data products and model outputs related to PICES activities. Metadata are data about data.

End users include a person, organization, group (including PICES expert groups) using data.

Data providers include a person, organization, group (including PICES expert groups) providing data.

The data inventory refers to data for which PICES has the primary responsibility to manage.

**Roles and Responsibilities**

The **Technical Committee of Data Exchange** (TCODE) is responsible to:
1. Manage the PICES data inventory.
2. Assist Expert Groups to identify data that are to be included in the data inventory.
3. Assist Expert Groups in the development of data management options and strategies.
4. Make recommendations to Science Board on PICES data management and priorities, with particular emphasis on correcting or mitigating any known or anticipated deficiencies.

The **PICES Secretariat** is responsible to:
1. Support TCODE in the maintenance of the data inventory
2. Support TCODE to correct or mitigate any known or anticipated deficiencies.

**Science Board** is responsible to:
1. Include data management requirements in the Terms of Reference of each PICES expert group.
2. Review the recommendations proposed by TCODE and provide recommendations to Governing Council as necessary.

**Expert Groups** are responsible to:
1. Identify any data developed during the activities of the expert group and inform TCODE and PICES secretariat
2. Develop, with assistance from TCODE, strategies or options for managing data used by the expert group.

**Data Produced by PICES**

All data produced by PICES are considered to be publicly available unless explicitly specified otherwise.

Results, conclusions, or recommendations derived from the data associated with PICES do not imply endorsement from PICES.

Contributions of data from PICES expert groups will adhere to the expert groups' Terms of Reference and be submitted to TCODE for inventory while the group is active.

All data including metadata should be archived using standard codes, formats, and protocols.

**Data Provided to PICES**

The quality assurance of data is the responsibility of the data provider.

In the event that PICES becomes aware there may be quality issues in the data PICES will inform the data providers as soon as possible.

Data providers should inform PICES secretariat of any policies that may place special conditions on their redistribution.

End users are responsible for the proper use of the data and metadata provided.

PICES may reformat data or metadata but will never change the data provider's original record.

Data must be acknowledged, preferably using a formal citation.

**Citation**

Data citations should facilitate giving scholarly credit and normative and legal attribution to all contributors to the data, recognizing that a single style or mechanism of attribution may not be applicable to all data.

Where DOIs exist (Digital Object Identifier) they should be included in the citation.

*TCODE Endnote 4*

**PICES data inventory**

| Dataset/Data product name | Expert Group responsible |
|---|---|
| Non-indigenous species database | WG 21 / AP-NIS |
| PICES Metadata federation | TCODE |
| CPR Survey | MONITOR |
| NPESR data portal | MONITOR / WG 35 |
| Micronekton sampling intercalibration data | BIO/WG 23 |
| ADRIFT-Hawaiian Islands Marine Debris Aerial Imagery Surveys (2015–2016) | ADRIFT Project Team |
| ADRIFT-Webcam monitoring<br>Webcam monitoring of marine/tsunami debris (2014–2017) | ADRIFT Project Team |
| ADRIFT-Development of life history database for Japanese Tsunami Marine Debris (JTMD) biota (2015–2016) | ADRIFT Project Team |
| ADRIFT - Japan Tsunami Debris species database (2012-2017) | ADRIFT Project Team |
| ADRIFT - BC Coast Marine Debris Aerial Imagery Surveys | ADRIFT Project Team |
| Coral and sponge data | WG 32 / BIO |
| Key environmental data | WG 32 / BIO |
| Well-being analysis in PICES nations and Indonesia | MarWeB Project Team |
| Data from 2014, 2015 and 2016 Indonesian Pond Aquaculture Experiments | MarWeB Project Team |
| Clicker survey data - Las Lisas, Guatemala | MarWeB Project Team |
| Clicker survey data – Monterrico, Guatemala | MarWeB Project Team |
| Bibliographies (2) on the key concepts used in the project | MarWeB Project Team |
| Dissolved iron data set in the North Pacific | WG 22 / BIO |

