

TAKING THE PULSE OF THE GLOBAL OCEAN



Strategy of the
Partnership for Observation of the Global Ocean (POGO)

POGO was founded in 1999 by directors of oceanographic institutions around the world as a forum to promote and coordinate the observation of the global ocean. Since then POGO has made many notable achievements.

POGO ACHIEVEMENTS

POGO's successes have been several and far-reaching. Here, we highlight just a few to indicate their significance and scope:

- POGO is a truly international organization.
- One of the first priorities of POGO was to throw the collective weight of its members behind the concept and the world expansion of Argo. Because the members of POGO are directors with the power to commit resources and influence decision makers, a resolution to accord full support to Argo had immediate effect, and the distribution of floats around the world ocean improved rapidly.
- POGO member institutions have been driving the establishment of OceanSites (coordinated, deep-ocean, multi-disciplinary time-series reference sites), which has made significant progress in recent years. In particular, deep temperature and salinity sensors have been added through a concerted effort by POGO members, as a contribution to the Deep Ocean Observing System.
- POGO contributed significantly to OceanObs'09 in Venice in 2009, and was able to lobby successfully to open up sustained ocean observations to a broader community, including chemical, biological and biogeochemical observations.
- In the São Paulo declaration of 2001, POGO drew attention to the world imbalance between Northern and Southern Hemispheres in the capacity to observe the oceans, recommending immediate action to enhance such capacity in developing countries. The result was the establishment by POGO of a capacity-building programme, which is regarded with universal esteem. A major part of the POGO training has been supported by the Nippon Foundation, which recently renewed its funding commitment to this programme.
- In the São Paulo declaration, POGO also underscored the relative paucity of ocean observations in the Southern Hemisphere compared with the Northern Hemisphere. In response, POGO member JAMSTEC organised a circumnavigation of the Southern Hemisphere, the BEAGLE Expedition, using its ship Mirai, at a cost estimated to be around \$35M.
- POGO has lobbied actively within the intergovernmental Group on Earth Observations (GEO) for more emphasis on ocean science and its connectivity to society. As a result a new Ocean Task (Oceans and Society: Blue Planet) was added to the 2012-2015 GEO Work Plan. Blue Planet is increasingly recognized as a vehicle for collaboration and integration between ocean observation efforts, adding value to existing programmes by engaging with end-users, and highlighting the societal benefits of ocean observations to a variety of stakeholders.

The purpose of this strategy is to look forward to our priorities for future years. It reaffirms our commitment to work collectively as a global community to promote and deliver the development of the truly global ocean observation system needed to advance understanding of the ocean and its wise use for the benefit of all humankind.



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WHO WE ARE

POGO's membership includes most of the world's leading ocean science and technology institutions. Our expertise, experience and infrastructure provide the unique and long term capability to design, build, operate and innovate the global ocean observing system. We are also training the next generation of ocean scientists, and strive for a more ocean literate society. Our commitment as a partnership is to pursue this mission nationally and internationally.

We bring to our shared aims the strength that comes from the diversity of our people, expertise, partnerships and our wide geographical coverage.

OUR VISION

Our vision is 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.

OUR MISSION

- 1 Lead **innovation and development** of the crucial components of the ocean observing system.
- 2 Identify and contribute to the development of the **key skills, capabilities and capacities** needed to achieve the vision.
- 3 Work with Governments, Foundations and Industry, to articulate the **benefits to society** and required funding to build and sustain the system.

OUR SHARED VALUES

We are motivated by a common belief that advancing scientific understanding of the ocean is rooted in making systematic, high quality measurements. We believe that this understanding and its wise use are critical to, and will make a real positive difference in, enabling humanity to develop a sustainable relationship with a healthy, productive and biologically diverse ocean. We are further motivated by the shared belief that our vision can only be realised by working together across the world, where we can achieve together what none of us could do alone.

For these reasons, in our collective endeavours, we value:

- **Research** excellence and relevance.
- **Diversity**, transparency and openness.
- **Shared belief** in science as critical to evidence-based decisions.
- **Partnership** and cooperation.



THE OCEAN

The ocean is the dominant feature of planet Earth, covering 70% of its surface. It makes Earth the only habitable planet in our solar system. It produces half of our oxygen, 80 percent of Earth's fresh water, and an enormous portion of the world's food. The ocean regulates the Earth's climate and weather patterns, is critical in the cycles of heat, water, and carbon, and is the source of large biodiversity.

