

Canadian NEMO/Ocean Modelling Forum



- There has been a long term desire to bring together ocean modellers in Canada, from government and academia, to increase collaboration, sharing and interaction
- Events have been occurring associated with the CMOS Congress for years
 - E.g. Those activities led by Youyu Lu and Susan Allen, for example
- Links have occurred for many years with CONCEPTS
 - Canadian Operational Network of Coupled Environmental Prediction Systems
- Many interactions through MEOPAR and Its Prediction Core
 - Marine Environmental Observation, Prediction and Response Network

Communities of Practice

- A key part of MEOPAR is their Communities of Practice (CoP)
 - Goal is to bring together practitioners working on a given topic
- In the Ocean Modelling Space
 - Bring together Canadian NEMO users – or more broadly all Canadian Ocean Modellers
- Goals
 - Easily see what we are all up to
 - Request/share: code/output/data
 - Increase interaction of HQP and ECR with potential employers and share/teach desired skills
- Which leads to the overarching goal of **Increased Communication and Collaboration**

Canadian NEMO/Ocean Modelling Forum

- With MEOPAR refunded and morphing from an NCE to an SSF, there was a call to fund Communities of Practice
- We submitted one for a Canadian NEMO/Ocean Modelling Forum
- Was funded by the new MEOPAR SSF for Nov 2024 – Oct 2025
 - A proposal for the next 3 years will be put in later this Summer
- Several key activities were proposed

I: Regular Seminar Series on Ocean Modelling

- Proposed a bi-monthly series, but in practice, have been running it monthly since January 2025
 - First Monday of the month
 - January – June
 - Plan a two month Summer gap then will restart in September
 - Normally 2 seminars each month
 - ~20 minutes each
 - Ideally, one more theoretical and one more applied (but lots of flexibility)
- <https://canadian-nemo-ocean-modelling-forum-community-of-practice.readthedocs.io/en/latest/index.html>
 - You can see past events, abstracts, through the calendar
- Speakers needed from September onwards
- Coordinator: Tahya Weiss-Gibbons (weissgib@ualberta.ca)

II: NEMO/Ocean Modelling Workshop

- Hybrid Workshop in conjunction with CMOS
- First one today
 - Ideally to continue each year
 - Is CMOS the best conference to link to?
- Coordinator: Inge Deschepper
(ideschep@ualberta.ca)

Website

Canadian NEMO Ocean Modelling Forum Community of Practice

Search docs

Institutions
User Guide
Useful Sources

WRITE THE DOCS

Love Documentation? Write the Docs is for people like you! Join our virtual conferences or Slack.

Community All

NEMO Ocean Modelling Forum Community of Practice

Welcome to the NEMO Ocean modelling forum community of practice. The goals of this site is to encourage collaboration across Canadian institutions to share our NEMO modelling progress, development, code, accomplishments, successes and failures, and many other aspects.

Contents

- Institutions
- User Guide
- Useful Sources

Upcoming Events:

UoFA NEMO

May 2022

Mon	Tue	Wed	Thu	Fri	Sat	Sun	1 May
2	3	4	5	6	7	8	
9	10	11	12	13	14	15	
16	17	18	19	20	21	22	
23	24	25	26	27	28	29	
30	31	1 Jun	2	3	4	5	

Events shown in time zone: Mountain Time - Edmonton

Join our Slack channel

This website is under active development.

- Request/share: code/output/data
- Help to share documentation
- Help to share output/forcing files/etc
- Goal: increase collaboration
- <https://canadian-nemo-ocean-modelling-forum-community-of-practice.readthedocs.io/en/latest/index.html#>

Canadian Ocean Modelling Forum workshop, 29 May 2025

Ocean model development: Globally and in Canada

A few general points:

- Numerical ocean models include **components** of circulation (with T/S), sea-ice, waves, sediment, BGC, etc.
- For each component, different models (systems, codes) exist. They have a lot in **common** (solving same or similar equations), but also many **differences** (in simplifying equations, parameterization of unresolved processes, numerical schemes, grid setups, code & software structure, regional scopes, input data, etc.)
- A particular model may **perform better over others for certain purposes** (climate simulation or short-term prediction; global/deep ocean, shelf, coastal, nearshore, lakes), due to the specific model design, experience of users, etc.