*TCODE Endnote 5*

**TCODE Terms of Reference**

(bold indicates additions)

1. Identify the data management requirements of PICES;

2. Develop plans to meet these requirements;

3. Recommend establishment of expert groups to deal with specific functions of TCODE;

4. Review the progress of expert groups and provide Annual Reports to Science Board on the work of TCODE;

5. Advise the PICES Secretariat and expert groups on their data exchange activities;

6. Develop, **review, and update** PICES data policies **and data inventory**.

*TCODE Endnote 6*
**TCODE Workplan 2017/2018 (adopted on September 27, 2017)**

1.  Maintain a dialogue and collaborate with international organizations and scientific programs
    *Responsibility*
    – Chair for ICES DIG
    – Lee for NOWPAP/DINRAC, NEAR-GOOS
    – Representative of China for ODINWESTPAC
    – All for new proposed SCOR WGs evaluation

2.  Propose and support topic sessions and workshops, inter-sessional meetings, symposia, and training course/education activities
    2-1.  Support co-sponsored topic sessions/workshops of PICES 2018 Annual Meeting in Yokohama, Japan
        *Responsibility* – All
    2-2.  Propose topic sessions/workshops at PICES 2019 Annual Meeting
        *Responsibility* – All
    2-3.  Prepare and support PICES/AP-NPCOOS summer school 2018 hosted by Canada
        *Responsibility* – Shevchenko and Chandler

3.  Prepare Workshop in PICES 2018
    3.1.  Presentation about PICES TCODE Geospatial Portal with examples
    3.2.  Validate the data and data product inventory
    3.3   Communicate with PICES committees and expert groups
    *Responsibility* – All

4.  Maintain the PICES TCODE Geospatial Portal
    4-1.  Continue to administer TierPoint server
    4-2.  Metadata publishing in China
        *Responsibility* – Shevchenko in collaboration with representative of China

5.  Support for the use of shared information technologies
    5-1.  Maintain TCODE website
        *Responsibility* – Shevchenko

6.  Support to development of North Pacific Ecosystem Status Report III
    *Responsibility* – Chandler

7.  POMA 2018 nomination and rank
    7-1.  Propose new nominations by March 2018
    7-2.  Rank/evaluate nominations in April 2018
    *Responsibility* – All

8.  Support AP-NPCOOS
    *Responsibility* – Chandler, Patten

9.  Review the PICES data management policy
    *Responsibility* – All

*TCODE Endnote 7*
### TCODE Workplan 2018/2019 (adopted on October 31, 2018)

1.  Maintain a dialogue and collaborate with international organizations and scientific programs
    *Responsibility*
    – Lee for ICES DIG
    – Lee for NOWPAP/DINRAC, NEAR-GOOS
    – Michida, Lee, Toru for IOC/IODE
    – Representative of China for ODINWESTPAC
    – All for new proposed SCOR WGs evaluation

2.  Propose and support topic sessions and workshops, inter-sessional meetings, symposia, and training course/education activities
    2-1.  Support co-sponsored topic sessions/workshops of PICES 2019 Annual Meeting in Victoria, Canada
        *Responsibility* – All
    2-2.  Propose topic sessions/workshops at PICES 2020 Annual Meeting
        *Responsibility* – All
    2-3.  Prepare and support NPESR-3 Synthesis Workshop
        *Responsibility – Chandler, Jeanette, Lee*

3.  Review the PICES metadata federation and submit the recommendations to TCODE
    *Responsibility* – Shevchenko (Lead), Chandler, Lee, Gann, Chen, representative from Japan

4.  Maintain the PICES TCODE Geospatial Portal
    4-1.  Continue to administer TierPoint server
        *Responsibility* – Shevchenko