As human population is predicted to reach 9 billion by 2050, people are turning with growing urgency to the ocean for answers to the greatest challenges of our age, such as:

- feeding the world's growing population;
- providing clean energy to power vibrant economies;
- increasing resilience to dangers from the sea, especially flooding;
- mitigating and adapting to climate change and variability;
- mitigating human impacts on marine ecosystems.

But people are also looking to the ocean for more – for hope and inspiration. The ocean is the last unexplored frontier on Earth and holds so much promise and opportunity for the future – provided we manage it wisely so future generations can benefit from it as we do.

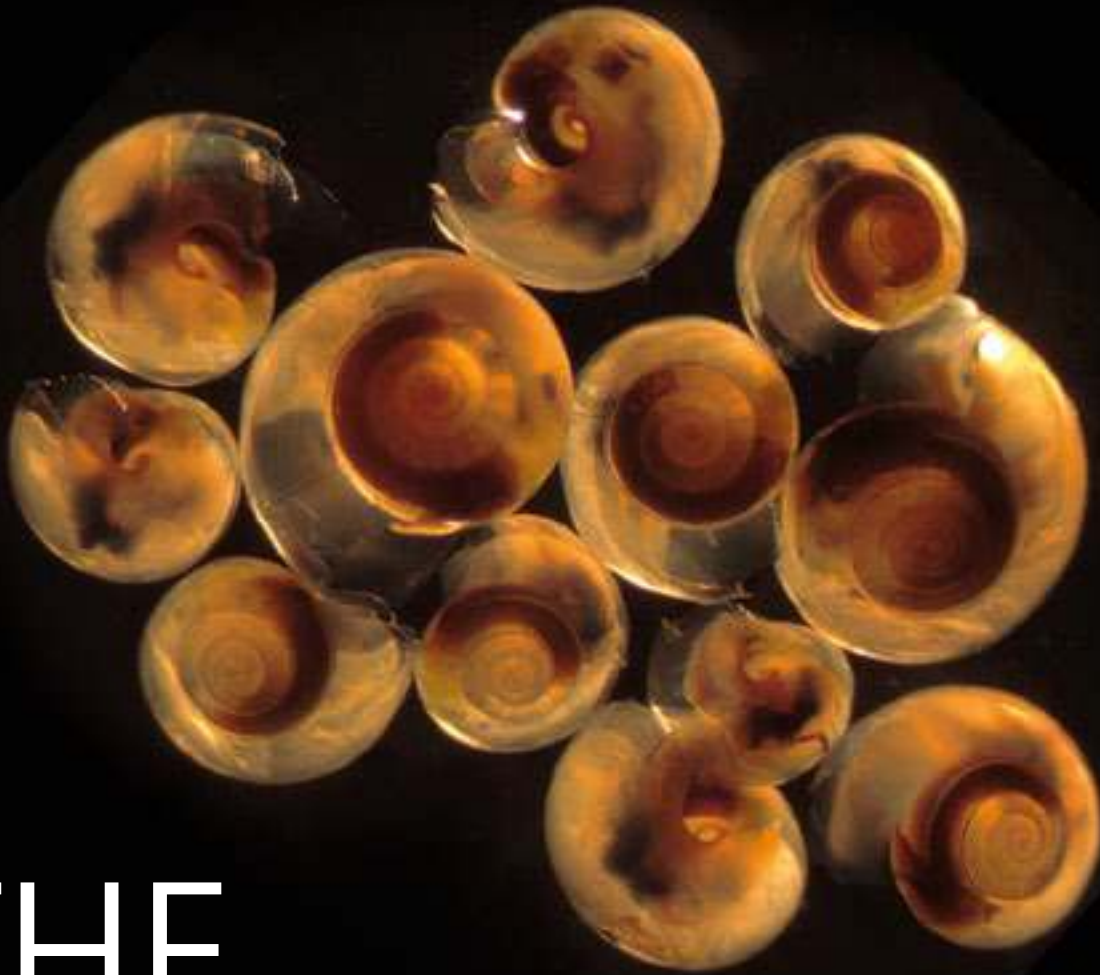
To realise this promise we need to understand that whilst the ocean benefits people, humans have had an unprecedented impact on the sea, with 40% of the ocean heavily affected by human activities, and

some marine ecosystems in crisis. This ocean state cannot continue and humanity needs to find ways to manage more effectively our relationship with the ocean, coastal seas and estuaries.

The global ocean is a shared resource. Whilst it separates us physically it also binds us together in many other ways. In their continual movement, the ocean's waters abundant with life respect no human borders. And the ocean's processes affect people who are widely separated across the world - whether that be through tsunami waves striking distant shores around the rim of a shared ocean basin or the dramatic shifts in weather patterns such as monsoons or irregular atmosphere-ocean oscillations that affect vast regions, bringing floods to some countries and droughts to others.

