2023 Report of the Technical Committee on Data Exchange

Day 1 Virtual meeting 16:00-17:30 (Pacific Daylight Time), Monday, September 25
The meeting of the Technical Committee on Data Exchange (hereafter TCODE) was held virtually via Zoom, from 16:00 to 17:30 on September 25, 2023. 5 member countries were represented (missing Russia). Some business agenda items were carried out over email (***TCODE Endnote 1***).

AGENDA ITEMS 1 and 2
Welcome, Introductions, Agenda, and Rapporteur

TCODE Chair, Jeanette Gann welcomed members and other participants to the meeting, and introductions were made by each member and guest. Brett Johnson was appointed rapporteur and the agenda was adopted by all.

AGENDA ITEM 3
Update on PICES DOI Proposal and Aquadocs

Jeanette Gann presented updates to TCODE on PICES acceptance of the DOI proposal and their actions to begin submitting PICES documents to the international open access repository for documents 'Aquadocs' (https://aquadocs.org/).

AGENDA ITEM 4
SG-DATA Update and WG-DATA Proposal

Jeanette Gann updated TCODE on results of the study group on encouraging Data Awareness and increased Transmission and Accessibility (SG-DATA).

AGENDA ITEM 5
New Data Award Proposal and Discussion

Brett Johnson presented a proposal for a new PICES award for 'Open Data Excellence Award' in honor of Dr. Igor Shevchenko, as a result of the work from SG-DATA (***TCODE Endnote 2***). Dr. Chiba suggested we may want to make sure that this award is clearly distinguishable from the POMA award to avoid confusion and overlap.

AGENDA ITEM 6
PICES Data Policy Update and Discussion

Jeanette Gann presented updates of the SG-DATA proposed changes to the PICES data policy that includes some vague language on repositories, among others, that needs to be clarified. Therefore, the data policy will be presented to Science Board as a draft (***TCODE Endnote 3***) with plans to finalize by the ISB meeting in May 2024.

AGENDA ITEM 7 and 8
Break and ECOP Presentation Judging

Jeanette Gann discussed the need for TCODE members to support presentations by ECOP and provide rankings for S2 (Applications of Deep Learning Systems in Marine Science). All TCODE members are encouraged to attend, and Brett Johnson, Jill Prewitt, and Jeanette Gann have volunteered to judge as representatives of TCODE.

AGENDA ITEMS 9
Tribute to Igor from TCODE and SG-DATA

Jeanette Gann discussed and invited members to contribute to a slide deck for contributions of memories, sentiments, and photos in honor of Dr. Igor Shevchenko to hopefully be added as a tribute in PICES press from the two groups.

AGENDA ITEMS 10
Final Comments and Close of Meeting

Final comments were made concerning the need for amendments to PICES data policy and upcoming agenda items at the next meeting to be held on October 22, during the PICES annual meeting. The meeting was adjourned.

Participants Day 1

Members:

Jeanette Gann (USA, Chair)
Wan Fangfang (China, Vice-chair)
Shelee Hamilton (Canada)
Brett Johnson (Canada)
Di Wan (Canada)
Daiki Ito (Japan)
Sung Dae Kim (Korea)
Jill Prewitt (USA)

Guests:
Sanae Chiba (PICES Deputy Secretary)
Toru Suzuki (Japan, ex-officio member)

Day 2 Hybrid 14:00- 17:00 (Pacific Daylight Time), Sunday, October 22

AGENDA ITEM 1

Welcome and Introduction of Members

AGENDA ITEM 2

Adoption of Agenda and Appointment of Rapporteur

Jeanette Gann agreed to be the rapporteur for the meeting, and all accepted the agenda.

AGENDA ITEM 3

Update on Status of TCODE Catalog

Brett Johnson presented updates on the TCODE catalog including the long history of metadata and over 4000 records. Not much data in the catalog, mostly metadata. Used to facilitate data discovery. Previously administered and managed by Igor Shevchenko, currently working on updating and pulling records for new management and repository system. Suggestions on migrating and/or improving on the catalog to modernize and make more useful to PICES members. Focus on sharing some data as well as metadata. Assess free third party catalog options to keep costs down for PICES.