5.  Maintain TCODE website and undertake survey of TCODE membership
    *Responsibility* – Shevchenko

6.  Support the development of North Pacific Ecosystem Status Report III
    *Responsibility* – Chandler, Gann, Lee

7.  POMA 2019 nomination and rank
    7-1.  Propose new nominations by March 2019
    7-2.  Rank/evaluate nominations in April 2019
    *Responsibility* – All

8.  Support AP-NPCOOS
    *Responsibility* – Chandler, Patten

9.  Review and update the PICES Data policy and Data Inventory
    *Responsibility* – All

10.  Apply for IODE/ADU or AIU
    *Responsibility* – Lee, Michida

*TCODE Endnote 8*

## Country Report of Canada
not reported

## Country Report of China
by Fangfang Wan on behalf of Jinkun Yang, NMDIS

As the responsible body of international ocean data and information exchange and cooperation in China, the National Marine Data and Information Service (NMDIS) has collected and integrated massive data, metadata and information from national and international ocean investigation, observation and monitoring activities, and filed marine geographic information, archives and publications. By implementing key technologies R & D programs, NMDIS has standardized the processing and management of various ocean data and information to provide operational services.

NMDIS endeavors to promote data sharing at home and worldwide. In May 2017, NMDIS released the ODINWESTPAC Data and Information Sharing Platform (http://odinwestpac.org). This year, on May 20, released the National Marine Science Data Sharing Platform (http://mds.nmdis.org.cn). At the end of the year, the China-ASEAN Marine Environmental Big Data Service Platform will be on line for open services.

Real time observation data colleting from 6 Chinese voluntary observing ships had been uploading to the GTS since last April. And in May 2018, the metadata of the six vessels were successfully uploaded to the VOS metadata website.

## Country Report of Japan
not reported

## Country Report of Korea
by Joon-Soo Lee, NIFS/KODC

Major governmental organizations or research institutes related to oceanographic data in the Republic of Korea are NIFS (National Institute of Fisheries Science), KMA (Korea Meteorological Administration), KHOA (Korea Hydrographic and Oceanographic Agency), and KIOST (Korea Institute of Ocean Science and Technology).

The Korea Oceanographic Data Center (KODC), which is operated by the National Institute of Fisheries Science (NIFS), is the National Oceanographic Data Center of the Republic of Korea. KODC established the ISO 9001:2015 Quality Management System (QMS) in 2016, and further achieved the status of "Accredited IODE National Oceanographic Data Centre" from IOC/IODE on August 24 2017. In accordance with Quality Management standards, KODC collects, manages and services data and data products.

Through GeoNetwork open source-based metadata system, KODC provided metadata of oceanographic observations in the Korean Seas to the PICES TCODE metadata catalogue system.

**Country Report of Russia**
by Georgiy Moiseenko and Igor Shevchenko

In 2018 Russian members participated in the following TCODE activities:

- Updating of the Key Institutions/Key Persons information (see *Appendix*).
- System administration of the TierPoint rented server.
- Maintaining of the PICES GeoNetwork portal
  http://67.212.128.196/geonetwork/srv/en/main.home
- A new draft instance of the PICES TCODE metadata catalogue http://82.162.170.226:8080/geonetwork was set up.
- Harvesting from the KODC catalogue was tuned up.
- Maintaining of the TCODE web pages
  https://sites.google.com/site/picestc/
- Maintaining of the PICES metadata federation web pages
  https://sites.google.com/site/picestcodegeonetwork/
- Participation in the preparation of a draft PICES data policy.

