

Report: POGO Industrial Liaison Council Activities 2016-2018

Stephen de Mora & Ralph Rayner
4 January 2018

Background

Interactions between POGO and industry had been a topic of discussion in breakout sessions at several Annual General Meetings, but accorded little attention intersessionally. The topic gained a higher profile in 2016 following the formation of a Working Group charged with developing a strategy to engage with marine industry; with action undertaken by a small committee subsequently termed the POGO Liaison Council. POGO provided financial support for the Working Group over a 2-year period.

The expectations of the Working Group were not well defined initially, but came into focus at the POGO Plymouth Meeting in 2017, whereby the expectation was to promote the value of ocean observations, especially as regards improved short-, middle- and long-term meteorological forecasting, to marine and terrestrial end user communities.

Membership

- Stephen de Mora (UK): *Co-Chair*
- Ralph Rayner (UK): *Co-Chair*
- Andy Steven (Australia)
- Jan de Leeuw (The Netherlands)
- Marck Smit (The Netherlands)
- Eduardo Balguerias Guerra (Spain)
- Yoshihisa Shirayama (Japan)
- Vikki Cheung (POGO); *Secretary*

Activities

The following activities were undertaken:

- In the course of 2 years, the POGO ILC held 9 meetings, mostly by teleconference.
- Compiled and maintained a list of international meetings that POGO ILC members were attending, with a view to taking the opportunity to promote POGO
- POGO Presentations were made at Oceanology International 2016 (London), Ocean Business 2017 (Southampton), IMarEST Conference (London), World Ocean Council 2017 (Halifax), and is planned for Oceanology International 2018 (London).
- The POGO Annual Meetings in 2017 & 2018 have / will have had dedicated plenary sessions to marine industry liaison.
- Invited Ralph Rayner (London School of Economics) and Paul Holthus (World Ocean Council) to the POGO Annual Meeting in Plymouth for discussions on interacting with marine industries.
- Marine companies were invited to exhibit and sponsor POGO Annual Meeting in Plymouth, and also in San Diego.
- Supported a session at the Blue Planet Symposium held at the NOAA Center for Weather and Climate on 31 May-2June 2017, dedicated to exploring the role of ocean observations in improved weather forecasting.
- Co-sponsored an IMarEST meeting held at the Royal Institution in London on 7 November 2017, entitled *Oceans of Knowledge* (see Appendix A for full programme) that highlighted the value of ocean observations for improving weather forecast models and the subsequent downstream benefits to end-users.
- Produced a generic PowerPoint presentation highlighting the potential of POGO for the marine and maritime industries can be made available to the POGO membership for use at appropriate venues.

At the kick-off meeting, the objectives were agreed to be firstly to form a bridge between POGO members and a range of industry sectors; and secondly to produce recommendations on how to promote and optimize collaborative interactions. The focus was on industries involved in either making better ocean observations (*e.g.* companies developing sensors) or developing better products and services from ocean observations. An expected outcome was to encourage industry to have advocacy role in promoting sustainable ocean observations.

Three broad areas of marine industry were identified as:

1. **Providers** of technology to conduct observations.
2. **Intermediaries** – take data streams and add value to create information products.
3. **End-users or Beneficiaries** – use information products to support regulatory compliance, operational planning, and safety *e.g.* oil and gas, deep-sea mining, ports, etc.
 - a. Direct users *e.g.* fisheries
 - b. Indirect users *e.g.* retail (weather forecasts which can influence supply chain, management).

The mutual benefits for POGO and marine industries derived from close collaboration are outlined below.

Benefits to industry of collaboration with POGO

“Provider” businesses	“Intermediary” businesses	“End-user” businesses
<ul style="list-style-type: none"> Connections with customers (<i>e.g.</i> understanding customers’ needs) Training & fellowships Research collaboration Standards development Access to test/ calibration facilities Influence over regulatory framework for observations in national and international waters 	<ul style="list-style-type: none"> Validation & verification Ease of access to public data streams Standards, interoperability & data archaeology POGO Members as customers 	<ul style="list-style-type: none"> Corporate social responsibility benefits Operational efficiency Safety & security Compliance Traceability, standards, quality Access to expertise & partners for addressing specific research needs

