MEOPAR

MARINE ENVIRONMENTAL OBSERVATION
PREDICTION & RESPONSE **NETWORK**

2013-2014 ANNUAL REPORT

MEOPAR

MARINE ENVIRONMENTAL OBSERVATION
PREDICTION & RESPONSE NETWORK

Vision:

MEOPAR will inspire and enable Canadian leadership in marine environmental observation, prediction and response.

Strategic Outcome:

MEOPAR will deliver knowledge, technology, and people to enable Canada's communities and industry to enhance resilience and economic opportunity through an informed relationship with the changing marine environment.

MEOPAR is supported by the Government of Canada through the Networks of Centres of Excellence program, a joint initiative of the Natural Sciences and Engineering Research Council, the Canadian Institutes of Health Research and the Social Sciences and Humanities Research Council, in partnership with Industry Canada and Health Canada.

NCE RCE

Canada

DALHOUSIE UNIVERSITY
Inspiring Minds

MEOPAR was established in 2012.

MEOPAR is hosted at Dalhousie University in Halifax, Nova Scotia.

Contents

Dalhousie Ocean Sciences Building
1355 Oxford Street, Suite 2-41
Halifax, NS B3H 4J1

902-494-4384
info@meopar.ca
www.meopar.ca

Welcome
MEOPAR Annual Report 2013-2014
BOARD CHAIR'S MESSAGE

2013-2014 was a banner year for the Marine Environmental Observation Prediction and Response Network (MEOPAR)

Significant progress has been made on all fronts, aligned with the network's Strategic Plan. The ocean science landscape in Canada is changing rapidly and the need for a network such as ours has never been greater. Under Board direction, the MEOPAR team with our researchers and partners has positioned the network for long-term success as a coordinating and mobilizing force among government science, academic research, external stakeholders such as private firms and non-governmental organizations, as well as international partners.

The recent release of a landmark study by the Council of Canadian Academies (CCA) entitled **Ocean Science in Canada: Meeting the Challenge, Seizing the Opportunity** has highlighted the quality of Canadian ocean science, but identified the lack of national coordination and integration among government, business and academia. In order to address this challenge, MEOPAR has strengthened its connections with federal government science and has played a leadership role in bringing together other research networks on areas of potential cooperation. The network's initial role has been to establish a community of practice in ocean data management and a national structure to share expertise and infrastructure related to ocean glider operation. On the international stage, the network has helped organize the Canadian response to the European Union's (EU) Horizon 2020 program. This wide-ranging program has a major ocean component entitled Blue Growth, which has a focus on the Atlantic Ocean. MEOPAR has been working with federal government and academic partners to coordinate a response to this EU initiative. To this end, we are developing an agreed-upon strategy for Canadian Atlantic Ocean observations and we have joined a large European research consortium and are playing a key role in facilitating significant Canadian involvement in Horizon 2020.

This critical national and international positioning was made possible through the growth and maturation of the network. Under the guidance of its Board of Directors, MEOPAR's Scientific and Associate Scientific Directors and Executive Director have established a strong Corporate Centre. With the network team fully in place and engaged, with research results beginning to appear, with partnerships emerging and evolving, the Board believes that MEOPAR is on track to meet the objectives of its Strategic Plan. It is effectively positioned to be a force in Canadian ocean research.

Over the course of the year, we have had some departures from the Board but have also had the privilege of new Directors joining the Board. On behalf of the network, I thank our Directors for your commitment, insights and experience in ensuring that MEOPAR is on track for success.

Dr. Robert Walker
Board Chair

DIRECTORS' MESSAGE

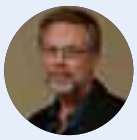
As the management team of MEOPAR, we are extremely proud of the progress made by the network this year. Our Corporate Centre has been staffed by a dedicated team of professionals. Our research program is showing results and it continues to grow and evolve in exciting new ways. Our new Partnership Program has been launched and we are working with a wide group of public and private partners to help build a more informed relationship with the ocean.

This year MEOPAR has grown into a truly national network, with active projects in the Atlantic, the Pacific, the Arctic and in the Gulf of St. Lawrence. We collaborated with government departments, private sector firms and other research networks to help share ocean data and information. We also reached out to international partners in the United States and Europe to help study the north Atlantic.

We would like to thank all of our partners for working with us this year, including the valued support of the Networks of Centres of Excellence program. The operations of MEOPAR rely upon a talented and committed group of volunteers. We owe a huge debt of gratitude to our Board of Directors, our Research Management Committee and our International Scientific Advisory Committee. We thank them for their hard work, for their support and for their advice. With the help of these stakeholders, MEOPAR is meeting the challenges of our changing ocean.

Dr. Douglas Wallace
Scientific Director

Dr. Ronald Pelot
Associate Scientific Director



Mr. Neil Gall
Executive Director

Seven Strategic Goals

In our first five years, MEOPAR's seven goals are to:

1. Establish the first nodes of a new pan-Canadian network of integrated observing and prediction systems for strategically important locations.

2. Develop new tools and technologies for rapid environmental assessment and forecasting during marine environmental emergencies.

3. Link projection of future changes in storms, coastal flooding, waves on local scales with consideration of economic impacts, safety, planning, and policy.

4. Assess the impact of long term, oceanic change on Canadian coastal communities, ecosystems and economic interests, including implications for resource management, regulation and policy.

5. Introduce new approaches for training of highly qualified personnel with skills in the natural and social sciences and their use in solving problems related to marine risk.

6. Implement new approaches for sharing natural and social science expertise, data and infrastructure in order to respond more effectively to marine emergencies.

7. Establish an "Expert Forum" involving Canadian and international experts, policymakers and stakeholders for the illumination, evaluation and communication of emerging and new risks in the marine environment.

The **Marine Environmental Observation Prediction and Response Network** (MEOPAR) is a team of outstanding, Canadian natural and social scientists. We're working to better understand and predict the impact of marine hazards on human activities and ecosystems... and improve response.

MEOPAR
MARINE ENVIRONMENTAL OBSERVATION PREDICTION & RESPONSE NETWORK

35 University Researchers

131 Highly Qualified People

12 Universities

WHO WORK WITH

18 federal & provincial departments and agencies,

30 industrial and other partners

In Canada and beyond

We already support over 20 research projects and our network and projects are growing.

$25 Million

Research	$16,851,589
Programs	$4,400,000
Corporate Centre	$3,745,946

MEOPAR is:

- **Generating Knowledge** people want and will use
- **Bringing People Together** in new and different ways
- **Training the Next Generation** of ocean experts

University of British Columbia
University of Victoria
BC Innovation Council (BCIC)
ASL Environmental Sciences Inc.
Pdocking Consulting Ltd.
Port Metro Vancouver
Ocean Networks Canada

University of Ottawa
University of Waterloo
University of Western Ontario
Atomic Energy of Canada Ltd.
Canadian Ice Service
Compute Canada
Environment Canada
Fisheries and Oceans Canada
Canadian Marine Pilots' Association
exactEarth
Institute for Catastrophic Loss Reduction

Partner Types:

Universities

Federal and Provincial departments and agencies

Industries and Others

Department of Transportation, Government of the Northwest Territories
Inuvialuit Regional Corporation

Memorial University
Atlantic Canada Opportunities Agency (ACOA)
Canada-Newfoundland and Labrador Offshore Petroleum Board

Dalhousie University
Saint Mary's University
Atlantic Climate Change Adaptation Committee
Atlantic Pilotage Authority
Bedford Institute of Oceanography (DFO)
Canada Excellence Research Chair (CERC)
Canadian Coast Guard
CREATE Transatlantic Ocean System Science and Technology Graduate School
Defence Research and Development Canada
Halifax Port Authority
AMEC
Atlantic Towing
Institute for Ocean Research Enterprise (IORE)
Irving Shipbuilding
Lloyd's Register
McInnes Cooper
Ocean Tracking Network
Optimum Talent Atlantic - Rosson & Gordon
Pro-Oceanus Inc.
Welaptega Marine Ltd.

McGill University
Université du Québec à Montréal
Université du Québec à Rimouski
Université Laval
le Bureau d'audiences publiques sur l'environnement
Institut des sciences de la mer de Rimouski

Arctic Region Supercomputing Center, University of Alaska Fairbanks
Hazards & Vulnerability Research Institute, University of South Carolina
Helmholtz Centre for Ocean Research Kiel (GEOMAR)
Intergovernmental Oceanographic Commission of United Nations Educational, Scientific and Cultural Organization (UNESCO)
National Oceanic and Atmospheric Administration (NOAA)
Northwest Association of Networked Ocean Observing Systems (NANOOS)
Plymouth Marine Laboratory
The Earth Institute, Columbia University
World Ocean Council

MEOPAR's top ten achievements for 2013-2014 are:

1 Expansion of our Research Program

MEOPAR completed its first Open Call for Proposals in 2013-2014; our network welcomed three new projects at the University of Victoria, the University of Waterloo and l'Université du Quebec à Rimouski (UQAR), with UQAR joining as a new partner university.

