Towards a Canadian Integrated Ocean Observing System

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The Canadian Perspective

PEOPLE

Steady increase in ocean science related undergraduates
Highly dispersed geographically
Canada ranks among top countries in output and impact of ocean science papers

ASSETS

Research Vessels
Ship based (CTDs, XBTs, current meters, nets)
Tide and water level gauges
Buoys (moored, profiling, surface drifting)
Sub-surface gliders
Subsurface profiling floats (Argo)

DATA

Physical Oceanography (temperature, salinity, currents)
Chemical oceanography (dissolved oxygen, nutrients, carbon)
Biological oceanography (chlorophyll, plankton, species distribution)

CLUSTERS

Victoria & Vancouver, British Columbia
Rimouski, Quebec
Halifax, Nova Scotia
St. John’s, Newfoundland
Challenges – Coordination Gap

- No comprehensive unified vision or strategy for ocean science in Canada.
- Large geographic area, therefore difficult achieving coverage, especially in the Arctic.
- Data and information held by a large number of institutions, available in a variety of formats, often difficult to find or simply not accessible to the public.
- Large amount of data collected, but no mechanism to easily integrate data from multiple sources.

So what do we do??????
Solution

Canada’s ocean science community, led and supported by Fisheries and Oceans Canada (DFO), in partnership with the Marine Environmental Observation, Prediction and Response Network (MEOPAR), is developing the **Canadian Integrated Ocean Observation System (CIOOS)** to bring existing ocean observation data into a federated system to generate value for users.

**CIOOS will:**

- Improve coordination and collaboration among diverse partners;
- Allow for ocean data to be discoverable, accessible and interoperable; and,
- Provide support for a wide variety of research efforts to better understand, monitor, and manage activities in Canada’s Oceans.

**User engagement** will be key during the development of CIOOS, from training and capacity development, to building networks and Communities of Practice.
CIOOS is envisioned as a network of people, resources, and technology, collaborating to build a comprehensive ocean observing community.

CIOOS will serve the needs of coastal communities, Canada, and the world.
Global Ocean Observing System (GOOS)

- Canada recognizes the value in forming stronger links to the existing GOOS structure – we are following the GOOS model, with the goal to become a regional alliance.

- Items of interest to Canada:
  - lessons learned during the development of other GRAs
  - data sharing
  - enhancing regional capacity development
  - linking with other observation systems with dedicated marine service goals, such as oil spill response capabilities
Brief History of CIOOS

- **Task Team** of federal and non-federal ocean observing experts formed (November 2016)

- DFO published an RFP for **Investigative Evaluations (IEs)** to move CIOOS from the concept state to the design stage (work completed June-November 2017)
  - Observation and Data
  - Cyber Infrastructure
  - Visualization Tools and Platforms

- Scoping Workshop held to determine what is **required, practical and realistic** to develop a successful proto-CIOOS (March 2018)

- Recommendation to begin with a **2 year ‘Pilot Phase’**, using a set number of requirements to test the system

- MEOPAR has worked in collaboration with DFO over the last few years towards the creation of a CIOOS. This initiative was a key component of the Network’s successful five-year renewal, with dedicated funding until March 31, 2022.

**Preliminary Engagement:** IOC (June 2017), GOOS Regional Alliance (Sept. 2017), Atlantic Stakeholder meeting (Jan. 2018), ORCA (April 2018), EOOS (Nov. 2018)
Proof of Concept

Where do we go now?

Pilot implementation (phase 1 in developing a CIOOS). This will:

• provide a proof of concept showing the benefit to a national network integrating data;
• identify issues that need work or improvement;
• offer an opportunity for further outreach and stakeholder consultation; and,
• improve cost estimates for further national development.

Focus on 11 baseline variables;
3 Regional Associations (RAs), a national web-presence, and a data stewardship node;

   RAs: gather data from multiple providers, demonstrate (meta)data management and dissemination (incl. visualization), develop an end-user engagement plan;

   National: branding, bilingual, metadata catalogue, national asset map;

   Data Stewardship: consistent data and metadata standards, to ensure the ability to share data among RAs and with the national portal.

The Pilot Phase will demonstrate the ability to integrate data from multiple sources and present it in a way that is accessible to the public.
Proposed variables for inclusion in CIOOS, including an evaluation of their availability and readiness. Proportion of core variables that are, Mature (green), Pilot (yellow), and Concept or have No Coverage (red) in each region.
The CIOOS Component Hierarchy

Data feeds into regional and thematic nodes and is aggregated by regional associations, where appropriate (e.g. Gliders). The national portal also aggregates data for the purposes of visualization.

Data that is compliant or nearly compliant can be accepted into CIOOS via a node.

Data that requires work to be made compliant with CIOOS can be integrated with assistance from a node (with reasonable limits).

Data can be taken from almost raw and integrated into CIOOS with a large amount of assistance from a node.
Proposed Governance

Regional Association Steering Committee
  • Oversight committee of stakeholders representing data providers, the users, provinces, Indigenous representatives, etc.

National Executive Committee
  • Provides national oversight, updates standards (where coordination is required across the RAs)
  • Membership includes Executive Directors from RAs, MEOPAR, Federal Departments, others?
  • Observer status: international partners (e.g. US IOOS), others?

Working Groups
  • Mandate determined by Executive Committee
  • For cross national issues e.g. define data standards, cyber infrastructure, user engagement
Web Presence

National Portal

Regional Portals

Interactive Map
Data Portal
Visualization Tools
Regional Links
Membership of the Regional Association

Links to National Data (e.g. FGP)
International Links
Next Steps

Ongoing:
• Staffing of Regional Associations
• Development of National website
• Establishment of common metadata standards, development/adoPTION of open-source tools, aggregation of datasets
• Continue to engage domestically and internationally

Jan 2019 – Inaugural Meeting of Executive Committee

Early 2019 - Launch CIOOS website

March/April 2019 – Year 1 report due
Questions

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