Benefits to POGO and its members

“Provider” businesses	“Intermediary” businesses	“End-user” businesses
<ul style="list-style-type: none"> Access to emerging technologies Influencing future instrumentation Commercialisation of research developments Standardisation Improve data collection Advocacy for the importance of ocean observations 	<ul style="list-style-type: none"> Impact of ocean measurements, observation & modelling Understanding subsequent use of scientific data streams Identification of data gaps Enhanced partnerships Access to the downstream products Advocacy for the importance of ocean observations, Access to commercial data streams 	<ul style="list-style-type: none"> Understanding of end-users’ needs Collaboration & funding Access to platforms of opportunity Access to industry data streams Advocacy for the importance of ocean observations Relevance and impact Benefactors (<i>e.g.</i> Nippon Foundation)

Legacy and Recommendations

Given that indefinite funding for this Working Group is neither possible nor desirable, there are some activities that we recommend be implemented by the POGO Secretariat and general membership.

- POGO Secretariat assume networking activities
- With input from the membership at large, POGO Secretariat should maintain a list of marine and business meetings at which POGO involvement / presentation might be desirable; inform membership of such upcoming meetings and solicit information from the membership as regards participation
- Maintain / update the POGO ILC PowerPoint presentation and make it available the POGO membership for use at appropriate venues; Members should be aware that the POGO Secretariat has on hand a range of other publicity materials that can be used at such meetings (POGO banner, flyers, etc.)
- Notably, a generic PowerPoint presentation highlighting the potential of POGO for the marine and maritime industries can be made available to
- Encourage future hosts of POGO Annual Meetings to incorporate a marine and maritime exhibition into the proceedings
- Maintain momentum in this area by linking closely with IMarEST Special Interest Group Operational Oceanography; recommend that Sophie or a Trustee join this Group
- When the Nature partner journal of POGO with JAMSTEC starts, the journal has a forum, which will provide a good mechanism for networking POGO members with industries. POGO members should utilize the forum, so as the new journal will have additional activities than just publishing a scientific paper.

In concluding, the IMarEST *Ocean of Knowledge* conference, of which POGO ILC was one of the sponsors, was considered to be a great success and fulfilled the mandate given the POGO ILC at the meeting in Plymouth. There was an excellent series of talks that were well attended with about 70 participants, including beneficiaries as defined above. As a follow up, Ralph Rayner plans to invite speakers to contribute to a peer reviewed summary paper aimed at the Special Blue Planet Issue of the *Journal of Operational Oceanography* scheduled for publication towards the end of 2018.

Appendices

Appendix A - Oceans of Knowledge Programme

Appendix B – PowerPoint presentation

Institute of
Marine Engineering,
Science & Technology

IMARREST

Oceans of Knowledge:

Exploring the benefits of improved
ocean observation and measurement

TUESDAY 7TH NOVEMBER 2017

Royal Institution, London, 21 Albemarle Street, London, W1S 4BS

Organised by the Operational Oceanography Special Interest Group of the IMarEST
in association with the Partnership for Observation of the Global Oceans.

For more information visit: www.imarest.org/events

SPONSORS



Partnership for
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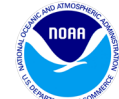


Met Office

StormGeo



SUPPORTERS



Society for
Underwater
Technology



BLUE PLANET
Oceans and Society
a CO Initiative

A one-day conference exploring how understanding of the oceans improves weather and climate prediction enabling better informed business decisions at sea, on land and in the air.

The oceans drive our weather and climate. All businesses are vulnerable to risks associated with adverse weather and climate change. This conference will explore how observation and measurement of the oceans improves ocean, weather and climate prediction enabling better informed business decisions at sea, on land and in the air.

Emerging capabilities in coupled ocean atmosphere modelling are improving our ability to predict weather and project climate change, with consequent benefits to business activity in the oceans, on land and in the air

By bringing together data and delivering the tools needed to increase our understanding of the connections between the ocean and weather, we can better predict when and where severe weather will strike. Better predictions mean safer and more profitable businesses and enhanced protection of the environment. By reducing the uncertainties in projections of climate change, we can improve understanding of longer term business risks and support the selection of strategies that position enterprises for future success.

Effective use of ocean observations, measurements and models is key to providing critical information to those operating in the oceans as well as for those far removed from the coast.

Who should attend?

This conference will be a great opportunity to meet and network with delegates from the following sectors:

- Agriculture
- Aviation
- Construction
- Energy
- Finance
- Fishing & Aquaculture
- Health Care
- Insurance
- Leisure
- Manufacturing
- Mining
- Retail
- Search and Rescue
- Tourism
- Transport
- Utilities

Why attend?