Bienvenue à l'Université du Quebec à Rimouski

UQAR

2 Leadership in Ocean Observation

MEOPAR has taken a leadership position to build a national coalition of ocean observation projects. MEOPAR's national workshop on data management was a first step towards national, cooperative standards on how ocean research programs and networks can effectively share and store data for a variety of purposes. MEOPAR's Scientific Director also led the development of a white paper outlining a Canadian strategy for Atlantic Ocean observation.

6 Implementation of the Partnership Program

MEOPAR developed and launched our Partnership Program this year, as a prime vehicle to engage organizations outside academia.

7 Creation of the MEOPeer Training Network

MEOPAR created our training network (known as the "MEOPeer" network) and held our first major MEOPeer training event in Ottawa, in February 2014.

3 Response to Horizon 2020

MEOPAR also responded to the European Union's Horizon 2020 funding initiative, which has an extensive component aimed at studying the Atlantic Ocean. MEOPAR has played a lead role in organizing the Canadian response to this EU initiative and has been actively building partnerships with European research entities.

4 University-Government Collaborative Research

Project 1.1: A Re-locatable Coupled Atmosphere-Ocean Prediction System led by Dr. Hal Ritchie, which is working with the DFO-EC CONCEPTS project and research outputs from the project are being operationalized by those departments. This project is being recognized as a model of government-university collaboration.

5 Development of our OceanViewer Website

www.oceanviewer.org - OceanViewer is a data aggregator – pulling publicly available ocean data from a variety of sources and displaying it in a simple format. There are many opportunities for this site to act as a knowledge transfer and ocean literacy platform.

8 SmartAtlantic Buoy Project

MEOPAR participated in the SmartAtlantic consortium, which saw the installation of a meteorological-oceanographic buoy in Herring Cove, outside of Halifax, NS.

9 Evolution of the MEOPAR Brand

MEOPAR has a new corporate logo, kiosk, Twitter account @MEOPAR_NCE, newsletter, etc. and has been dynamically sharing and promoting our research activities and success stories.

MEOPAR
MARINE ENVIRONMENTAL OBSERVATION PREDICTION & RESPONSE NETWORK

10 Completion of our Corporate Centre

At the start of the year, MEOPAR had an interim Network Manager and two half-time staff. By the end of 2013-14, MEOPAR had a full staff of six highly-qualified and skilled individuals who are fully engaged in delivering upon MEOPAR's Strategic Plan.

MEOPAR CONNECTIONS
National Ocean Research Connections

MEOPAR's initial role has been in establishing a community of practice on ocean data management

MEOPAR assumed a key coordination role within the Canadian ocean research community by bringing together for the first time, relevant groups from different sectors from across the country, to address long-standing deficiencies of Canadian ocean science. These were identified in the Council of Canadian Academies November 2013 report on the state of ocean science in Canada.

MEOPAR's initial role has been in establishing a community of practice on ocean data management and a national structure to share expertise and infrastructure related to ocean glider operation.

In November 2013, the Council of Canadian Academies (CCA) released their report, **Ocean Science in Canada: Meeting the Challenge, Seizing the Opportunity**. A group known as the Canadian Consortium of Ocean Research Universities (CCORU) commissioned this report. CCORU, as the name suggests, is a group of universities who have self-identified as institutions with a specialized focus on oceans issues. Four of the CCORU members; Dalhousie, Memorial, Laval and the University of Victoria, are represented on MEOPAR's Board of Directors. MEOPAR Board member, Dr. Wendy Watson-Wright and Research Management Committee member, Dr. Barb Neis, served on the report's expert panel, as did Jim Hanlon of the Institute for Ocean Research Enterprise (IORE), a close MEOPAR partner. MEOPAR's Executive Director, Neil Gall, also provided input to the report at the request of the CCA. The report recognized the importance of Canada's ocean science community, as well as its international reputation for quality. However, the report acknowledged the extremely disconnected nature of the ocean science community and the lack of national coordination at the federal level. MEOPAR's goals and objectives in our Strategic Plan position us to play a leading role in addressing these challenges.

MEOPAR CONNECTIONS
Government Connections

This partnership is being highlighted by MEOPAR's federal board representatives as a model of academic-government cooperation

MEOPAR enhanced its already strong connections to the federal government. Researchers from Environment Canada (EC), Fisheries and Oceans Canada (DFO) and Defence Research and Development Canada (DRDC) all play leading roles in MEOPAR projects. EC and DFO are also represented on the Board of Directors and in 2013-14, both departments joined the Research Management Committee. Discussions with other departments such as Transport Canada were also initiated this year.

A good example of how MEOPAR is accelerating world-class research is our network's connection to the Canadian Operational Network of Coupled Environmental Prediction Systems (CONCEPTS). CONCEPTS is a DFO and EC initiative to establish an operational, Canadian-global atmosphere-ocean-ice assimilation and modelling system. It aims to take advantage of ocean model improvements and new, near real-time global oceanographic data sets to produce new ocean products and will improve weather predictions and seasonal to inter-annual climate forecasts. MEOPAR's project: A Re-locatable Coupled Atmosphere-Ocean Prediction System is fully integrated into the CONCEPTS project and its research results will become part of this federal system of improved predictions. This project has brought CONCEPTS to the local level and will allow EC, DFO and other federal entities to be able to address extreme events more quickly and more efficiently. This addition to CONCEPTS was not possible under the original federal project scope and it demonstrates the valuable role MEOPAR can play for the federal government.

International Connections

MEOPAR developed a lead role internationally as well, and is now working closely with DFO to coordinate and implement the Canadian response to a new transatlantic research alliance focussed on the Atlantic Ocean and the European Union's (EU) Horizon 2020 research funding program. To this end, MEOPAR is developing an agreed-upon strategy for Canadian Atlantic Ocean observations and has joined a large European research consortium with the potential to play a key role in facilitating Canadian involvement in Horizon 2020.

Workshops With Stakeholders

MEOPAR hosted a number of workshops across the country, attracting stakeholders from diverse backgrounds. These workshops looked at areas of concern such as increased marine traffic in Saint John, NB and the Strait of Georgia, BC or the risk of oil spills in Halifax, NS, and sought to determine the needs of end-user communities.

1 Strait of Georgia Marine Hazards Workshop

This workshop was the first of its kind for MEOPAR and launched stakeholder engagement for MEOPAR's **Building a Network of Fixed Coastal Observing and Forecast Systems** project on the West Coast. Discussion centered on the need for more collaboration and specific tools for addressing marine hazards. A common theme was that an active, up-to-date, central resource portal linking into existing data such as predicted tides, winds, waves, and sea level estimates would be very helpful. Immediately following the workshop, the MEOPAR research team convened to discuss what they had heard, and how this input could help shape MEOPAR research efforts, and priority research gaps to be addressed. MEOPAR's researchers look forward to developing further dialogue and collaboration with the workshop participants and other stakeholder groups in coming years.

2 Port of Saint John (PSJ) Marine Risk Workshop

The purpose of this workshop was two-fold: first, to introduce the newly-established MEOPAR research network to potential investigators and other stakeholder groups in the Saint John area; and second, to hear from stakeholders regarding their related interests and research needs surrounding PSJ risks. A broad range of risks were identified and grouped; existing research into these areas was presented, and gaps identified. Future collaborations can: address gaps in data availability and continuity for ecosystems, fisheries, and water quality, amongst other things; develop new and better models for PSJ processes; build tools that can be used to inform business and other operational decision-making.

Strait of Georgia Marine Hazards Workshop, Vancouver, BC – June 2013

Port of Saint John Marine Risk Workshop, Saint John, NB – October 2013

Strait of Georgia Oceanography Workshop, Vancouver, BC – January 2014

Halifax Harbour Oil Spill Modelling & Response Workshop, Halifax, NS – February 2014

MEOPAR Data Management & Glider Workshops, Montreal, QC – March 2014

3 Strait of Georgia Oceanography Workshop

This workshop was co-sponsored by MEOPAR, the University of British Columbia's Earth, Ocean, and Atmospheric Sciences Department, and Ocean Networks Canada. The workshop attracted 40 participants and included a series of short presentations, discussions, and several break-out working groups focused on specific issues, research collaborations, and observing systems. One of the questions addressed was "what might a coordinated observation program look like and where and when might it be implemented in 2015?"