AGENDA ITEM 4

Guest Presentation

Maciej Telszewski from the International Ocean Carbon Coordination Project (IOCCP) gave a guest presentation to TCODE regarding difficulties in biogeochemical observations. Need to monitor ocean carbon cycles to understand impacts of emissions as they happen and to adapt. Funding is not being realized, and needs are great as there is much discrepancy between models and real data. Need to transition to a standard global monitoring effort. Latest congress approved implementation plan for continued monitoring efforts. One of these includes data. PICES should take this opportunity seriously by making sure that delegations for each member country are aware of this and that delegates prompt for support of this within each member country. For example, once the World Meteorological Organization (WMO) approves something the member countries are bound to deliver. IOC is not the same. There is a meeting in November to discuss this issue and further the cause.

AGENDA ITEM 5

AP-NPCOOS Presentation AP-NPCOOS did not respond to requests for updates on activities.

AGENDA ITEM 6

AP-UNDOS Presentation

AP-UNDOS representatives were unable to attend, but Ryan Rykaczewski attended and presented updates for FUTURE SSC. The overarching science plan for PICES is to pool all of the science groups and collaborations and provide perspective on PICES contributions as a whole. Discussions regarding potential overlap between PICES plans for questions to answer and UNDOS may end up being redundant. Is there enough capacity for FUTURE group to focus on both? Perhaps, if the efforts align. Do not want to dissolve PICES scientific visions while focusing only on UNDOS goals. Phase II priorities were outlined as a result of this discussion, to retain a flagship science program to integrate PICES science. Will support ECOP to attend meeting. Around 2025-2027 will re-address the new themes for the next round of goals. Early career ocean professionals (SEES) award, a new award that will be given annually. Also working on FUTURE review paper to evaluate success of FUTURE in addressing science plan. Has the program evolved to meet the changes and needs? Will work to identify gaps, determine cause of gaps, provide lessons learned, and look at questions that align with the end of the UNDOS.

AGENDA ITEM 7

Discussion and Update of TCODE Workplan

Workplan discussions were tabled and sent for evaluation via email. Discussions will dive deeper into this during the TCODE meeting around ISB in May.

AGENDA ITEMS 8 and 9

Break and Update on Relations with IOC/IODE

With the stepping down of Prof. Yutaka Michida, Dr. Toru Suzuki has stepped up to fill the role of ex-officio member of TCODE and IODE liaison. Suzuki-san updated the group on the 27th session of IODE, held at UNESCO headquarters in Paris, France. IODE data products/projects were discussed including: World Ocean Database (WOD), GTSPP, GOSUD, IQuOD, OBIS, and SDG. Also presented the different IODE Information services including: AquaDocs with IAMSCLIC and ASFA, OCBS, ocean expert, ocean info Hub, Ocean Teacher Global Academy, ODIS (currently ODIScat). Suggested for PICES to join IODE network as an ADU and add to PICES member countries. Question from Brett Johnson: Is there a possibility for ODIS to host metadata in the future or to provide data? Suzuki response: In the future, ODIS will also be able to host data, yes.

AGENDA ITEM 10

Alaska Ocean Observing System presentation

Jill Prewitt presented on the Alaska Ocean Observing System (AOOS). AOOS is one of the 5 regional associations within PICES area. There are lots of 'ooses' where almost all data and information is leveraged from other projects. Funding from AOOS tends to help round out projects rather than funding a whole project. AOOS has partnerships with federal and state agencies, academic and private institutions, industry, non-profits, tribal communities, and many others. AOOS can help provide funding and logistical support for various projects: 1) marine operations 2) ecosystems 3) coastal hazards, and 4) water quality. They have ecosystem and biophysical moorings in places throughout Alaska, high frequency radars, and weather stations. They also make data public through external programs (federal data to public, PIs, and collaborative spaces). Also, long term datasets and continuous mooring information, etc. can visualize data on the portal and download the data from there. AOOS helps coordinate networks, researchers, the Alaska HAB and Ocean Acidification networks. Working on a new Alaska marine ecosystem network bringing together the ecosystem researchers and stakeholders in the area, look at gaps, needs, and how to shift focus to monitor everything needed.

