OceanPredict '19

GODAE OceanView Symposium | 6-10 May 2019 Halifax, Canada

Advancing the science and application of ocean predictions

Forum discussion summaries

The forum was set up to develop plans and direction for Ocean Predict based on activities and discussions highlighted on first 3 days of the symposium

The forum discussions are addressing four different topics, led by experts in the field. The goal of the discussions is to generate cross cutting project ideas that increase Ocean Predict prediction capacity, but more importantly enhances the entire value chain from observation to end use with OceanPredict partners.

The forum format includes

1. Opening remarks from co-leads / facilitators
    a. Objectives and outcomes of particular forum session
2. Opening remarks from key contributors (2 min each)
3. General Discussion with Audience
4. Recap on consensus in last 10 min

Enquires should be sent to:

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Forum 1	International Partnerships in Operational Oceanography
Leads	Andreas Schiller and Fraser Davidson
Contributors	Albert Fisher (IOC), Pierre Pellerin (ECCC), Douglas Wallace (MEOPAR), PN Vinayachandran (Ocean Predict), Katy Hill (WMO)
Desired outcome	Ideas on how OceanPredict fits in or works within the existing or soon to be international frameworks/networks/activities such as IOC, GOOS, International Decade of Ocean Science, GEO, WMO

This forum discussed aspects of *Funding International Activities* and *Suitable Partnerships.*

Funding International Activities

The forum observed that most research is funded at national levels and there is limited scope of engaging in international activities. International engagements are possible between individual groups, but it falls short of providing a sustainable path for long-term international collaborations or projects. The forum proposed that organisations should consciously include a percentage of research resource for international collaborations in any project proposals and core organisational budgets, and plan for initiating concrete research ideas and activities. For example, Africa, needs to be supported to develop its preparedness for future ocean related problems and opportunities.

The turnover of the world ocean economy is a useful parameter to make a case with the national operational centres or governments as well as to provide a good argument for investment in international ocean research activities. It is important that such projects are approached in a concerted way, involving intergovernmental organisations, international groups, but also national operational centres or governments.

OP should facilitate collaboration and spread information amongst international groups so that multiple organizations can collaborate and propose same mandates, which may encourage funding that would facilitate higher level of International Activities.

Suitable Partnerships

In order to foster greater international projects, it is required for OP to build reliable partnerships in a complex and crowded international space. There should be a balance between informal working relationships (as a working group or similar) and setting up long-term formal relationships. Closer linkages with intergovernmental organisations such as GOOS, WMO, IOC, World Bank etc. would be a useful to pave the pathway for better collaboration in the long-term. The level of collaboration between national forecasting centres and intergovernmental organisations need to be enhanced. Such collaboration can benefit in capacity development and training and towards building better connectivity between development agencies and operational forecast systems. In the value chain, IOC is perhaps more upstream/transversal (observations, best practice, and science) and WMO downstream (data systems, service provision, standards) and OceanPredict can act as a potential integrator of ocean and other information into services.

Advocating the requirements of the ocean observing system and providing feedback on requirements of observations is vital for forecasting systems. Interaction between OP with space agencies, GOOS regional alliances and new technologies (including private organizations and academia) has been suggested.

Forum 2	**Collaborations / Knowledge exchange mechanisms: Improving Linkages between Operational Oceanography and Industry**
Leads	Gary Brassington (BoM) and Corinne Bourgault-Brunelle (DFO)
Contributors	Laurence Crosnier (Mercator Ocean International), Mike Smit (Dalhousie University), Shayla Fitzgibbons (Canadian Integrated *Ocean* Observing System Atlantic Regional Association)

The forum realized that the communication between providers of ocean products and users need to be effective and understandable. Unfamiliarity of the users with technical and scientific terms is an issue and there is a need to evolve messages that are simple yet contain all the required information. The information needs to be presented in a manner that can be absorbed and exploited for decision making as well. Exchange mechanisms such as GOOS associations, industry and government forum can be explored for communication to users and marketing. In a similar vein it is also required to explore links than can connect end users to OP who can provide new information on developing new tailor-made products for specific applications.