4 Halifax Harbour Oil Spill Modelling & Response Workshop

This workshop was held to build connections between regional organizations and researchers who share an interest in improving stakeholders' ability to manage and respond to marine risks, focusing on oil spills in particular. Comments and suggestions included the need for more real-time data and information, data with larger spatial coverage, and higher accuracy to reduce data gaps. MEOPAR could play a key role by working on topics including risk assessment; creating models; and reducing the operational gap between oil spill modelling and response.

5 MEOPAR Data Management & Glider Workshops

This workshop was organized by MEOPAR's Observation Core and brought together a large number of partners engaged in the management of data derived from ocean observation. This included representatives from DFO and a number of major research networks including Ocean Networks Canada, ArcticNet, the St. Lawrence Global Observatory, SmartAtlantic, the Ocean Tracking Network and others. The workshop represented one of the largest gatherings of ocean research groups ever held in Canada and included discussions with representatives of data management groups in Europe and the USA (via videoconference). The workshop identified a number of pressing issues related to the organization and capacity for management of ocean-related data and agreed common data management standards and practices are a prerequisite for building a national network of ocean observation activities. The data workshop led to the formation of a Canadian Community of Practice for Ocean Data Management.

A second Observation Core workshop focussed on establishment of a national approach towards management and operation of an increasingly-used ocean observation platform: namely sea gliders. These low-power, high-endurance autonomous vehicles are used by university and government-based researchers across the country. The workshop provided an opportunity for exchange of technical expertise and information between the various groups, and identification of ways in which the various groups could work more effectively together to improve data quality and data management, logistics and best practices and coordination of effort. The workshop participants agreed to establish a voluntary consortium, Ocean Gliders Canada, to carry forward the ideas and plans developed at the workshop.

One of our industry partners, Port Metro Vancouver trades $184 billion in goods (based on 2013 cargo volumes) with more than 160 trading economies annually.

MEOPAR RESEARCH

MEOPAR's research is broad in scope, yet focuses on practical applications: it bridges weather and climate time scales; it couples physical, biological and socio-economic aspects of the marine environment; it provides a framework for ocean observers to work with modellers; it brings together natural and social scientists to solve real-life problems facing multiple groups living and working in the marine environment.

MEOPAR's researchers study marine hazards arising from:

- Weather and climate change, e.g. storms, coastal erosion due to waves
- Chemical and biological change, e.g. ocean acidification
- Geophysical events, e.g. tsunamis
- Direct human impacts, e.g. oil spills, ship accidents

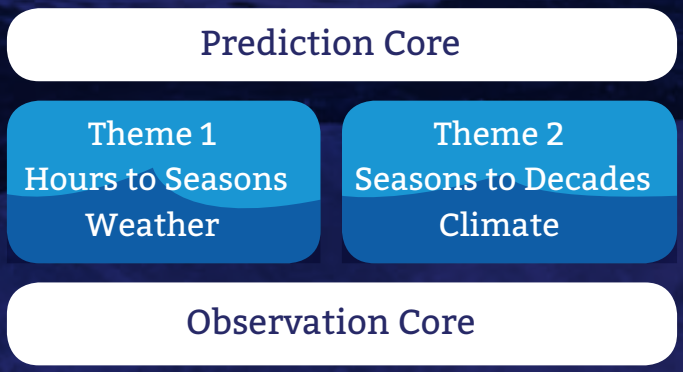
Responding to marine emergencies, and adapting to our changing climate, involve very different time scales, so MEOPAR's research projects are organized under two, main research themes:

Theme 1 - Hours to Seasons – Weather - focuses on prediction and rapid response to marine emergencies (e.g. storm surges, hurricanes, oil spills, accidents).

Theme 2 - Seasons to Decades – Climate - deals with longer-term predictions and impacts (sea level rise, ocean acidification, changing frequency of adverse events).

Each theme has large, multi-disciplinary, integrated projects that bring together researchers and students from across the country, with diverse expertise in collecting and analyzing observations, modelling and data assimilation, risk analysis and/or vulnerability mapping, etc.

MEOPAR's research themes and their projects are supported by two cores: the Prediction Core and Observation Core, which share and optimize use of personnel, software, technical developments, hardware, and databases across the network. The cores also facilitate knowledge exchange and transfer between projects.



MEOPAR began with four projects (two per theme) early in 2013. MEOPAR's first Open Call for proposals resulted in the addition of three new projects in 2013-14. We now have active projects in all three of Canada's oceans, as well as the Gulf of St. Lawrence. As the fiscal year closed, a second, much larger Open Call for Proposals was progressing well. Up to $4 million may be awarded to new projects by the end of 2014, which could commit the bulk of our research budget for MEOPAR's first NCE funding cycle.

MEOPAR Research

Theme 1: Hours to Seasons - Weather

Hours to Seasons focuses on prediction and rapid response to marine emergencies (e.g. storm surge, hurricane).

As of March 2014, MEOPAR's research portfolio consists of the following projects:

1.1 A Re-locatable Coupled Atmosphere-Ocean Prediction System

Dr. Harold Ritchie,
Environment Canada/Dalhousie University

Dr. Ritchie and his co-investigators are developing a re-locatable forecast system that can be used within hours of a marine emergency (such as a search and rescue incident or oil spill) anywhere along Canada's coastline. This system will produce high-resolution, short-term forecasts of variables like wind, sea fog, sea level, waves and currents; be able to track plumes of hazardous material from a marine wreck; and provide rapid appraisal of socio-economic risks to the environment and coastal communities. Through being easily and quickly re-locatable and providing this range of predictions, better decisions can be made and incorporated into emergency response plans. Ultimately, this rapidly deployable prediction system will be transferred to Environment Canada for operational use.

1.2 Building a Network of Fixed Coastal Observing and Forecast Systems

Dr. Jinyu Sheng,
Dalhousie University

Dr. Susan Allen,
University of British Columbia

Dr. Sheng and Dr. Allen are leading a group of investigators building the basis for an integrated observation and prediction system for Halifax Harbour, NS and the southern Strait of Georgia, BC. This project will transform observations into useful products (e.g., forecasts of sea level, waves, currents, biogeochemical properties) to support multiple users (e.g., port authorities, municipalities, oil and gas sector).

1.2 Strait of Georgia Indicators and Impact Scenarios

Dr. Stephanie Chang, University of British Columbia

Dr. Chang is looking at the vulnerability of coastal communities to marine hazards (earthquake, flooding, etc.) and creating a tool to share MEOPAR hazard information to help those communities plan and react. Using the Strait of Georgia, BC, as a model, Chang is developing an interactive platform, Sea-Link'D, which allows communities with similar disaster vulnerability characteristics to share lessons learned and resources to develop more effective preparedness plans. Indicators have been established to help communities identify others who face similar risks, and learn from those who have tested relevant solutions. The platform will be linked to existing MEOPAR observation and prediction systems to provide marine hazard information, and will be used by West Coast (and eventually East Coast) communities.

1.3 Improving Marine Drift and Dispersion Forecasts

Dr. Dany Dumont, Université du Québec à Rimouski

Dr. Dumont and his team are examining ways to improve the forecasting of drifting objects and substances at the ocean's surface.

This will lead to improved emergency response(s) to hazardous marine situations like oil spills and lost ships in Canada's harsh, ice-infested coastal areas. The movement of surface water and sea ice is challenging to observe and model, so Dumont is combining new and old techniques including satellites, small boats, drifters, buoys, ice canoes, high-resolution time-lapsed cameras, and local knowledge.

Improved models will better predict the movement of sea ice, and help improve the protocols used to protect people and the environment.

Dr. Dany Dumont (Université du Québec à Rimouski) and his team are: combining innovative models and observations, **(their vision)** of seasonally ice-infested waters, **(their peculiarity)** to improve surface drift forecasts, **(their goal).**

Many sea/ice forecasting systems rely on data that work for weather forecasting, but not for shipping or other operations in ice-infested waters.

1.4 Improved Sea Ice Forecast Through Classification and Assimilation of SAR Imagery

Dr. Andrea Scott, University of Waterloo

Accurate information about sea ice conditions is critical for weather forecasting and for safe operations of industries such as fishing, shipping, and oil exploration in Canadian waters. Presently, much of the sea ice data comes from satellites (passive microwave sensors). The spatial resolution of these sensors may be sufficient to provide data for weather forecasting, but the resolution is too low for operations in ice-infested waters. Dr. Scott is developing automated methods to assimilate data from synthetic aperture radar (SAR) sensors, which provide higher resolution information about the sea ice state.

MEOPAR Research

Theme 2: Seasons to Decades - Climate

Longer-term predictions and impacts (sea level rise, ocean acidification, changing frequency of adverse events).