AGENDA ITEM 11

Status of CFP Project and Data Handling

Daisuke Ambe presented an update on the CFP project evolution to FishPhytO. Initiated by creating a phytoplankton-fishery observing program for local communities in Indonesian waters. Started spring/summer 2023 to go through March 2026. The project is funded by the Ministry of Agriculture, Forestry and Fisheries (MAFF) of Japan through fisheries agency of Japan. A smartphone app was developed (FishGIS) for citizen monitoring of ciguatera fish poisoning "CFP". It has now evolved into "FishPhytO". This project aims to share the monitoring AI technology with member countries of PICES. AI-based individual fish extraction is being developed to monitor individual fish species and look at

body composition. Will also implement the 'Planktoscope' to monitor plankton. First PST (project science team) meeting was in Lombok, Indonesia (4-7 July, 2023). Field surveys were conducted along with a fish market survey, where the planktoscope was demonstrated. There will be new types of data from this project: plankton images with the planktoscope, classifications and compositions of fish and plankton by AI tools. Data obtained outside of Lombok will be similar to the previous program's data. Data from the previous project is stored via cloud storage, and local data is kept by the local research institute. It's not yet open access, local scientists want time to write papers and analyze data, and then will release to public in 3 years.

AGENDA ITEM 12

Update and Discuss TCODE Inventory

Meeting running late, decided to look at work-plan and inventory via email and discuss more thoroughly at the next meeting closer to ISB.

Participants Day 2
Members (in Person)
Brett Johnson (Canada)
Daiki Ito (Japan)
Daisuke Ambe (Japan)
Sun-Dae Kim (Korea)
Jeanette Gann (USA)
Jill Prewitt (USA)
Members (Online)
Wan Fangfang (China, Chair)
Shelee Hamilton (Canada)
Huitae Joo (Korea)
Guests
Toru Suzuki (Ex-officio member-IODE)
Maciej Telszewski (IOCCP, presenter)
Erin Satterthwaite (USA, ECOP, observer)
Jorn Schmidt (ICES, external reviewer)
Ryan Rykaczewski (USA, FUTURE, presenter)
Li Weilu (China, NMDIS, observer)

TCODE meeting agendas (Days 1 and 2)

Day 1 (Virtual only) 16:00-17:30 (Seattle, USA Pacific Time), Monday September 25

1) (16:00-16:05) Welcome and introduction of members (All)
2) (16:05-16:10) Adoption of agenda and appointment of rapporteur (All)
3) (16:10-16:15) Update on PICES DOI proposal and Aquadocs (Gann)
4) (16:15-16:30) SG-DATA Update + WG-DATA proposal (Gann)
5) (16:30-16:40) New Data Award Proposal + discussion (Johnson + all)
6) (16:40-17:00) PICES Data Policy Update + Discussion (Gann + all)
7) (17:00-17:10) Break
8) (17:10-17:20) ECOP Presentations Discuss and select session Judges (A/ll)
9) (17:20-17:25) Tribute to Igor from TCODE and SG-DATA members (Gann)/
10) (17:25-17:30) Final group comments and closing of meeting (all)

Day 2 (hybrid) 14:00- 17:00 (Seattle, USA Pacific Time), Sunday, October 22

1. (14:00-14:05) Welcome and introduction of members (All)
2. (14:05-14:10) Adoption of agenda and appointment of rapporteur (All)
3. (14:10-14:20) Update on status of TCODE Catalog (Johnson)
4. (14:10- 14:20) IOCCP presentation (Telszewski) **Pending confirmation*
5. (14:20-14:30) AP-NPCOOS Presentation (Yoshie or Juniper) **Pending confirmation*
6. (14:30-14:40) AP-UNDOS Presentation (Bograd or Chiba)
7. (14:40-15:00) Discussion and update of TCODE workplan 2022/2023 (All)
8. (15:00-15:20) Break
9. (15:20-15:30) Update on relations with IOC/IODE (Suzuki, ex-officio member)
10. (15:30-15:40) Alaska Ocean Observing System presentation (Prewitt)
11. (15:40-15:50) Status of CFP Project, and data handling (Ambe)
12. (15:40-16:00) Update and discuss TCODE Inventory and management (Gann +all)