In an increasingly globalised economy the ocean affects lives in often hidden ways. Some 95% of global trade is carried by sea and 95% of internet traffic is carried by submarine cables. The effects of marine-related natural disasters experienced in one place can ripple around the world with unforeseen effects on societies – through impacts on commodity prices, financial markets or disruption of globally-distributed supply chains.

Likewise human activities are having widespread impacts on the ocean such as overfishing and biodiversity loss, the acidification of the ocean as it takes up excess carbon dioxide from fossil fuel burning, or the spread of disintegrating waste plastics throughout the ocean with as yet unknown consequences.



THE CHALLENGE

Despite its growing importance and pervasive impact, too little is known about the ocean. This cannot continue. There are far more detailed maps of the surface of Mars and the dark side of the Moon than there are of the seafloor – but those places do not sustain human life and do not harbour the rich biodiversity of our ocean.

When it comes to ocean waters and marine life we know even less. There is far too little in situ measurement coverage across the ocean's near-surface area, even less going deeper below the surface, and far too few measurements that allow us to track changes over time.

We need to be more continuously aware of how and why the ocean is changing – and maybe better predict the impacts of the ocean on people and of people on the ocean. To this end, making continuous ocean measurements with global coverage is now a pressing priority. We need to do this to manage a safer, more sustainable relationship between people and the ocean – and we cannot manage what we cannot measure!

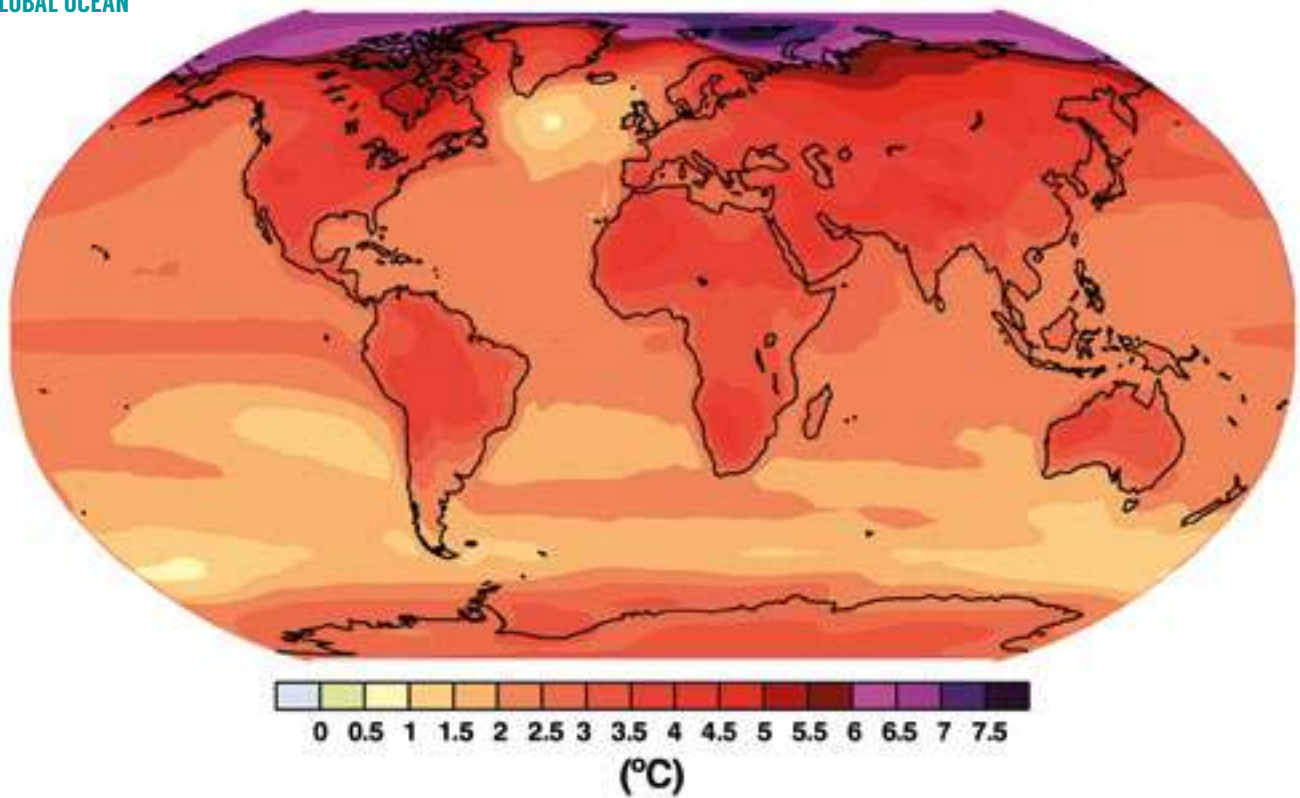
Under the remit of the Global Ocean Observing System's framework for ocean observing, a diverse set

of "essential ocean variables" is being established which range from physical quantities such as temperature, salinity and sea-level through to chemical, biogeochemical and ecosystem variables.