The conference will:

- Describe the latest developments in use of ocean observations, measurements and models to improve prediction of weather and climate.
- Explore and demonstrate the business benefits of improved weather forecasting and climate projection.

Oceans of Knowledge 2017 Programme

TIME	PRESENTATION	TIME	PRESENTATION
From 0830	REGISTRATION SESSION 1: SETTING THE SCENE	1200 – 1220	Aviation Dr Helen Wells , <i>Met Office</i>
0900 – 0905	Welcome and Opening Remarks Professor Ralph Rayner , <i>IMarEST</i>	1220 – 1230	Questions and Discussion
0905 – 0915	Conference Objectives Professor Stephen de Mora , <i>Partnership for the Observation of the Global Ocean</i>	1230 – 1330	LUNCH BREAK SESSION 2: USER PERSPECTIVES (<i>continued</i>)
0915 – 0945	The Impact of Ocean Science, Observations and Models on Weather and Ocean Services Dr Huw Lewis , <i>Met Office</i>	1330 – 1350	Offshore Wind Installation and Development Jacob Royle , <i>Scottish Power Renewables</i>
0945 – 1015	The Role of the Ocean in Medium Range Forecasting Professor Roberto Buizza , <i>European Centre for Medium-Range Weather Forecasts</i>	1350 – 1410	Offshore Wind Forecasting and Energy Trading Dr Samuel Hawkins , <i>Vattenfall</i>
1015 – 1045	Biological and Chemical Ocean Forecasting Professor Icarus Allen , <i>Plymouth Marine Laboratory</i>	1410 – 1430	Electrical Energy Distribution Dr Andrew Richards , <i>National Grid</i>
1045 – 1055	Questions and Discussion	1430 – 1450	Aquaculture Dr Bruce McAdam , <i>Institute of Aquaculture, University of Stirling</i>
1055 – 1115	COFFEE BREAK SESSION 2: USER PERSPECTIVES	1450 – 1510	Weather Forecasting for Tropical Agriculture Dr Andreas Vallgren , <i>Ignitia Ltd</i>
1115 – 1120	Opening Remarks Dr Gus Jeans , <i>IMarEST</i>	1510 – 1520	Questions and Discussion
1120 – 1140	Search and Rescue Speaker tbc , <i>Maritime Coastguard Agency</i>	1520 – 1540	COFFEE BREAK
1140 – 1200	Ship Routing Keith Thomson , <i>Aerospace and Marine International</i>	1540 – 1600	Insurance and Reinsurance Dr Trevor Maynard , <i>Lloyds of London</i>
		1600 – 1620	Retail and Logistics Matthew Griffith , <i>Walkers</i>
		1620 – 1650	Challenges in making Useful Forecasts and Predictions Professor Leonard Smith , <i>London School of Economics</i>
		1650 – 1700	Questions and Discussion



Collaborations between academia and industry for ocean observations:
Challenges and opportunities from the POGO perspective



Stephen de Mora
Chief Executive, Plymouth Marine Laboratory
Co-chair, POGO Industrial Liaison Council

Objective today

- Promote the value of ocean observations, especially as regards improved meteorological forecasting, to marine and **terrestrial** end user communities

Outline

- What is POGO?
 - Membership, Role and Achievements
- Overview of Ocean Observations
- POGI Industrial Liaison Council



What is POGO?

- POGO is a **consortium of major oceanographic institutes** around the world, represented by their Directors.
- **Vision :**
 - To have by 2030, world-wide cooperation for a sustainable, state-of-the-art global ocean observing system that serves the needs of science and society.
- **Mission:**
 - Lead innovation and development of the crucial components of the ocean observing system.
 - Identify and contribute to the development of the key skills, capabilities and capacities needed to achieve the vision.
 - Work with Governments, Foundations and **Industry**, to articulate the benefits to society and required funding to build and sustain the system.