*Appendix*

**1. Key Institutions/Key Persons:**

**<u>Fisheries Institutes</u>**
Pacific Fisheries Research Center (TINRO-Center)
http://www.tinro-center.ru
Igor Shevchenko

Russian Federal Research Institute of Fisheries & Oceanography (VNIRO)
http://www.vniro.ru
Georgiy Moiseenko

Khabarovsk Branch of Pacific Fisheries Research Center (KhOTINRO)
http://www.tinro.khv.ru/
Ekaterina Kurilova

Magadan Institute of Fisheries and Oceanography (MagadanNIRO)

Sakhalin Institute of Fisheries and Oceanography (SakhNIRO)
http://www.sakhniro.ru

Kamchatka Research Institute of Fisheries & Oceanography (KamchatNIRO)
http://www.kamniro.ru/en

Russian Federal Fisheries Agency
http://fish.gov.ru

Atlantic Research Institute of Marine Fisheries and Oceanography (AtlantNIRO)
http://www.atlantniro.ru

Caspian Institute of Fisheries (KaspNIRKH)
http://www.kaspnirh.ru/en/

Azov Institute of Fisheries (AzNIIRKH)
http://azniirkh.ru/

Polar Marine Fisheries Institute (PINRO)
http://www.pinro.ru

Centre for Fishery Monitoring and Communications (CFMC)
http://www.cfmc.ru

National Fishery Resources
http://www.nfr.ru

**Hydrometeorological Institutes**
All-Russian Research Institute of Hydrometeorological Information – World Data Center (RIHMI-WDC)
http://www.meteo.ru/english/
Nickolay Mikhailov

State Oceanographic Institute (SOI)
http://www.oceanography.ru
Igor Zemlyanov

Arctic and Antarctic Research Institute (AARI)
http://www.aari.ru/main.php?lg=1

Far Eastern Regional Hydrometeorological Research Institute (FERHRI)
http://ferhri.org/en

**Academy of Science**
Pacific Oceanological Institute (POI)
https://www.poi.dvo.ru
Vyacheslav Lobanov

http://www.pacificinfo.ru/en/
Igor Rostov

Institute of Marine Biology (IMB)
http://www.imb.dvo.ru

Space Research Institute (IKI)
http://www.iki.rssi.ru/eng/
Evgeny Loupian

P.P. Shirshov Institute of Oceanology
of the Russian Academy of Sciences
http://www.ocean.ru/en/

### 2. Existing Data and Metadata Sets

| Agency | Division | Data/Metadata Description | URL |
|---|---|---|---|
| Federal Service for Hydrometeorology and Environmental Monitoring | Hydrometeorological Centre of Russia | Climate temperature and precipitation data Weather forecasts | http://wmc.meteoinfo.ru |
| | AARI | Ice charts and forecasts | http://www.aari.ru/main.php?lg=1 |
| | SOI | Hydrographic, meteorology and pollution data for Russian seas | http://www.oceanography.ru/ |
| Russian Academy of Science | IKI | Satellite data (NOAA, GOMS, RESURS) | http://smiswww.iki.rssi.ru/ |
| | POI | Hydrographic observations (national and foreign) in the Northern Pacific | http://www.pacificinfo.ru/en/ |

The Russian Federal Program ESIMO portal http://www.esimo.ru is an entry point to sites maintaining governmental information funds of data on the state of the World Ocean and coastal areas.

**Country Report of USA**
by Jeanette Gann, NOAA

The U.S. has a variety of data sites, searchable databases, and integrated portals that are accessible to the public. The main data portal for oceanographic and climate data is through the National Centers for Environmental Information (NCEI), which is a confluence of 3 national data organizations as explained below. The National Snow and Ice Data Center (NSIDC) is another data center whereby data for snow and ice (including sea ice in the Bering Sea and Arctic) can be searched and downloaded in a variety of formats. Other organizations have formed as integrated networks of government and private organizations that are working together to provide access to a variety of ocean-based data sets pooled into one place where regional observation networks are all under an umbrella of the 'Integrated Ocean Observing System' (IOOS). Detailed explanations for each center, along with links to data sites below:

**National Centers for Environmental Information (NCEI):**
The demand for high-value environmental data and information has dramatically increased in recent years. To improve our ability to meet that demand, NOAA's former three data centers—the National Climatic Data Center, the National Geophysical Data Center, and the National Oceanographic Data Center, which includes the National Coastal Data Development Center—have merged into the National Centers for Environmental Information (NCEI).