It could be useful to run an assessment of the different ocean forecasting centres engagement into international organizations that could enhance links with end users and weather forecasting centres.

It was suggested that OP should identify areas where ocean forecasting has applications and identify areas where OP can make an impact. While there are successful applications in marine transportation areas such as energy, fisheries, defence applications, human health, resilient coasts, hydrology (water quality) and ecological forecasts (hypoxia, habitat, HAB etc.), there might be several high priority applications where OP can make significant impact. These include surge forecast associated with severe weather, seasonal forecasts, marine industries (oil & Gas, shipping, fisheries), defense, recreation, blue economy.

Forum 3	Challenges and Exploitation of Ocean Products
Leads	Elisabeth Remy (Mercator Ocean International) and Greg Smith (ECCC)
Contributors	Shayla Fitzgibbons (Canadian Integrated *Ocean* Observing System Atlantic Regional Association), Mike Smit (Dalhousie University), John Wilkin (Rutgers University)

The forum discussed the need for bringing together ocean observations and OceanPredict, so that efforts can be focused towards common goals, such as good model representation of ocean status, and a larger mix of various observation platform contributing to the observing system. For example, engaging with a *broader research observing* community could offer the opportunity to work with observations to improve the parameterizations of processes in models.

Forum 4	Crosscutting project themes
Leads	PN Vinayachandran (Indian Institute of Sciences) and Eric Chassignet (Florida State University)
Contributors	Fabrice Hernandez (IRD), Douglas Wallace (MEOPAR), Pierre de Mey-Frémaux (LEGOS), Elisabeth Remy (Mercator Ocean International), Dany Dumont (ISMER-UQAR)

This forum discussed cross-cutting projects that OP should undertake in order to enhance its capacity for ocean prediction as well as the entire value chain from observations to end use. The forum identified several areas such as:

1. Air-sea fluxes, land-sea fluxes (using hydrological models), surface currents
2. Ecosystem models that include higher trophic levels (fish) and Biogeochemical models use for oil spill remediation
3. Observing system design, evaluation of impact of observing systems on OP
4. Communication and marketing efforts to to increase the entire value chain from observation to modelling to users and to end-users
5. Co-ordinated field experiments to cross-validate science, methodologies and technologies for environmental purposes
6. Seamless transition between coastal and basin-global scales to promote regional alliances and interaction between international efforts and local initiatives.
7. Coupled prediction systems towards improving predictability in the tropics.

In response to the forum discussion outcome Ocean Predict should consider the following recommendations for its strategy

- **OP should** focus on its known interfaces with observations & forecasting systems, operations and user groups to **foster greater international activities and generate deeper partnerships**.
- A potential model for **OceanPredict is to remain independent and flexible**, but to **formalize some links to WMO and IOC** groups (such as the Expert Team on Operational Ocean Forecast Systems).
- **OceanPredict** has the capability to engaging with end users, developers & modelers, observing systems forecasting agencies and intergovernmental agencies and thus **can help coordinate best practices**, data sharing, data display and dissemination etc. This potential need to be explored to the possible extent.
- **Stronger engagement with industry** (oil and gas sector, wind energy, instrument manufactures and end use companies)

OP has reached a level of maturity at which it should play a stronger role in

- **Setting standards / best-practice** for operational ocean forecasting systems (together with ET-OOFS)
- **Engage in capacity building** of skills and knowledge in countries who are staring to develop operational oceanography systems (all levels from regional to global)
- **Provide better connections** with end-users and their requirements (e.g. with Blue Planet)
- **Recommend / deliver** information on the value and improvement for the ocean observing system

→ OP should engage in making efforts to bring the observing, modelling and forecasting community together.

→ OP should engage in efforts towards close interaction between regional initiatives and established international systems.

→ OP should encourage the community to promote cross-cutting project areas that are identified and listed.

The outcome from the forum discussion will flow into drafting the new OceanPredict strategy.