The ocean is too vast, too interconnected and its impacts too widespread for any one nation let alone one organisation to embark on this task alone. One simple message is clear: international cooperation is essential.

That is why we, the major ocean research institutions of the world have come together to form the Partnership for Observation of the Global Oceans (POGO).

We are not daunted by the task ahead of us – we are excited by it. This is because we believe that collectively we have the capability to succeed, enabled by rapidly advancing technological innovations that we are leading. We believe that working together there is now a real prospect, over the next decade, of making major strides forward in building the truly global ocean measurement system needed to understand and monitor the ocean for the benefit of all.



WHY NOW?

Building the global ocean observing system began nearly two decades ago and important advances have been made, particularly in the realm of physical (climate-related) ocean observations. Disappointingly, however, progress has been stalled for almost a decade, partly because of the costs entailed especially during a period of economic down-turn for many countries. Biological and chemical observations are still lagging behind their physical counterparts. The observing system falls far short of what is needed.

However, we now stand at the cusp of a technological revolution based on autonomous and robotic observation systems, smart sensors and communication technologies. Similarly, the capabilities of Earth Observations are rapidly evolving. These offer new promise of more cost effective continuous presence in the ocean, making measurements all day every day, at least for some essential ocean variables. What was once a dream is now in our grasp if we work hard at it over the coming decade.

“Now is the time to redouble our efforts and once more set our sights on building a truly comprehensive global ocean observing system.”



OUR UNIQUE ROLE

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

These include:

- National governments working individually and through intergovernmental structures and bodies – who are agents for political action and international consensus and support the governance framework for international cooperation.
- Non-governmental organisations aimed at coordinating science, influencing policy and/or raising public awareness at regional and global scales.
- The wider scientific community, working nationally and internationally - who undertake research, share and synthesise ideas and findings and identify key scientific challenges and develop internationally agreed research agendas.
- Funders of research and monitoring programmes whether they be governments, businesses or not for profit foundations - who provide the resources needed.
- Individual citizens working independently and collectively whose support and desire for a better life and world provides continuing motivation and inspiration for all involved.

Within this landscape, we as members of POGO individually have distinctive roles and collectively have a unique role.

It is within our institutions that the key long-term scientific and technical capability resides that is needed to develop and interpret the results from systematic global ocean measurements.



We, the Members of POGO:

- Are distributed across the world with a presence on every continent with access to all major ocean basins.
- Have established reputations and track records of achievement often over many decades and longer.
- Provide the stable institutional longevity needed for supporting and innovating a long-term observing system at global-scale.

In terms of capabilities, we are:

- Each well-known ocean research institutions of high stature and profile in our own countries. We are each respected for the excellence and impact of our science and the authoritative advice we provide in our own countries. We are recognised and respected institutions within the international scientific community.
- Home institutions to many of the key scientists and technologists developing the global ocean research and measurement agenda.
- Home of the key long-term infrastructure, facilities and capability needed. We are repositories of the technical expertise, experience and know how, often built up over many decades, needed to develop, continually innovate and adapt an in situ observing system in harsh ocean environments.
- Leading many of the key technological and methodological innovations needed for in-situ observations.

Our aim is to focus on actions based on our unique individual and collective capabilities as described. It is not our aim to duplicate or replicate work that can or should be done by other organisations with other relevant competencies.

We have particularly close and complementary relationships with two bodies providing overarching frameworks for global observations, namely UNESCO's Intergovernmental Oceanographic Commission governed Global Ocean Observing System (IOC-GOOS) and the Group on Earth Observations' Global Earth Observation System of Systems (GEO-GEOS).

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



Image Courtesy: © JAMSTEC



OUR PRIORITIES

Our priorities both individually and collectively are to:

- 1** Lead the making and innovation of observations that contribute to the global ocean observing system.

We will judge progress by our success in:

- Refreshing the way we think about the approach to building the global observing system from the opportunities opened by rapidly developing and adopting emerging and transformative technologies.
- Expanding the observing system in quantum steps in respect of biological and biogeochemical parameters.
- Driving these into the agenda of the decadal status review at the Ocean Observations 2019 conference.