A few general points (cont'd):

- **Internationally, there are R&D groups** dedicated in developing ocean models, many are open sourced
- In the past (before 2000), Canadian researchers have worked on developing (or co-developing) **“own” ocean models**, hence possessing expertise in developing numerics
- In recent two decades, we are mainly **using open-source models** for global and regional applications, hence focusing on using, setting up, modifying/integrating & tuning models.
- This still requires **developing, cumulating and sharing expertise**, within specific groups and across different groups. These are facilitated by major national programs/projects, e.g., CONCEPTS & MEOPAR, and academic training (graduate students & postdocs) and subsequent staffing

List of major ocean **circulation (+ other modules)** models currently used in Canada

▪ **Structured-grid** models

- **NEMO + ice (LIM, CICE, SI3) + waves + turbidity + BGC**
- **ROMS + ice (CICE) + waves + sediment + BGC**
- **MOM + ice (CICE)**
- **POM & ELCOM + ice; MITgcm**
- **MOHID + oil fate & behavior**
- **Oceananigans, CROCO (ROMS-AGRIF)?**

▪ **Unstructured-grid** models

- **FVCOM + ice + waves + sediment + BGC?**
- **SCHISM + ice + waves + sediment + BGC?**
- **French tidal model (D Greenberg)? FESOM? + ice + BGC**
- **MIKE ?**

Major usage of ocean models in Canada

- **Short-term operational forecasting**
 - NEMO + GEM @ CONCEPTS (ECCC, DFO port models), UBC
- **Coupled climate modelling**
 - MOM & NEMO + other earth system components @ CCCma
 - NEMO + WRF @ DFO
 - ?? + other earth system components @ UQAM?
- **Long-term historical hindcasting & future ocean-only climate modelling**
 - NEMO + ice + BGC @DFO, UoA, DAL, UBC, etc.
 - ROMS + ice + waves + BGC @DAL, DFO

Major usage of ocean models in Canada (cont'd)

- **Processes studies & specific applications**
- **FVCOM & SCHISM for aquaculture @DFO, DAL**
- **NEMO & ROMS + ice+ BGC for ecosystems @DFO, DAL, UBC, UoA, UoM**
- **ROMS & NEMO + waves for wave-current interaction @DAL, DFO**
- **FVCOM, SCHISM & MIKE + waves + sediment for sediment transport, tidal & wind power @DFO, RMC? UoQ?**
- **NEMO, FVCOM, POM & ELCPM + ice for lakes @ECCC, RMC?**
- **MITgcm, Oceananigans for process studies @Dal, UoW?, UQAR?**
- **French tidal model for tides @DFO (D Greenberg)**

Topics for discussion:

- **Are there missing information in previous slides?**
- **Report from different groups:**
 - **Progresses and plans**
 - **Model products produced or to be produced**
 - **Successful stories & experience to share**
 - **Issues and difficulties to report – input & evaluation data, etc.**
- **Are there needs for coordination & collaboration? How?**

Topics for discussion

1. Groups present discuss their models, configurations, approaches and questions
2. Most important technical questions/needs/concerns for each group
3. Topics for potential collaboration
 1. Forcing fields
 1. Air/sea fluxes, runoff, glacial, biogeochemical
 2. Time periods, both for hindcasts, as well as future experiments
 2. Bathymetry
 3. Sea-ice improvements and parameters
 4. Mixing and other small scale processes
 5. Other

Topics for discussion

- What activities should be consider going forward
 - Sharing Portals
 - Website
 - Virtual meetings
 - Broad, or on a specific sub-topic
 - Resources (computational or storage) for common usage?
 - White Paper
 - Canada's role in the NEMO Consortium (topic for later today)