NCEI is responsible for hosting and providing access to one of the most significant archives on Earth, with comprehensive oceanic, atmospheric, and geophysical data. From the depths of the ocean to the surface of the sun and from million-year-old sediment records to near real-time satellite images, NCEI is the Nation's leading authority for environmental information.

NCEI continues the tradition of excellence, unmatched expertise, and trusted, authoritative data that the previous three Data Centers established. The top priority during the near future is to build on the full spectrum of atmospheric, oceanographic, coastal, and geophysical products and services that the Data Centers delivered. While NCEI's product portfolio will evolve as current products and services are assessed, no products or services are currently slated to be cut or reduced. By using consistent data stewardship tools and practices across all of our science disciplines and by forging an improved data management paradigm, we expect to provide users with improved access to environmental data and information archive products.   For more information, please visit www.ncei.noaa.gov

NCEI provides the following:

- The World's largest collection of freely available oceanographic data;
- Water temperatures dating back to the late 1700s and measuring thousands of meters deep;
- A "State of the Ocean Climate" from NCEI's Ocean Climate Lab and Satellite Team's scientific analyses;
- Scientific journals, rare books, historical photo collections and maps through the NOAA Central Library, a division of NCEI;
- Data management expertise including metadata training.

*Data Search:*

NOAA data discovery portal:   https://data.noaa.gov/datasetsearch/ currently provides two approaches to enable searching of NOAA's vast data holdings: the traditional NOAA Data Catalog for all data, and the new NOAA OneStop catalog, which initially includes only the archived datasets but will eventually replace the traditional catalog.

- NOAA OneStop provides enhanced collection and granule searching for only those datasets archived at the National Centers for Environmental Information (NCEI). Emphasis is on both improved search relevancy and overall user experience.

- The NOAA Data Catalog is an inventory of all NOAA data collections. The user interface allows web-based searching by keywords and other attributes; machine-to-machine searching is available using the OGC CSW protocol (Open Geospatial Consortium Catalog Service for the Web).

*Data Access:*

- NOAA NCEI World Ocean Database: https://www.nodc.noaa.gov/OC5/WOD/pr_wod.html
- In addition to the above links for searching available data, there is the National Ocean Database that includes access to scientific, quality-controlled global ocean profile and plankton data that includes measured in situ variables gathered since 1773.

**National Snow and Ice Data Center (NSIDC): https://nsidc.org/**

Advancing knowledge of Earth's frozen regions: NSIDC manages and distributes scientific data, creates tools for data access, supports data users, performs scientific research, and educates the public about the cryosphere.

**Integrated Ocean Observing System (IOOS): https://ioos.noaa.gov/**

IOOS is our eyes on the ocean, costs, and Great Lakes. We are an integrated network of people and technology gathering observing data and developing tracking and predictive tools to benefit the economy, the environment, and public safety at home, across the nation, and around the globe.

*IOOS Data*
https://ioos.noaa.gov/data/access-ioos-data/

IOOS data comes from a variety of technologies or data collection systems. While types of data available through any one of our 11 regional associations may vary depending on the local area, the national IOOS data products include data collected from buoys, high frequency radar systems and gliders. Modeling teams across regional associations also create data products including physical and environmental models of coastal systems.

IOOS data can be accessed through a variety of access services and tools through IOOS interactive maps, Data Assembly Centers (DACs), and individual Regional Association portals. This data access page provides an overview of all these services and tools as well as links to data usage demonstrations for scientists and managers looking to analyze data using various programing languages (Python, Matlab, R, *etc.*).

**Explore Regional 'IOOS' Data Portals:**

- **Alaska Ocean Observing System (AOOS): https://www.aoos.org/**

As the "eye on Alaska's coasts and oceans," AOOS represents a network of critical ocean and coastal observations, data and information products that aid our understanding of the status of Alaska's marine ecosystem and allow stakeholders to make better decisions about their use of the marine environment.