TCODE Endnote 1

Agenda items carried out via email:

1) Review of PICES data inventory
2) PICES Data Policy potential updates
3) SG-DATA final report -technical report for PICES upon TCODE approval
4) Invitation to WG-DATA membership and approval
5) New proposed PICES Data Award (in honor of Igor Shevchenko)
6) Igor Shevchenko memorial slide deck contributions
7) ECOP Judging sheet and list of presentations to attend
8) Rank PICES 2024 session and workshop proposals

TCODE Endnote 2

Draft Proposal for the

PICES Open Data Excellence Award

in honor of Igor Shevchenko

Overview

The **PICES Open Data Excellence Award** is an annual award presented to individuals, groups, or organizations who have demonstrated exceptional innovation in the field of open science, data sharing, and FAIR data principles (Findable, Accessible, Interoperable, Reusable; Wilkinson et al., 2016) in support of the PICES community. This prestigious award recognizes individuals or groups who have made outstanding contributions to the advancement of open data science, with a particular focus on its applications in marine research and oceanography, and as relevant to the PICES mission, data policies, as outlined in the organization's Convention.

The Data Science Excellence Award is bestowed in honor of the respected Dr. Igor Shevchenko, who, for many years, was deeply involved in national and international data sharing activities. Dr. Shevchenko's pioneering work in differential games and artificial intelligence, along with his extensive involvement in data sharing and metadata initiatives, has left an indelible mark on the PICES community in the field of marine science. In particular, his tireless work in helping to create and maintain an extensive resource for metadata and data records via the technical committee on data exchange (TCODE) metadata catalog, will be a PICES legacy upon which we continue to build. As an Advisor to the Head of the Pacific branch of the Russian Institute of Fisheries and Oceanography, his leadership and expertise have played a pivotal role in advancing scientific knowledge and promoting international collaborative approaches. Additionally, his dedication to teaching and mentoring students majoring in mathematics and programming has inspired countless young minds to pursue careers in data science and its applications. In recognition of his remarkable achievements and contributions, the PICES Open Data Excellence Award stands as a testament to Dr. Igor Shevchenko's legacy and the enduring impact of his work.

This award honors an individual or group within PICES who exemplifies the spirit of excellence in open data science and data sharing and continues to push the boundaries of knowledge, just as Dr. Shevchenko has done throughout his distinguished career. The award celebrates the spirit of collaboration, transparency, and progress in marine science research through open data sharing and access equity. By recognizing outstanding individuals or groups who embrace these principles, the award aims to inspire further advancements in the field and foster a community committed to innovation in open data and sharing for the betterment of our marine ecosystems and the greatest societal good.

Rationale/Purpose of the Award

The main purpose of the PICES Open Data Excellence Award is to honor those who have excelled in promoting and coordinating marine scientific research by actively and openly sharing and exchanging information and data originating within the PICES region or relevant to the PICES community. The award highlights the importance of open data and its role in driving scientific progress and addressing global challenges, including weather and climate change impacts on marine ecosystems and human activities.

Nomination and Selection Process

The PICES Open Data Excellence Award invites annual nominations from the PICES community, aiming to acknowledge significant contributors to advancing open data, data sharing, and data management in marine-related disciplines. While the award may not be granted annually, its purpose is to honor individuals or groups who have made substantial strides in promoting and advancing a culture of open data principles and practices in alignment with PICES' mission and objectives. This includes advancing open data principles from research to application and particularly within the realm of marine and ocean related work. Priority will be granted to nominees who have demonstrated exceptional dedication to integrating diverse marine science disciplines within their open data initiatives.