Membership

38 members (including 2 consortia) in 20 countries

Logos of member institutions include:

- National Oceanography Centre
- British Antarctic Survey
- The Gravel Hill Marine Laboratory
- INSTITUTE OF MARINE RESEARCH
- SCRIPPS INSTITUTION OF OCEANOGRAPHY
- PML Plymouth Marine Laboratory
- HARBOR BRANCH FLORIDA ATLANTIC UNIVERSITY
- SCOTTISH ASSOCIATION FOR MARINE SCIENCE
- CARS INSU
- Flinders Marine Institute
- AWI
- NIOZ
- GEOMAR
- NIOZ Royal Netherlands Institute for Sea Research
- Helmholtz Centre for Ocean Research Kiel
- NIOZ
- IFREMER
- QCS
- JAMSTEC
- Monterey Bay Aquarium Research Institute
- RUTGERS THE STATE UNIVERSITY OF NEW JERSEY
- IFREMER
- QCS
- JAMSTEC
- KIOST
- FIO
- COPAS
- CICESE
- NIO
- INCOIS
- CSIRO
- AUSTRALIAN INSTITUTE OF MARINE SCIENCE
- IMO
- IO
- IMAS

POGO: OUR UNIQUE ROLE

Many actors, working together internationally needed to bring about sustainable management of the ocean informed by sound science, underpinned by a **comprehensive global ocean measurement system**.

“We are distributed across the world with a presence on every continent with access to all major ocean basins”

- National governments individually and intergovernmental structures (e.g. IOC, GEO)
- International science programmes setting research agenda (e.g. Future Earth)
- Non-governmental organisations and businesses (many)
- Funders of research and monitoring programmes (e.g. Belmont Forum)

Members of POGO individually have distinctive roles, each interact with above
Collectively have a unique role

Within POGO member - institutions resides key long-term scientific and technical capability to develop and interpret the results from systematic, long- term global ocean measurements.



POGO ACHIEVEMENTS


- Threw collective weight behind the world expansion of **Argo**.
- Driving **OceanSites** (coordinated, deep-ocean, multi-disciplinary time-series reference sites)
- POGO contributed significantly to **OceanObs'09** - lobby successfully to expand chemical, biological and biogeochemical ocean observations
- In the **São Paulo Declaration** - relative paucity of ocean observations in the Southern Hemisphere and capacity to observe the oceans in SH
- Lobbied intergovernmental **Group on Earth Observations (GEO)** for more emphasis on ocean resulting in new Ocean Task (Oceans and Society: Blue Planet) added to GEO Work Plan



New Strategy launched in Jan 2016

"We are distributed across the world with a presence on every continent with access to all major ocean basins"

"We call on the ocean observing community to commit itself at this pivotal opportunity, to build and innovate the truly global ocean observing system needed."



Argo floats, such as this one deployed from a French vessel, have produced valuable oceanographic data but new techniques are needed to track changes in the world's oceans. ARGO

TAKING THE PULSE OF THE GLOBAL OCEAN

New sensors promise better picture of world ocean health

By Tim Hornyak | Jan. 25, 2016, 8:15 AM

<http://www.sciencemag.org/news/2016/01/new-sensors-promise-better-picture-world-ocean-health>




The 3 pillars of POGO

		
Ocean observations	Professional training	Outreach and advocacy



Global Ocean Observing System

Building global ocean observing system began two decades ago

- important advances - physical (climate-related) observations
- progress stalled for almost a decade
- costs plus economic down-turn
- biological and chemical observations lagging
- system falls far short of what is needed

However, at the cusp of a technological revolution

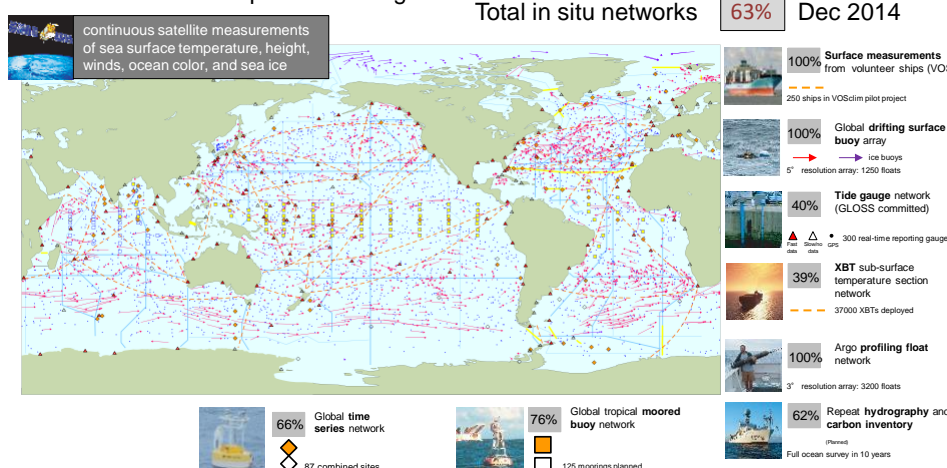
- autonomous and robotic systems
- smart sensors
- communication technologies
- capabilities of satellite Earth Observations.