- **Caribbean (CARICOOS): https://www.caricoos.org/**

CARICOOS is the observing arm of the Caribbean Regional Association for Integrated Coastal Ocean Observing (CaRA). CARICOOS operates a network of observing assets including data buoys, coastal meteorological stations, vessels, instruments, and radars. Data from these assets and value-added data products such as graphs and maps are provided free of charge to the general public through the web page above.

- **Central and Northern California (CeNCOOS): https://www.cencoos.org/**

The Central and Northern California Ocean Observing System (CeNCOOS) is a collaborative that enables sustained and coordinated measurements, model nowcasts and forecasts, and integrated products to inform decisions about our regional ocean.

- **Gulf of Mexico (GCOOS):** **http://gcoos.org/**

The Gulf of Mexico Coastal Ocean Observing System (GCOOS) provides timely information about the environment of the United States portion of the Gulf of Mexico and its estuaries for use by decision-makers, including researchers, government managers, industry, the military, educators, emergency responders, and the general public.

- **Great Lakes (GLOS):** **https://www.glos.us/**

Easy access to real-time observations from buoys and monitoring stations in the Great Lakes region. Buoy data gives users a glimpse of current lake conditions by reporting meteorological and oceanographic conditions, including physical data, *e.g.*, wind (speed, direction, gusts), waves (height, period, direction), and water temperature, as well as selected bio-chemical data, phosphorous, chlorophyll *a*, and related remote sensing activities.

- **Mid-Atlantic (MARACOOS):** **https://maracoos.org/**

MARACOOS is the Mid-Atlantic Regional Association Coastal Ocean Observing System, covering the region from Cape Cod, MA to Cape Hatteras, NC for U.S. IOOS. Diverse Regional Needs: The Mid-Atlantic Bight (MAB) extends 1000 km alongshore, from Cape Cod, MA to Cape Hatteras, NC. It includes five major estuarine systems and a wide continental shelf cut by a deep cross-shelf valley and multiple shelf-break canyons. The footprint encompasses 10 states, the District of Columbia, and approximately 76 million people, or 25% of the US population.

- **Pacific Northwest US (NANOOS):** **http://www.nanoos.org/**

The Northwest Association of Networked Ocean Observing Systems (NANOOS) is the Regional Association of the national Integrated Ocean Observing System (IOOS) in the Pacific Northwest, primarily Washington and Oregon. NANOOS has strong ties with the observing programs in Alaska and British Columbia through our common purpose and the occasional overlap of data and products.

- **Northeast Atlantic (NERACOOS):** **http://neracoos.org/**

The Northeastern Regional Association of Coastal Ocean Observing Systems (NERACOOS) spans coastal waters from the Canadian Maritime Provinces to the New York Bight. NERACOOS provides weather and ocean data to fishers and commercial shippers determining if conditions are safe for passage and to emergency managers issuing storm warnings. NERACOOS is also advancing efforts to improve water quality monitoring, harmful algal bloom predictions and warnings, and coastal flooding and erosion forecasting systems.

- **Pacific Islands (PacIOOS):** **http://www.pacioos.hawaii.edu/**

PacIOOS empowers ocean users and stakeholders in the Pacific Islands by providing accurate and reliable coastal and ocean information, tools, and services that are easy to access and use.

- **Southern California (SCCOOS):** **http://sccoos.org/**

We provide the scientific data and information necessary to address coastal issues.

- **Southeast Atlantic (SECOORA):** **https://portal.secoora.org/**

Use the portal to:
- Search and download real-time data
- Search historical data
- Compare datasets from different stations
- Generate and share custom data views (how to coming soon!)
- Access metadata for SECOORA stations
- Access to regional and sub-regional models, including coastal circulation, water quality and fisheries habitat models.