2.1 Climate Change and Extreme Events in the Marine Environment

Dr. Bill Merryfield, Environment Canada/University of Victoria

Dr. Greg Flato, Environment Canada/University of Victoria

Dr. Merryfield and Dr. Flato are working to quantify risks associated with changes in the physical properties of the marine atmosphere and ocean (e.g. extreme wind, waves, etc.) The goal is to better predict the likelihood and intensity of extreme events, and identify issues related to the fishing industry and coastal communities.

2.1 Marine Applications and Downscaling of Seasonal Climate Predictions

Dr. Bill Merryfield, Environment Canada/University of Victoria

Dr. Merryfield is evaluating how Environment Canada's seasonal climate forecasts can be applied to marine environmental prediction. This includes assessing forecasts of ocean temperatures below the surface, and developing methods to downscale seasonal predictions to a 25 km resolution.

2.1 Coastal Storm Activity

Dr. Francis Zwiers, University of Victoria

Dr. Zwiers and his team are analyzing our ability to simulate and predict severe coastal storms. They are evaluating storm activity records on both coasts and will study the predictably of seasonal variations in storm activity.

They are also assessing the ability of the latest climate models to simulate "weather bombs", the rapidly intensifying storm systems that are often associated with extreme marine hazards. Results show that most models underestimate bomb frequency, wind intensity and spinning motion. Zwiers' goal is to understand what causes these model biases, to appropriately account for them when interpreting results at the smaller scales that are relevant to those working in the marine environment, and when projecting future storm activity. This understanding should also help to develop the potential to forecast seasonal variations in storm activity.

More precise prediction of the frequency and intensity of weather bombs will be extremely useful for the shipping and fishing industries, search and rescue operations, and coastal communities.

2.1 Estimation of Extreme Wave Statistics Off the East Coast of Canada and Their Future Change

Dr. Jinyu Sheng, Dalhousie University

Dr. Sheng is improving the model used to predict extreme waves in the northwest Atlantic Ocean by downscaling the resolution. By using modified wind data from Hurricane Juan (2003), he's improving the accuracy of the wave model. The results will better forecast the future severity of waves in extreme weather conditions like hurricanes and tropical storms, allowing shipping, fishing, and other coastal stakeholders to better prepare.

30yr A 30-year wave simulation for the northwest Atlantic is now complete. The accuracy of the model has been improved using information from Hurricane Juan.

2.1 Assessing and Reducing Risk and Vulnerability to Extreme Events in Newfoundland and Labrador Fishing by Engaging Stakeholders and their Knowledge

Dr. Barbara Neis,
Memorial University

Dr. Neis and her team are working to improve the occupational health and safety conditions in the fishing industry that are affected by severe marine weather and environmental change. By engaging stakeholders in the Newfoundland and Labrador commercial fishing industry and their coastal communities, this project will document, map, and assess the risk of injury and fatality associated with extreme events by season, species, gear and fleet sector, and region. The results could improve risk reduction strategies and resilience systems while reducing the industry's vulnerability.

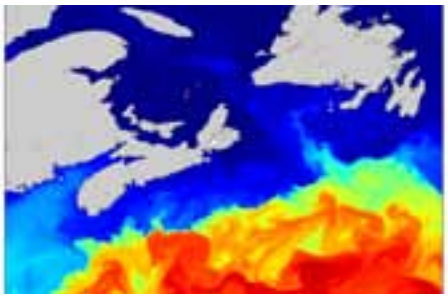
2.1 Adapting to Climate Change Risks: Planning and Policy in Municipalities

Dr. Gordon McBean,
University of Western Ontario

Dr. McBean and his team are evaluating municipal action plans for reducing risks due to climate change. A major focus is Nova Scotia's Municipal Climate Change Action Plans (MCCAP); each NS municipality has developed a plan to outline how they will adapt to climate change and prepare for associated hazards including severe weather, storm surges, and sea level rise. As NS is the only province in Canada to mandate MCCAP, this provides an excellent opportunity for a comparative analysis of the planning and policies of coastal communities. A second focus is action plans of two communities in coastal BC. Findings from these analyses will help improve the ability of government, industry, and coastal communities to prepare for the effects and impacts of climate change.

2.2 Biogeochemical Projections Under a Changing Climate

Dr. Katja Fennel,
Dalhousie University



Oceans across the globe are warming, becoming more acidic, and losing oxygen. These biogeochemical changes could have severe impacts on local marine ecosystems.

Dr. Fennel's research is looking at ways to better quantify and project how marine species in Atlantic Canada will respond to these environmental changes over the coming decades and century. Through regional downscaling of global models to a high-resolution regional model specific to the East Coast, the more accurate findings can be shared with stakeholders. These specific models can also help when developing appropriate ocean laws and policies to protect the marine environment.

Globally, oceans are warming, becoming more acidic and losing oxygen. We need to observe and predict these changes, to better understand potential effects on marine plants and animals.

2.3 User-Driven Monitoring of Adverse Marine Weather States in the Eastern Beaufort Sea

Dr. David Atkinson, University of Victoria

The social, economic, and political advancement of the Northwest Territories is now focussing on oil and gas, mining, and tourism development. As a result, accurate, time-sensitive information about weather, sea ice, and waves is critical to the success of these industries. Sea ice prevents large ocean waves from forming; a reduction in sea ice suggests that larger waves are to be expected. This could limit travel for barges that can only pull into a limited number of ports, as well as increase coastal erosion for Northern communities. Dr. Atkinson is identifying economic activities, asking which large-scale weather patterns are of greatest concern, exploring how specific weather events impact stakeholders, and assessing how to provide access to accurate information in the Eastern Beaufort Sea region. Atkinson is hoping to provide communities and companies with the accurate information they need to reduce risk and enhance the safety of their operations.

MEOPAR Research
Observation Core

Observations underpin identification and characterization of natural hazards, guidance and testing of model development, the assessment of social vulnerability and the operation of early warning and prediction systems. The Observation Core ensures that quality-controlled observational and model-derived data are accessible in appropriate formats to meet the model validation, data assimilation and assessment needs of our investigators and projects. Technological developments supported by the Observation Core are also being tested and integrated within MEOPAR's projects.

The Observation Core is building on, and integrating, a national capacity to deal effectively with marine emergencies and risk. An important function of the Observation Core is the work to improve the exchange of expertise, technological developments and data across Canada, including new technologies and expertise that will outlast, and extend beyond, MEOPAR and its projects.

As of March 2014, MEOPAR's Observation Core activities include:

DORADO Autonomous Vehicle Development

Dr. Doug Wallace,
Dalhousie University

Dr. Wallace and his team are working on modifying the existing Canadian Autonomous Surface Vehicle, DORADO, presently used for mine countermeasures, into a platform for conducting rapid surveys of the marine environment. DORADO will have the ability to assist, unattended, with new ocean experiments like rapid environmental assessments, oil dispersion experiments, and as a model for search and rescue. The project is a collaboration with Defence Research and Development Canada and supports MEOPAR's re-locatable coupled atmosphere-ocean prediction system project (Project 1.1).

Coastal Ocean Dynamics Application Radar (CODAR) Halifax

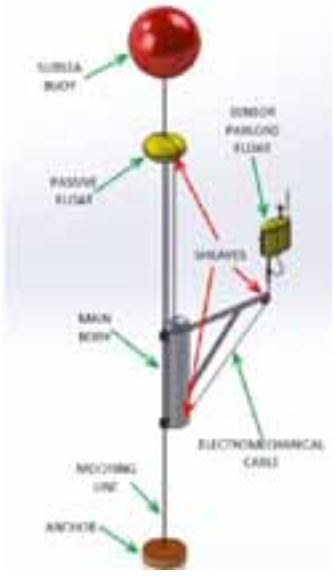
Dr. Doug Wallace,
Dalhousie University
Dr. Brad deYoung,
Memorial University

Working in partnership with Dalhousie and Memorial universities, Defence Research and Development Canada and OEA Technologies, Dr. deYoung and his co-investigators are focused on new ways to measure the currents and waves in the Halifax Approaches. CODAR will contribute to an Atlantic Scotian Shelf observation system, as well as support other MEOPAR projects and outside stakeholders.

