

Partnership for Observation of the Global Oceans

International management of the ocean relies on the provision of sound data upon which to make marine policy decisions. Executive Director **Dr Trevor Platt** and Scientific Coordinator **Dr Sophie Seeyave** discuss the vital role of POGO in making such a valuable resource available



First, could you outline the role of the POGO Secretariat?

The Secretariat of POGO is the executive arm of the organisation. It is responsible for developing the necessary strategy to turn the broad mandate of POGO into an operational reality, and to manage the elements of that strategy as they come to fruition in the form of real programmes. A related responsibility is to maintain constructive working relationships with partner organisations in the international arena. We work together to manage the activities of POGO and create new ones when required.

For this type of work, a scientific background in marine science with experience in international science policy and coordination is very important. Experience in international capacity building is also highly relevant.

As a forum for the promotion and advancement of global ocean observations, you represent some of the leading bodies in this field. From what context did this collaborative effort emerge?

Around the time that POGO was founded, there was a prevalent view that the global effort devoted to observing the ocean for the benefit of society might be coordinated to better effect. It was recognised that those institutions having ownership of the world's capacity to observe the oceans, represented by their directors, needed a forum to discuss issues of mutual interest. These were the principal motivations for the creation of POGO.

Oceans are not bound by physical jurisdictions and as such can prove difficult to police. With over-fishing and exploitation posing a continued threat to the health of these ecosystems, how is POGO assessing the management of oceanic resources?

The oceans are divided according to fixed boundaries for political purposes, but only in the continental shelf areas, where defined blocks are subject to national jurisdiction. The major parts of the oceans lie outside the jurisdiction of any coastal state. The UN Convention on the Law of the Sea (UNCLOS) is intended to help deal with this reality.

POGO is not empowered or expected to assess the management of oceanic resources. Its role is to promote the development of a sound database for rational management of the ocean, in other words, to provide intelligence as an aid to the creation of an international governance strategy for the high seas.

To what extent is the scientific observation of global oceans contributing to the political framework? Do you represent the scientific community internationally at conferences? How do you communicate your involvement?

Various organisations purport to contribute to the political agenda regarding ocean observations. In a rather crowded field, it is important to be seen as a credible voice. An example of POGO leadership in this respect is its influence in the creation of an oceans-related Task within the Group on Earth Observations (GEO), which is a ministerial-level initiative dedicated to the effective use of Earth observation for societal benefit. This Task is called 'Oceans and Society: Blue Planet'.

POGO has established an informal grouping of marine interests called Oceans United, through which it seeks to have a role as the 'Voice of the Oceans'. The 'Oceans and Society: Blue Planet' Task is its first initiative. This will have its kick-off symposium in Brazil in November, immediately before the next GEO Plenary Session.

Many contend that ocean acidification is the 'silent sister' of climate change. With climate change posing an increasing threat, what are the partners of POGO doing to address this issue?

POGO members are all conducting studies relating to climate change and ocean acidification as an important part of their research agendas. Studying

climate change requires conducting measurements in the same location at regular intervals and over long time scales (several decades). This allows significant trends to be teased apart from natural variation. Several of the POGO members maintain such so-called 'time-series stations', where the same measurements have been conducted for decades. Examples include: the Western Channel Observatory in the English Channel (since 1903); the Helgoland Roads Observatory off the North coast of Germany (since 1962); Hydrostation 'S' off Bermuda in the North Atlantic (since 1954); the Hawaii Ocean Time-series (HOT) in the Pacific (since 1988); and many others. A number of these stations are included in the OceanSITES programme, which is a network of long-term, deep-water reference stations. These time series measurements are very important for the validation of data obtained from satellites, which provide an 'instantaneous' global coverage of the world ocean, including the remotest parts that cannot be sampled manually.

This type of data, collected over decades, is extremely valuable for climate change studies, although it can only be useful in conjunction with measurements that have been made manually. Many of the POGO members are also conducting studies of ocean acidification, either measuring changes in dissolved CO₂ concentrations in the ocean over time, or conducting laboratory studies to determine the effects of potential changes in these concentrations on marine organisms, such as phytoplankton, bivalves and corals. Such studies are also being conducted in mesocosms, which are large enclosures deployed in the sea that allow experiments to be made in quasi-natural conditions, while providing the option of manipulating certain environmental parameters.

Do you link your global ocean observations with other Earth system observations? Is this an important aspect of POGO's work?

POGO was established initially with a specific focus on ocean observations, and has kept that theme as a central part of its agenda. However, POGO recognises that the ocean is part of a global system, and the importance of integrating ocean observations with other types of Earth system observations. POGO is an active participant in the Group on Earth Observations (GEO). In this forum, we strive to link ocean observations with other Earth observations in the creation of a Global Earth Observation System of Systems (GEOSS). Geology and geophysics are also increasingly recognised as highly relevant to the POGO agenda, and this is reflected in the recent inclusion of the Integrated Ocean Drilling Programme (IODP) among the POGO membership.

What programmes and products do you develop in order to support POGO initiatives?

POGO supports the development of a number of programmes in pursuit of its central goal of promoting and enhancing ocean observations. For example, POGO contributed to the establishment of the Southern Ocean Observing System (SOOS) and the Global Alliance of Continuous Plankton Recorder Surveys (GACS). The Continuous Plankton Recorder (CPR) is an instrument that is towed behind commercial ships and collects plankton on a band of silk that is preserved for later analysis. The data collected by these instruments since their invention in 1931 constitutes the longest and most geographically extensive marine biological survey in the world. Since 2011, CPR surveys from around the world have been working together under the umbrella of GACS, to ensure standardisation of their data collection methods, and facilitate sharing of data.