- 2** Develop the world-wide capacity and capabilities needed for ocean observations and nurture new generations of scientists, technical experts and leaders in ocean affairs.

We will judge progress by our success in:

- Building networks, technologies and human resources required for ocean observations at the global scale.

- 3** Advocate and promote in our own countries and world-wide (to inter-governmental organisations, governments, funding agencies, businesses, foundations and citizens) the importance of making systematic sustained, ocean observations for the advancement of science and for informed, sustainable management of the ocean for the well-being of all humankind and making the case for securing the necessary funding resources to achieve it.

We will judge progress by our success in:

- Broadening the membership of POGO to a wider range of oceanographic institutions across the world to increase diversity of perspectives on our shared goals and extending geographical coverage.
- Widening and strengthening engagement with a more diverse range of potential partners especially in business and industry, to better understand their measurement needs, advance uptake and exchange of new technologies between business and science, enhance skills and capabilities, and achieve a more broad-based support for sustained ocean observations.

HOW WE WORK

This strategy provides the overall framework within which we work and explain our aims to others.

We will place particular emphasis on:

- Continually committing to the importance of scientific and technical excellence and rigour in underpinning all we do.
- Developing joint activities where we particularly strive to support long-term measurements and associated capability (rather than more ad hoc individual experiments or expeditions, which are also part of our work as individual institutions).
- Areas where we can make a collective difference because the whole is greater than the sum of what we could do individually.
- Developing common messages and consensus position statements that can be used by members to promote and deliver our shared aims in national contexts.
- Sharing experiences and practices that can be used to assist individual institutions to continually improve their approaches to delivering our shared priorities.
- Keeping our primary focus on ocean observations, while adapting to changing global circumstances.

In recognising the complementary contributions of others we may from time to time:

- Develop recommendations for consideration by other competent organisations.
- Seek, where appropriate, to work in partnership with a diverse range of other like-minded organisations and individuals when that would add weight, value and breadth of perspective in delivering or promoting our vision and purposes.

In terms of working methods we will:

- Work by consensus.
- Work within a documented, open and transparent governance, decision making and reporting framework.
- Engage together as a group directly once a year. This is expected to be at director level within institutions to build and sustain a spirit of mutual trust, ease communication and maximise the influence of our collective voice.
- Communicate on a regular basis, electronically or in person, in between annual meetings, to ensure that progress is being made.

In terms of the annual meeting:

- Its purpose will be to set priorities and hear reports of progress.
- In selecting a venue for the annual meeting, due consideration will be given to the relative merits, opportunities and timeliness of meeting in one of the member's institutes or in other venues such as in capital cities where we may have the opportunity to directly engage collectively with relevant decision-makers and other influencers to advance our collective aims.
- Time-limited inter-sessional working groups shall be established to progress activities agreed upon at the annual meeting.
- In terms of this strategy document, we will:
- Support delivery of this strategy with a more detailed implementation plan and work programme.
- Revisit and refresh our strategy at least every 5 years.



CALL TO ACTION

We call on the wider scientific community to communicate with the general public about the importance of the ocean and its life to human well-being. We can no longer afford to remain ignorant of the ocean's impact on society and our impact on it.

We call on policy makers in all nations to take into account the urgent need for a more sustainable relationship between healthy people, healthy economies and a healthy ocean. To do this we need to be more continually aware of how and why the ocean is changing. We believe that sound scientific understanding of the ocean underpinned by ocean observations spanning the globe can make a real difference to transforming the relationship between people and the ocean.

We call on the ocean observing community to commit itself at this pivotal opportunity, driven by advances in technology and the ever growing urgency to redouble efforts to complete work already started: to build and innovate the truly global ocean observation system needed. We, the world's major oceanographic institutions – who are based on every continent and around every ocean basin on the globe - have between us most of the key expertise necessary to build this system - but we

know the endeavour will fail unless we work together – the ocean is too vast and too interconnected to do otherwise.

We call on all like-minded institutions to join us – to take up the tasks of making the measurements, growing and developing the skills needed world-wide and engaging decision-makers, influencers and citizens everywhere in promoting the case for resources to enable this vitally important world-wide endeavour.

“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.”





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Partnership for Observation of the Global Oceans (POGO)

Plymouth Marine Laboratory
Prospect Place
Plymouth PL1 3DH
United Kingdom

Tel: +44 (0)1752 633 424
Fax: +44 (0)1752 633 101
E-mail: pogoadmin@pml.ac.uk
Website: <http://ocean-partners.org>