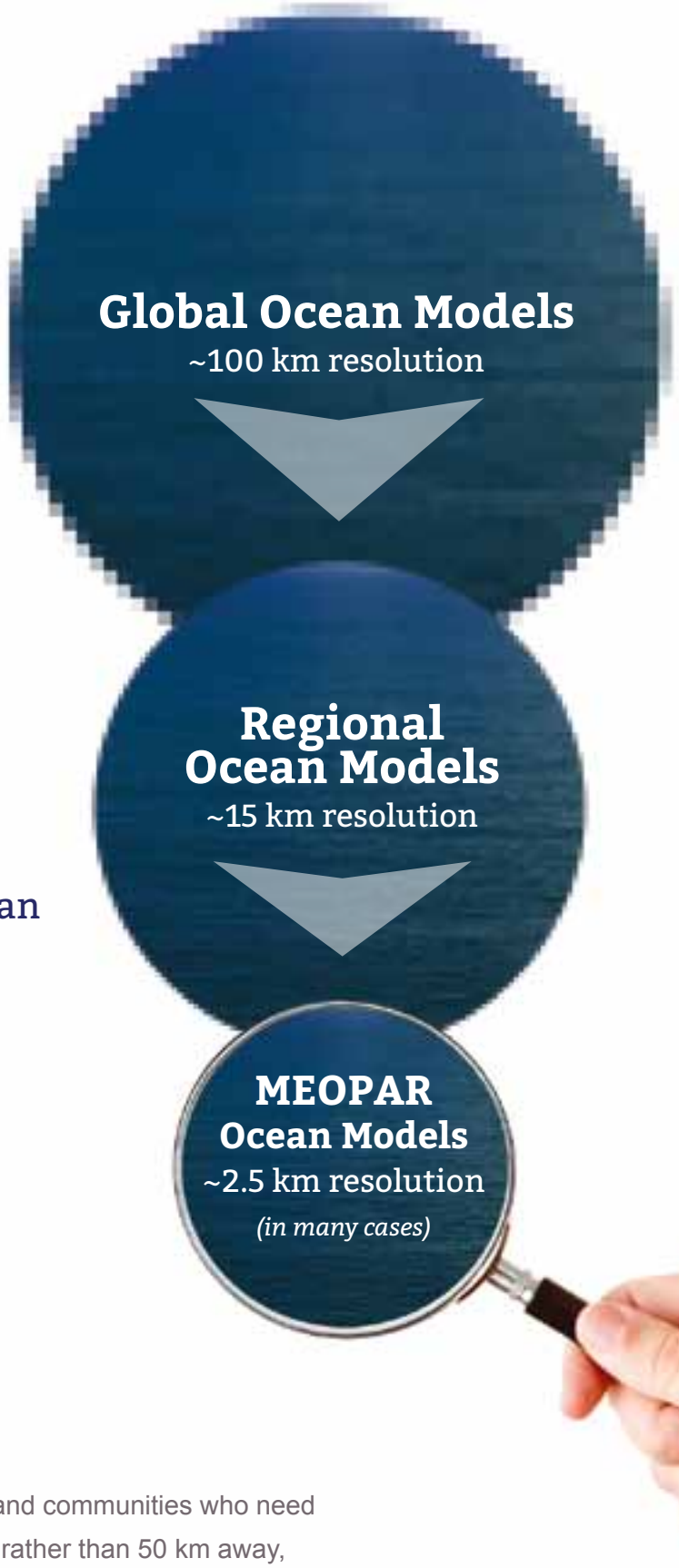
Tethered Vertical Profiler

Dr. Brad deYoung,
Memorial University

Dr. deYoung and his team are developing and testing a tethered profiler for deployment at marine emergency sites to support the re-locatable model (Project 1.1). Working with the APEX profiler, an autonomous drifting profiler used to measure subsurface currents and take profile measurements, the team is focusing on developing a way to tether APEX to a fixed mooring so it can move vertically and gather data without drifting away from the site altogether.



MEOPAR researchers use the latest ocean models, and work to downscale them, which includes testing and correcting them to make sure they are still valid and accurate.



Within MEOPAR:

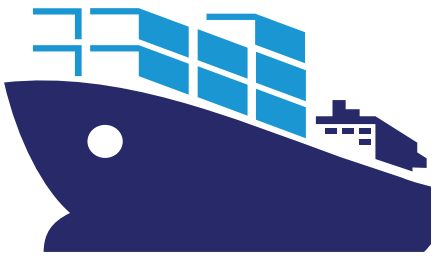
People who observe the ocean

+

Ocean modellers

=

Better prediction



This is important for container ship pilots and communities who need to know what will happen where they are, rather than 50 km away, and when. How strong will the wind be? How big will the waves be tomorrow morning?

MEOPAR Research
Prediction Core

MEOPAR's Prediction Core is improving models to make them more specific to a region by downscaling; more precise using data assimilation to support of MEOPAR projects; and more interpretive of the risks and socioeconomic impacts involved by establishing baseline indicators. These models help predict how often and how big extreme events like wind, storm surges, and waves will be, due to climate change. Transferring this information and sharing expertise helps MEOPAR's projects, but also helps communities, government, and industries plan and react to potential marine hazards of all kinds. More accurate and smaller-scale models help the government, the private sector, and coastal communities to better prepare and plan for how they will respond to emerging risks linked to our changing ocean.

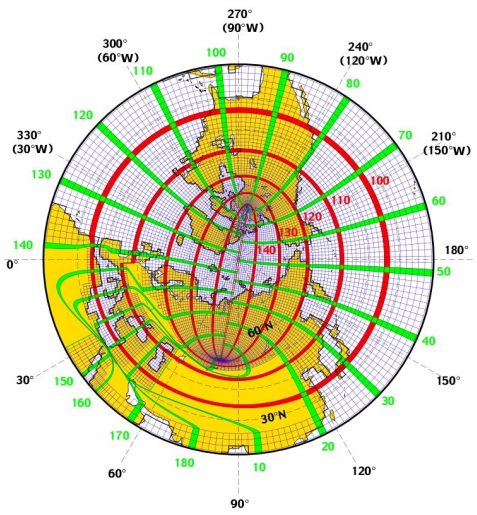
As of March 2014, MEOPAR's Prediction Core activities include:

Downscaling from Large to Small Spatial Scales

Dr. René Laprise,

Université du Québec à Montréal

Owing to their huge computational load, global climate models must use coarse grids that prevent adequate resolution of several key regional processes. A common requirement of several MEOPAR projects is the need to downscale from global models to a regional/local scale. Dr. Laprise's research centres on downscaling the results of large-scale, coupled, global models to relatively small spatial scales.



Support for the NEMO Model

Dr. Youyu Lu,

Fisheries and Oceans Canada/
Dalhousie University

When trying to predict the dynamic condition of the ocean, MEOPAR's projects rely heavily on a forecast system/model called Nucleus for European Modelling of the Ocean (NEMO). Dr. Lu is working with NEMO to make it more accurate and applicable for MEOPAR and Canada (e.g. using regional data, incorporating sea-ice variability, coupling it to our regional climate, etc.). His expertise provides technical support to adjust the model and then test it to assess its performance and accuracy.

Climate Change and Marine Risk

Dr. Ronald Pelot,

Dalhousie University

Dr. Pelot is developing a model to determine the relationship between the frequency, strength and location of extreme weather conditions leading to marine accidents in Atlantic Canada. This model will also help quantify how climate change may affect storm patterns and alter the risk to marine activities. By identifying the weather conditions associated with fishing incidents, understanding the connection between those conditions and fishing incidents, and linking extreme weather conditions with fishing traffic patterns, tools can be developed to predict future danger zones and their risk levels on marine activities. Questions addressed include: When is it risky to go out in a boat? How often do such adverse conditions occur? How can we prevent accidents through better prediction and communication?

Programs

GENERATING KNOWLEDGE

Proposal Calls

Research Program

BRINGING PEOPLE TOGETHER

Partnership Program

Partnership Workshop Program

TRAINING

Research Development

Early-Career Faculty Development Program

Generating Knowledge

Proposal (Open) Calls

MEOPAR has scheduled opportunities for researchers to propose additional MEOPAR-funded projects that address our strategic vision and objectives.

For our first Open Call, MEOPAR approved three new projects in 2013-14. With up to $4 million of funding available, MEOPAR launched a second Open Call in the fall of 2013. Increased emphasis was placed on how these research projects will benefit Canadian industry and ocean community groups. Over 40 letters of intent were received, and 14 projects were invited to submit full proposals by April 2014. Several proposals involve new university partners and new researchers; we look forward to announcing the results in summer 2014.

Bringing People Together

Partnership Program

Promotes the involvement of private sector partners, municipalities and NGOs within MEOPAR by providing matching funds. Integrates external partners into existing projects and helps to develop new research projects.

Partnership Workshop Program

Up to $15K of workshop funding to help increase partnerships and expand our reach and impact with organizations including:

- All levels of government
- The insurance industry
- The oil and gas industry
- Marine technology firms
- Coastal communities
- Non-governmental organizations
- Academia

Training

Researcher (MEOPeer) Development

Supports the academic, research and/or career development needs of MEOPeer-HQP researchers. Funding contributes to expenses for a MEOPeer to attend a professional skills training and/or career development session or event.

Early-Career Faculty Development Program

Scheduled to be launched in 2014. Support funding for early-career (within five years of appointment) tenure-track professors at Canadian universities. Priority is for topics that link natural sciences results with socioeconomic impacts and/or policy and regulation. Up to $100K for 2 years.