New promise of more cost effective continuous presence in the ocean

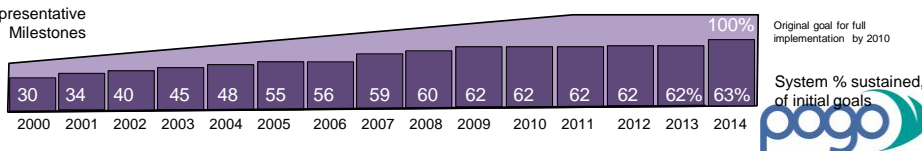
- measurements all day, every day some essential ocean variables



GOOS/GCOS 2010 implementation goals

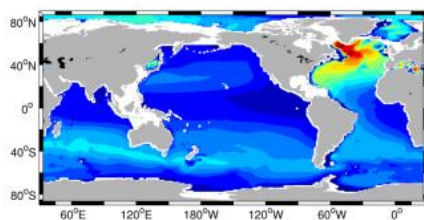
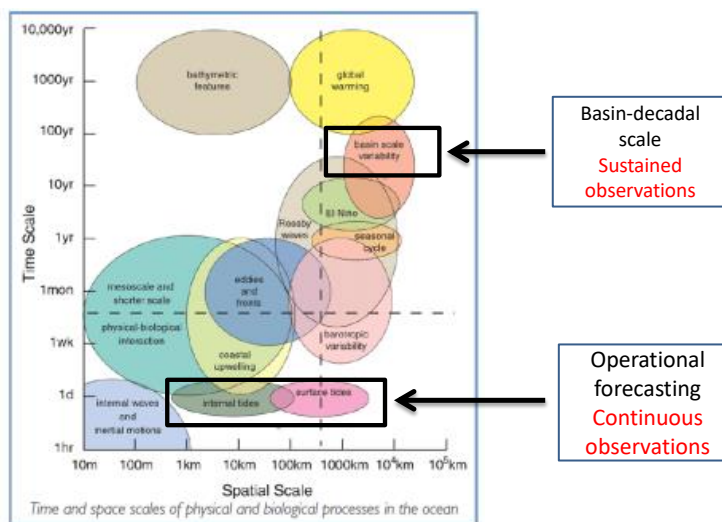


Representative Milestones

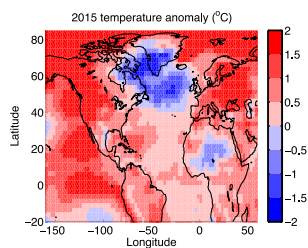




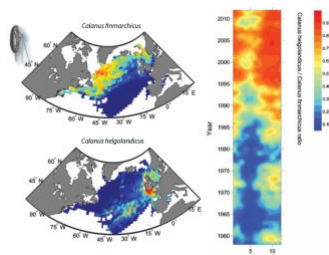
A question of scale



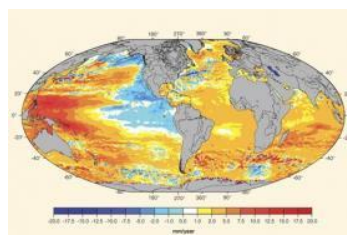
Anthropogenic carbon storage - column inventory