Criteria for selection include outstanding and inspiring contributions to advancing data sharing and management across the entire data pipeline (e.g., collection, archival, quality control, analysis, interpretation, and use/communication) and will encompass factors such as relevance, impact, duration, and balance of activities (including data relevance and management, the length of time series or database size, adherence to FAIR principles, and demonstrated impact, among others). The criteria also includes contributions such as: developing open data tools, infrastructure, databases; publishing impactful and reusable data/metadata; catalyzing interoperability of data/metadata; building open data communities, networks, practices; developing novel training and mentoring around data science; sharing data, algorithms, code, data management capacity building, and protocols. Only one award will be conferred each year.

Nominations from individuals or groups residing in PICES member countries should be submitted, along with the requested supporting documentation, to the Executive Secretary (Sonia.Batten@pices.int) by the deadline specified in the Call for Nominations. Nominees who have actively participated in PICES activities or research projects within the organization's purview will receive preferential consideration. The Technical Committee on Data Exchange (TCODE) will independently assess the documents accompanying each nomination and recommend some or all of the nominations for consideration by the Science Board. The Selection Committee, represented by the PICES Science Board, will evaluate all nominations and identify the most deserving recipient. Those who have been nominated but not selected for the PICES Open Data Excellence Award will remain eligible for re-nomination in subsequent years. If re-nominating, please provide updated nomination documents to ensure an accurate representation of the candidate's open data accomplishments. To maintain a substantial pool of potential candidates, the Science Board will retain any excess recommendations for review over two consecutive years, and these recommendations will be reactivated with the nominator's approval.

Award Presentation and Benefits

The Award Presentation Ceremony takes place during the Opening Session of the PICES Annual Meeting. The successful nominee will be provided with a certificate of recognition to attend the ceremony. No financial support from PICES will be provided to the recipient to attend the Annual Meeting where the award is given. Should any representative be unable to attend the Annual Meeting, a Delegate of the recipient's country will be asked to accept the award on behalf of the recipient. The award itself symbolizes recognition of the recipient's commitment to open data principles and their contributions to advancing marine scientific research through data sharing.

TCODE Endnote 3

– **PICES Draft Data Policy (proposed changes included in red)**

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.

The timely, free, and unrestricted international sharing of oceanographic data, metadata, products and services is essential for a wide variety of purposes and benefits including the prediction of weather and climate, the operational forecasting of the marine environment, the preservation of life, economic welfare, safety and security of society, the mitigation of human-induced changes in the marine and coastal environment, as well as for the advancement of scientific understanding that makes this possible.

Data, metadata, and products should be accessible, reproducible, interoperable, and freely and openly shared with minimum delay and restrictions. Such sharing of data in both real-time and delayed mode facilitates scientific research and innovation.

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. Data should be quality-controlled, accompanied by metadata and, when possible, it is best to be stored in an openly-accessible data repository and made accessible and discoverable through a web interface and machine-to-machine protocols. PICES members shall, where possible, use IODE data centres linked to the IOC Ocean Data and Information System (ODIS) as repositories for oceanographic data and associated metadata.

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 on Data Exchange (TCODE) is responsible to:

1. Manage the PICES data inventory and promote within PICES and the general public through the TCODE data catalog service (or another new repository as determined by PICES TCODE and/or working group).
2. Communicate and disseminate data and metadata to all PICES members as well as the general public through PICES Catalog (or new option, TBD).
3. Assist Expert Groups to identify data that are to be included in the data inventory.
4. Assist Expert Groups in the development of data management options and strategies.
5. 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 use must be acknowledged, preferably using a formal citation.

To support knowledge discovery and innovation both by humans and machines, data should meet FAIR Guiding Principles (Findable, Accessible, Interoperable and Reusable)[1] to the greatest extent practicable.

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.

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[1] Wilkinson, M., Dumontier, M., Aalbersberg, I. *et al.* The FAIR Guiding Principles for scientific data management and stewardship. *Sci Data* **3,** 160018 (2016). https://doi.org/10.1038/sdata.2016.18