Expansion of our Research Program

MEOPAR completed its first Open Call for Proposals in 2013-2014; our network welcomed three new projects at the University of Victoria, the University of Waterloo and l'Université du Quebec à Rimouski (UQAR), with UQAR joining as a new partner university. In the fall of 2013, MEOPAR launched a larger, second Open Call valued at up to $4 million. Over 40 letters of intent were received, a total of 14 full proposals were requested, and by the close of the fiscal year, the process was moving towards the proposal review stage.

MEOPeers

MEOPeers are an important part of how we share our research results

The goal of MEOPAR's training program is to expose our Highly Qualified People (HQPs or MEOPeers), hired by our network's research projects, to network-specific, diverse training and learning experiences that they would not receive from their home universities. Training includes, for example, network-wide meetings, sharing via communities of practice, online research exchanges via Adobe Connect, social media, ocean literacy activities, etc.

MEOPAR's Training Co-ordinator was hired in mid-January 2014, and the first training event occurred in February 2014, with a national, two-day gathering of over 30 MEOPeers in Ottawa, ON.

This training workshop had three themes:

- Communication,
- Knowledge Mobilization, and the
- Researcher Development Framework.

Communication

Imagine this, you're a MEOPeer working on a fabulous research project that you know will have a big impact. Yet you're struggling to explain it to other students, your friends and those who could benefit from your research. That's where the session led by Leo Artalejo from National about how to communicate your research provided some pointers:

- Your research needs a story
- Your story needs to lead with the WHY
- Your WHY needs to be simple, sticky and shareable

- Leo Artalejo

Chief Storyteller and Senior Consultant, National

Knowledge Mobilization

By helping the MEOPeer trainee group gain the skills and practice they need, MEOPAR is helping facilitate knowledge mobilization.

Research is three things: what, so what, now what?

- Peter Levesque

Founder/President, Institute for Knowledge Mobilization

Researcher Development Framework

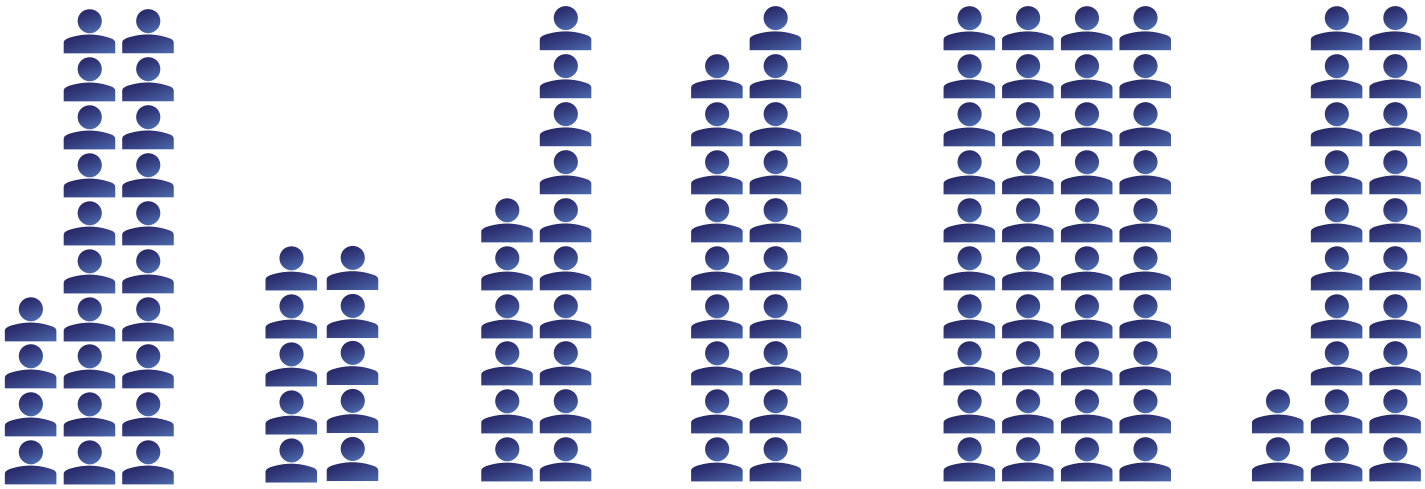
Alison Mitchell from ***vitae***, introduced MEOPeers to the Researcher Development Framework and helped them identify the knowledge, behaviour and attributes of successful researchers. The framework serves as a tool to help MEOPeers maximise their potential and get the most out of their career by developing these attributes.

Online Needs Assessment

In collaboration with two MEOPeers, an online needs assessment was written and completed by the MEOPeers. The results were shared with the MEOPeers and from them, the MEOPAR training plan was developed and features a variety of in-person and online training and professional development activities.

MEOPAR works closely with our end-user communities such as federal departments, Research Impact, industry and other Networks of Centres of Excellence to collaborate on training and to ensure our research results are applied in operational settings.

By the end of 2013-14, 131 HPQs had joined MEOPAR at the following stages of their academic careers:



131 HPQs represents more than a 400% increase in HQP over the previous year!

Communications

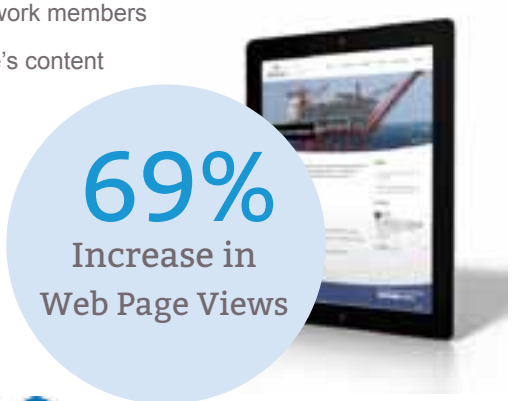
Increasing awareness and understanding about who we are, what we do, and our impact are crucial to our success. MEOPAR has actively developed a consistent brand and has been working to increase our visibility.

Website

MEOPAR's web site is a source of up-to-date information and a toolbox for our network members and partners. Traffic to our site is increasing and we are working to improve the site's content and architecture to better serve everyone's needs.

MEOPAR Web Site Page views

March 2013	March 2014
2303	3904



Twitter

Google Analytics confirmed that in the past year, 18 to 34 year-olds accounted for 61% of our web traffic. Given this demographic, the MEOPAR Twitter feed @MEOPAR_NCE became our first priority and was launched in late February 2014. In our first month (March), conversations with our 75 new followers potentially reached over 3,000 people.

LinkedIn

Our MEOPAR LinkedIn company page was launched in March 2014. An article we posted about the Polar Data Catalogue quickly reached 254 impressions. Interestingly, our demographics on LinkedIn show that 63% of our viewers there are in senior management positions.

OceanViewer.org

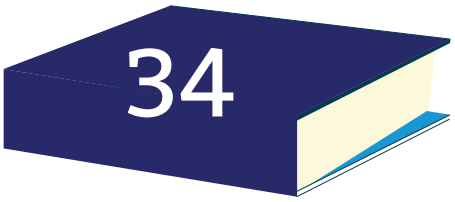
A key MEOPAR-supported knowledge mobilization tool is the OceanViewer website (www.oceanviewer.org). OceanViewer is a data aggregator – pulling publicly available ocean data from a variety of sources and displaying it in a simple format. OceanViewer continues to evolve and involves many co-op and volunteer undergraduate students. There are many opportunities for this site to act as a knowledge transfer platform and MEOPAR is further integrating OceanViewer into our research activities.

Communications activities include;

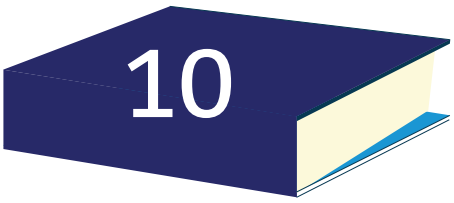
- Preparation of a full communications plan
- Creation of our Twitter feed (please follow us @MEOPAR_NCE)
- Creation of a LinkedIn corporate page
- Updates to the MEOPAR website
- A new logo
- Creation of an electronic newsletter MEOPAR News

Communications

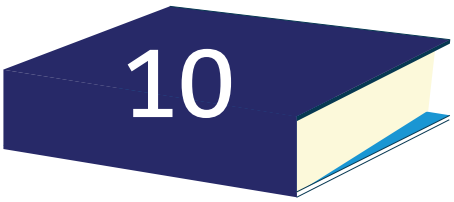
Publications



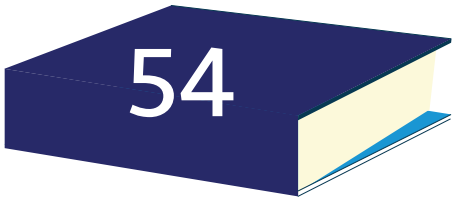
Peer-Reviewed Publications



Non-Peer-Reviewed Publications



Specialized Publications



Total All Publications

APPENDIX 1 - STAFF

Dr. Douglas Wallace
Scientific Director

902-494-4132
douglas.wallace@dal.ca

I direct MEOPAR's Research Program and ensure our projects are multi-disciplinary, multi-institutional and world-class. I'm also responsible for seeking new and exciting partnership opportunities both domestically and abroad.