2015 Sea surface temperature anomaly

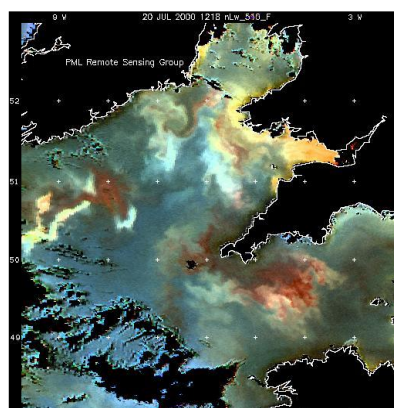
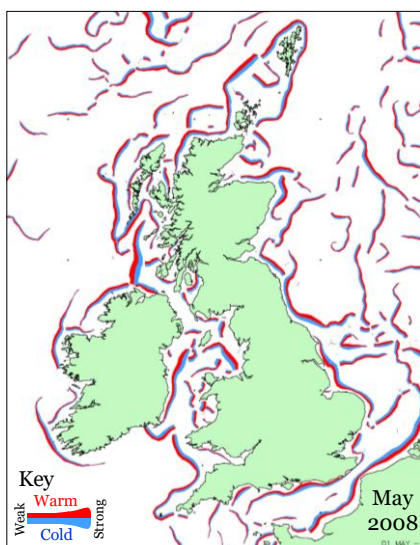
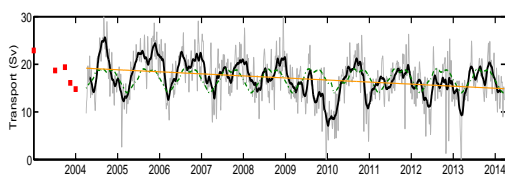
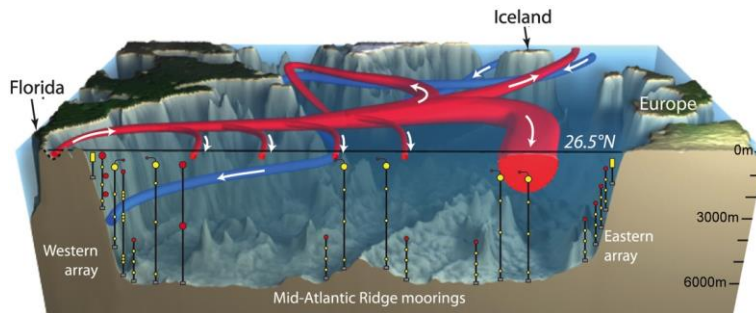


Surface plankton



Regional sea level trends

A Decade of Measuring the Atlantic Meridional Overturning Circulation (AMOC)



Karenia mikimotoi & *Noctiluca scintillans* in the English Channel (20 July 2000)



POGO initiative on industry engagement

- Workshops held during POGO annual meetings in 2015, 2016
- Included POGO members & industry representatives (oil & gas, robotics)
- Key questions addressed:
 - What are the diverse benefits to industry and academic/research institutions that would stimulate the formation of partnerships/collaborations?
 - What are the opportunities and barriers in industry partnerships with research institutions?
 - What models of partnership or engagement work? Is this nation/institution specific?
 - What unanticipated or unintended consequences are associated in partnering with industry?



POGO Industry Liaison Council

- Objectives:
 - Form a bridge between POGO members and a range of industry sectors;
 - Produce recommendations on how to promote and optimize collaborative interactions.
- Focus on industries involved in:
 - Making better observations: Industries developing sensors
 - Developing better products and services from observations
- Encourage industry to have advocacy role in promoting sustainable observations
- Recognise cultural differences in approaches to engagement with industry.



Benefits to industry of collaboration with POGO

“Provider” businesses	“Intermediary” businesses	“End-user” businesses
<ul style="list-style-type: none"> • Connections with customers (e.g. understanding customers’ needs) • Training & fellowships • Research collaboration • Standards development • Access to test/calibration facilities • Influence over regulatory framework for observations in national and international waters 	<ul style="list-style-type: none"> • Validation & verification • Ease of access to public data streams • Standards, interoperability & data archaeology • POGO Members as customers 	<ul style="list-style-type: none"> • Corporate social responsibility benefits • Operational efficiency • Safety & security • Compliance • Traceability, standards, quality • Access to expertise & partners for addressing specific research needs



Benefits to POGO and its members

“Provider” businesses	“Intermediary” businesses	“End-user” businesses
<ul style="list-style-type: none"> • Access to emerging technologies • Influencing future instrumentation • Commercialisation of research developments • Standardisation • Improve data collection • Advocacy for the importance of ocean observations 	<ul style="list-style-type: none"> • Impact of ocean measurements, observation & modelling • Understanding subsequent use of scientific data streams • Identification of data gaps • Enhanced partnerships • Access to the downstream products • Advocacy for the importance of ocean observations, • Access to commercial data streams 	<ul style="list-style-type: none"> • Understanding of end-users’ needs • Collaboration & funding • Access to platforms of opportunity • Access to industry data streams • Advocacy for the importance of ocean observations • Relevance and impact • Benefactors (e.g. Nippon Foundation)

Summary



- POGO is a truly international grouping of the world's leading oceanographic organisations represented at the highest level.
- POGO comprises most of the global capacity for in situ ocean observing infrastructure, facilities and data.
- POGO is interested in partnering with industry to pursue common goals and optimise collaborative actions.



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