From its inception, POGO has recognised and drawn attention to the world imbalance between Northern and Southern Hemispheres in the capacity to observe the oceans. To address this, POGO set up training initiatives for scientists from developing countries, which have grown into a comprehensive and renowned capacity-building programme.

Part of the POGO agenda is to engage with the general public and to demonstrate the importance of ocean observations for society. This is carried out either through the media (press releases, press conferences, published articles) or through public events such as exhibitions. For example, a POGO exhibit and associated public event were held at the World Expo 2012 in Yeosu, Korea, from May to August 2012.

You work with the world's leading oceanic institutions – for example the British Antarctic Survey (BAS) and National Oceanic and Atmospheric Administration (NOAA). What trends have your global partners been observing?

The following comments were provided by Dr Mike Meredith, Programme leader at BAS: "BAS have been observing some striking trends in both the physical and biological aspects of the polar seas. The Southern Ocean is warming faster than the rest of the world, with certain 'hotspots' of warming superposed. Paramount amongst these is the ocean adjacent to the Antarctic Peninsula, which is the most rapidly warming region of the Southern Hemisphere. There is also a marked freshening and acidification of the Southern Ocean, and striking changes in the abundance and distribution of plankton. Concurrently, changes in the physical properties of the ocean near the seabed are acting to influence benthic species and communities. Further, the increased supply of heat from the ocean toward the Antarctic ice sheet is acting to accelerate deglaciation in parts of West Antarctica. Each of these trends has global consequences, via impacts on climate, sea level and ecosystems, and further investigations and monitoring are vital".

POGO contributed to the establishment of the SOOS in 2011, and continues to endorse it. What makes the Southern Ocean a particularly important area for study? Has the effort provided any unexpected outcomes?

The following comments were again provided by Dr Mike Meredith, who is also one of the co-Chairs of SOOS: "The Southern Ocean is disproportionately important in the Earth system. It is central to the global ocean circulation, with the world's largest current system (the Antarctic Circumpolar Current) acting to distribute heat, freshwater, carbon and other climatically-important tracers around the rest of the world's oceans. The overturning circulation in the Southern Ocean acts to draw down anthropogenic carbon from the atmosphere and hence slow the rate of human-induced climate change – however, this important sink is threatened, and may already have become saturated. It is adjacent to the Antarctic ice sheet, and ice sheet-ocean interaction is critical in controlling global sea level rise. It is also home to some unique and vulnerable marine species, some of which are commercially harvested, and many of which are threatened by the combined actions of climate change and human exploitation. Each of these drivers calls for sustained, strategic observations of the Southern Ocean; however, its remoteness and harsh characteristics has led to it being the most data-sparse ocean in the world. SOOS was thus initiated to fill the data void and provide the necessary observations that are required by science and society. It is still early days for SOOS, but already the effort is providing unique new insight into the rate of change of the Southern Ocean, its role in the global climate system, and the impacts of climate change on marine productivity".

The partnership states that some nations currently lack the necessary capacity to make the detailed ocean observations you require. How do you intend to bridge this gap? What is the significance of their coastal regions and surrounding oceans?

There is a deficit in trained personnel to conduct ocean observations in developing countries, resulting in a lack of sustained ocean observations in many parts of the world ocean, particularly in the Southern Hemisphere. To address this, POGO has developed an exceptionally strong programme



for professional training in ocean observations and their interpretation, intended primarily for scholars from developing countries. It is multi-pronged, including: 1) a Centre of Excellence which offers 10-month training in Bermuda; 2) a Regional Centre of Excellence, which offers training for about one month at a venue, located in a developing country, that changes each year; 3) a Visiting Professor Programme, held for one month each year in a developing country; 4) a Fellowship Programme under which scholars can travel for up to three months to study in a leading oceanographic institution of their choice; and 5) a Field-work Programme under which scholars are selected to join a major oceanographic expedition and participate in the synthesis of the results. Together, these training programmes are making significant contributions to reducing the deficit in trained observers of the ocean in developing countries.

Marine scientists were disappointed as a result of the Rio+20 declaration. Urgent action was needed but world leaders failed to act. What are your views on this matter?

Events such as Rio+20 are very difficult to control, in the sense that NGOs of varying degrees of competence will vie for the limelight. The media will be attracted to the most flamboyant and vociferous of these, with the result that opportunities for rational progress may be lost. World leaders may or may not have wanted to take constructive action, but there is always a danger that the agenda may be hijacked by other special interests. It is the job of POGO to help assemble credible evidence that can be presented to governments so that they will be persuaded to take appropriate action regardless of the side shows emerging around them.

Finally, what are POGO's key priorities for the future of oceanic monitoring? How do you hope to continue to build capacity and lead the way in the study of the ocean?

POGO's current priorities, as defined at the last POGO annual meeting and stated in the Honolulu Declaration of January 2012, are to: provide vigorous support for the network of time series stations OceanSITES; actively engage with the SOOS; continue to develop Oceans United as a forum for dialogue within the marine scientific community, in particular by launching the GEO Task 'Oceans and Society: Blue Planet'; and continue investment in capacity building for developing countries, in particular through support of the NF-POGO Alumni Network for Oceans.

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