Dr. Ronald Pelot
Associate Scientific Director

902-494-6113
ronald.pelot@dal.ca

Alongside Doug, I help direct MEOPAR's research program and implement MEOPAR's various funding programs. I'm responsible for organizing innovative workshops and facilitating new partnership opportunities.

Mr. Neil Gall
Executive Director

902-494-4386
neil.gall@meopar.ca

I keep all the plates spinning and all the balls in the air. My responsibility is to make sure that funding flows smoothly, deliverables are delivered and milestones are met. I serve as the go-between for the Board of Directors, the researchers, Dalhousie and other university members and external partners.

Ms. Janet Marshall
Executive Assistant

902-494-4384
janet.marshall@meopar.ca

I answer questions. I am dedicated to assisting the Executive Director and the MEOPAR team in an administrative capacity. I also keep the treat jar filled for visitors and create a warm and welcome atmosphere in the office.

Ms. Catherine Vardy
Communications Manager

902-494-4389
catherine.vardy@meopar.ca

I promote MEOPAR. I explain things. I help create "show and tell" tools and messages for the interesting work that MEOPAR scientists and students do. I use my skills as a communicator, interpreter and science geek.

Ms. Alison Maunder
Communications Officer & Events Manager

902-494-4387
alison.maunder@meopar.ca

I bring people together. My responsibility is to plan and execute MEOPAR events across Canada. From workshops and one-day seminars to multi-day scientific conferences, I make sure our MEOPeople are well fed, well rested and on-task.

Ms. Tanya Crawford
Training & Research Coordinator

902-494-4385
tanya.crawford@meopar.ca

In consultation with our MEOPeers, I research, plan, implement and assess the MEOPAR Training and Research Program that enables the MEOPeers to become world class marine researchers and practitioners.

Ms. Julie Atienza
Financial Controller

902-494-4388
julie.atienza@meopar.ca

I tell a story using numbers. I make sure that every dollar MEOPAR spends is aligned with our mandate. Anything that has a $ attached to it gets my attention.

APPENDIX 2 – BOARD AND COMMITTEES

Dr. Robert Walker (Chair)
President & CEO, Atomic Energy of Canada Limited

Dr. Pierre Baril
President, Office of Public Hearings on the Environment

Mr. Brian Flemming
Counsel, McInnes & Cooper

Mr. Tony Hall
Chief Executive Officer Welaptega Marine

Dr. Richard Marceau
Vice-President Research, Memorial University

Dr. Rachael Scarth
Associate Vice-President Research Operations, University of Victoria

Mr. Scott Tessier
Chair & CEO, Canada-Newfoundland and Labrador Offshore Petroleum Board

Dr. Douglas Wallace
Scientific Director, MEOPAR Dalhousie University

Dr. Martha Crago (Vice-Chair)
Vice-President Research, Dalhousie University

Mr. David Fissel
Chair & Senior Scientist, ASL Environmental Sciences

Mr. David Gillis (Observer)
Assistant Deputy Minister, Fisheries and Oceans Canada

Dr. Charles Lin
Director General, Atmospheric Science & Technology Directorate, Environment Canada

Mr. Michael Roberts
President, Optimum Talent Atlantic-Rosson & Gordon

Mr. Rick Schwartzburg (Observer)
Senior Program Manager, Networks of Centres of Excellence Program

Ms. Paule Têtu
Assistant to the Vice Rector and Director of the Office for Research Internationalization and Partnerships Université Laval

Dr. Wendy Watson-Wright
Assistant Director General & Executive Secretary, UNESCO Intergovernmental Oceanographic Commission

RESEARCH MANAGEMENT COMMITTEE

Dr. Véronique Bouchet
Environment Canada

Dr. Stephanie Chang
University of British Columbia

Dr. Brad deYoung
Memorial University

Ms. Patricia Docking
Independent

Ms. Helen Joseph
Independent

Dr. René Laprise
Université du Québec à Montréal

Dr. Barbara Neis
Memorial University

Dr. Ronald Pelot
MEOPAR & Dalhousie University

Dr. Jinyu Sheng
Dalhousie University

Dr. Keith Thompson
Dalhousie University

Dr. Douglas Wallace
MEOPAR & Dalhousie University

Dr. Francis Zwiers
University of Victoria

INTERNATIONAL SCIENTIFIC ADVISORY COMMITTEE

Dr. Stephen de Mora (Chair)
Chief Executive, Plymouth Marine Laboratory

Dr. Susan Cutter
Director, Hazards & Vulnerability Research Institute (University of South Carolina)

Mr. Paul Holthus
Founding CEO & President, World Ocean Council

Dr. Jan Newton
Executive Director, NANOOS

Dr. Peter Schlosser
Deputy Director & Director of Research, Earth Institute (Columbia University)

Our Researchers

DALHOUSIE UNIVERSITY

University / Researchers	Project	MEOPeers
John Cullen	Observation Core	
Katja Fennel	Biogeochemical Projections under a Changing Climate	Laura Bianucci Katie Brennan Liuqian Yu Rui Zhang
Youyu Lu (DFO)	Prediction Core	Jean-Phillipe Paquin
Haibo Niu	A Re-locatable Coupled Atmosphere Ocean Prediction System	
Ronald Pelot	Prediction Core Building a Network of Fixed Coastal Observing & Forecast Systems Climate Change & Extreme Events in the Marine Environment	Hilario Calderon Sara Rezaee
William Perrie (DFO)	Building a Network of Fixed Coastal Observing & Forecast Systems	Mike Casey Yujuan Sun
Hal Ritchie (EC)	A Re-locatable Coupled Atmosphere Ocean Prediction System	Jean-Pierre Auclair Fatemeh Chegini
Jinyu Sheng	Building a Network of Fixed Coastal Observing & Forecast Systems Climate Change & Extreme Events in the Marine Environment	Wei Chen Lanli Guo Yi Sui Pengchang Wang
Helmuth Thomas	Biogeochemical Projections under a Changing Climate	Jonathan Lemay
Keith Thompson	Observation Core A Re-locatable Coupled Atmosphere-Ocean Prediction System	Anna Katavouta Tsubasa Kodaira Vasily Korabel Erica Rogers Fred Woslyng
David VanderZwaag	Biogeochemical Projections under a Changing Climate	Cecilia Engler-Palma Aaron Lemkow
Doug Wallace	Observation Core	Kareem Gawdat Diego Ibarra Chris L'Esperance

Our Researchers

University / Researchers	Project	MEOPeers
MCGILL UNIVERSITY		
Eric Galbraith	Biogeochemical Projections under a Changing Climate	David Carozza
Luc Fillion (EC)	A Re-locatable Coupled Atmosphere-Ocean Prediction System	Kao-Shen Chung
MEMORIAL UNIVERSITY		
Brad deYoung	Observation Core	Samantha Benton Joe Singleton
Ralf Bachmayer	Observation Core	
Joel Finnis		
Barb Neis	Climate Change & Extreme Events in the Marine Environment	James Shewmake
SAINT MARY'S UNIVERSITY		
Tony Charles	Observation Core	Barbara Paterson
UNIVERSITÉ DU QUÉBEC À MONTRÉAL		
René Laprise	Prediction Core Climate Change & Extreme Events in the Marine Environment	Pierre Dutrieux Philippe Lucas-Picher
UNIVERSITÉ DU QUÉBEC À RIMOUSKI		
Dany Dumont	Combining Innovative Models & Observations of Seasonally Ice-Infested Waters for Improving Surface Drift Forecasts	Marion Bandet Paul Nicot Simon St.Onge-Drouin
UNIVERSITÉ LAVAL		
Marcel Babin	Observation Core	Emmanuel Devred Eric Rehm
UNIVERSITY OF BRITISH COLUMBIA		
Susan Allen	Building a Network of Fixed Coastal Observing & Forecast Systems	Doug Latornell Kate LeSouef Ben Moore-Maley Nancy Soontiens
Stephanie Chang	Prediction Core Building a Network of Fixed Coastal Observing & Forecast Systems	Christopher Carter Rebecca Chaster Ashley Lowcock Shona van Zijll de Jong Jackie Yip
Rich Pawlowicz	A Re-locatable Coupled Atmosphere-Ocean Prediction System	Mark Halverson

Our Researchers

University / Researchers	Project	MEOPeers
UNIVERSITY OF OTTAWA		
UNIVERSITY OF VICTORIA		
David Atkinson	User-Driven Monitoring of Adverse Marine & Weather States in the Eastern Beaufort Sea	Laura Eerkes-Medrano
Jim Christian	Prediction Core	Cathy Reader
	Observation Core	Olivier Riche
Maycira Costa		Stephen Phillips
Ken Denman	Observation Core	Jeremy Krogh
Greg Flato (EC)	Climate Change & Extreme Events in the Marine Environment	Woo-Sung Lee
Bill Merryfield (EC)	Climate Change & Extreme Events in the Marine Environment	
Adam Monahan	Climate Change & Extreme Events in the Marine Environment	Johannes Gemmrich
Francis Zwiers	Climate Change & Extreme Events in the Marine Environment	Katie Pingree-Shippee
		Christian Seiler
UNIVERSITY OF WATERLOO		
Andrea Scott	Improved Sea Ice Forecasts Through Classification & Assimilation of SAR Imagery	Stephen Leigh
		Lei Wang
UNIVERSITY OF WESTERN ONTARIO		
Gordon McBean	Observation Core	Jonathan Raikes
	Climate Change & Extreme Events in the Marine Environment	Brennan Vogel

Financial Statements

MEOPAR Incorporated

March 31, 2014

Contents

Independent auditor's report

Grant Thornton LLP
Suite 1100
2000 Barrington Street
Halifax, NS
B3J 3K1

T (902) 421-1734
F (902) 420-1068
www.GrantThornton.ca

To the Board of Directors of MEOPAR Incorporated

We have audited the accompanying financial statements of **MEOPAR Incorporated**, which comprise the statement of financial position as at March 31, 2014, and the statements of revenue, expenses and net assets for the year then ended, and a summary of significant accounting policies and other explanatory information.

Management's responsibility for the financial statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with accounting standards for not-for-profit organizations, and for such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditor's responsibility

Our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit in accordance with Canadian generally accepted auditing standards. Those standards require that we comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion, the financial statements present fairly, in all material respects, the financial position of MEOPAR Incorporated as at March 31, 2014, and the results of its operations for the year then ended in accordance with accounting standards for not-for-profit organizations.

Grant Thornton LLP

Halifax, Canada
September 11, 2014

Chartered Accountants

MEOPAR Incorporated
Statements of revenue, expenses and net assets

Year ended March 31	**2014**	2013
Revenue		
Government assistance – Natural Sciences and Engineering Research Council of Canada (NSERC)	**$ 3,732,610**	$ 1,532,441
Research grants	**3,098,600**	1,302,550
	634,010	229,891
Expenses -Admin Centre		
Board insurance	**12,293**	11,210
Contract personnel	**20,462**	54,245
Depreciation	**14,630**	2,349
Marketing and communications	**60,365**	-
Meetings and receptions	**8,402**	-
Miscellaneous	**13,342**	2,639
Office supplies and administration	**3,965**	-
Partnership program	**35,248**	-
Printing and publications	**4,241**	-
Professional fees	**18,248**	47,474
Research management	**47,769**	-
Salaries and benefits	**259,555**	77,831
Training and knowledge mobilization	**72,765**	-
Travel	**62,725**	34,143
	634,010	229,891
Excess of revenue over expenses	**$ -**	$ -
Net assets, beginning of year	**$ -**	$ -
Excess of revenue over expenses	**-**	-
Net assets, end of year	**$ -**	$ -

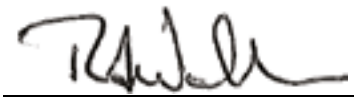
See accompanying notes to the financial statements.

MEOPAR Incorporated
Statement of financial position

March 31	**2014**	2013
Assets		
Current		
Receivable from Dalhousie University (Note 6)	**$ 6,175,959**	$ 4,467,263
HST receivable	**14,708**	4,418
	6,190,667	4,471,681
Capital assets (Note 3)	**12,281**	2,349
	$ 6,202,948	$ 4,474,030
Liabilities		
Current		
Accounts payable and accruals	**$ 26,989**	$ 22,461
Deferred revenue (Note 4)	**6,175,959**	4,451,569
	6,202,948	4,474,030
Net assets		
Unrestricted net assets	**-**	-
	$ 6,202,948	$ 4,474,030

Commitments (Note 5)

On behalf of the Board



_____ Director

See accompanying notes to the financial statements.

MEOPAR Incorporated
Notes to the financial statements
March 31, 2014

1. Authority and purpose

The Company was incorporated on February 17, 2012 under the Canada Corporations Act – Part II – as a not-for-profit organization. The Company provides funding to develop knowledge, tools, technology and highly qualified people through collaborative research.

2. Summary of significant accounting policies

These financial statements are prepared in accordance with Canadian Accounting Standards Board Part III: Accounting Standards for Not-For-Profit Organizations ("ASNPO").

Revenue recognition
The Company follows the deferral method of accounting for contributions, which include government grants.

Contributions which have external restrictions governing the types of activities they can be used to fund are deferred until such time as the actual spending on these activities is incurred. Consequently, unspent grants having restrictions will be recognized as revenue in future periods when the related expense is incurred, and until such time are recorded as deferred revenue.

Restricted contributions for the purchase of capital assets that will be amortized are deferred and recognized as revenue at the same rate of amortization as the related acquired capital assets.

Unrestricted contributions are recorded as revenue when received or receivable, provided the amount to be received can be reasonably estimated and collection is reasonably assured.

Capital assets
Capital assets are recorded at cost. Depreciation is provided on the straight-line basis over their estimated useful lives as follows:

Computer hardware	2 years

When a capital asset no longer has any long-term service potential to the Company, the excess of its net carrying amount over any residual value is recognized as an expense in the statement of revenues, expenses, and net assets. Any write-downs recognized are not reversed.

Use of estimates
The preparation of the financial statements in conformity with ASNPO requires management to make estimates and assumptions that affect the amounts of assets and liabilities and disclosure of contingent liabilities at the date of the financial statements and reported amounts of revenue and expenditures during the year. Certain of these estimates require subjective judgments by management that may be uncertain. These items include deferred revenue. Actual results could differ from those reported.

2. Summary of significant accounting policies (continued)

Financial Instruments
The Company considers any contract creating a financial asset, liability or equity instrument as a financial instrument, except in certain limited circumstances. The Company accounts for the following as financial instruments:

- Receivables
- Payables

A financial asset or liability is recognized when the Company becomes party to contractual provisions of the instrument.

Financial assets or liabilities obtained in related party transactions are measured at the exchange amount agreed to by the related parties except for those transactions that are with a person whose sole relationship with the Company is in the capacity of management, in which case they are accounted for in accordance with financial instruments.

The Company subsequently measures its financial assets and liabilities at amortized cost (less impairment in the case of financial assets).

For financial assets measured at cost or amortized cost, the Company regularly assesses whether there are any indications of impairment. If there is an indication of impairment, and the Company determines that there is a significant adverse change in the expected timing or amount of future cash flows from the financial asset; it recognizes an impairment loss in the statement of revenues, expenses and net assets. Any reversals of previously recognized impairment losses are recognized in operations in the year the reversal occurs.

Credit risk
The Company is exposed to credit risk that arises from receivables. Credit risk arises from the possibility that Dalhousie University will be unable to fulfill their obligations, as they hold in trust all funding received but not utilized to date.

3. Capital assets

			2014	2013
	Cost	Accumulated Depreciation	**Net Book Value**	Net Book Value
Computer hardware	$ 29,260	$ 16,979	**$ 12,281**	$ 2,349

4. Deferred revenue

	2014	2013
Balance – beginning of year	**$ 4,451,569**	$ 2,055,010
Contributions received from NSERC	**5,457,000**	3,929,000
Less: amounts recognized as revenue in year	**(3,732,610)**	(1,532,441)
Balance – end of year	**$ 6,175,959**	$ 4,451,569

5. Commitments

The Company has committed to provide funding of approximately $2,750,600 to participating institutions over the next fiscal year.

6. Related party transactions

The Company is related to Dalhousie University by virtue of the fact that the University is its host institution under the Networks of Centres of Excellence program.

Under an agreement between the Company and the host institution, the University provides accounting and administrative support services as well as office space without charge to the Company. The value of the in-kind contributions received by means of services, equipment and facilities in fiscal 2014 is estimated by Dalhousie to be $66,000 (2013 – $60,500). These contributions have not been recognized in the financial statements.

Receivable from Dalhousie University represents government contributions received, which are subject to NSERC eligibility requirements. The cash is held in trust by Dalhousie University in accordance with the Host Agreement.