

POGO Capacity Building News

Nippon-Foundation-POGO Centre of Excellence at Alfred Wegener Institute Scholars are selected for 2014

The ten successful candidates for the 2014-15 programme have now been selected and notified. The fellows are from Brazil, Ethiopia, Fiji, Mauritius, Togo, India, Indonesia, Spain, Venezuela and Vietnam. The new scholars will start their ten months of training in observational oceanography in mid-October, spending part of their time in Helgoland focusing upon open-ocean sciences and the second part of the training in Sylt for studies focusing upon shelf/basin interactions.



Mariele Paiva

Brazil



Assefa Tegen

Ethiopia



Sri Nandini

Fiji



Arnaud Nicolas

Mauritius



Serge Tomety

Togo



Atul Yadav

India



Lamona Bernawis

Indonesia



Irene Garcia

Spain



Ana Carolina Peralta

Venezuela



Nguyen Hoa

Vietnam

Report from POGO-AMT Fellow 2013

Ankita Misra, doctoral student studying at the National Institute of Oceanography, Goa, India reports upon her training following the Atlantic Meridional Transect Cruise



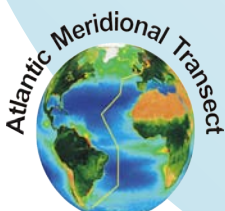
Ankita Misra prepares laboratory equipment during her POGO-AMT training.
Photo credit: Natalie Wager, University of East Anglia

"I was awarded the POGO fellowship for on-board training on an Atlantic Meridional Transect cruise for 2013 under the Guidance of Dr Gavin Tilstone of Plymouth Marine Laboratory (PML), UK. As a part of the fellowship I was required to carry out my project on "Understanding and Evaluating the role of the phytoplankton community in the photosynthesis and primary production in the Atlantic Ocean" by participating in a AMT cruise from UK to Falkland islands. The Fellowship was divided into three phases: (1) the pre-cruise phase was spent in the various activities involving preparation for the cruise such as sea survival course, collecting and packing equipment, consumables as well as learning spectrometric measurement techniques; (2) onboard the ship, I was involved in carrying out measurements pertaining to chlorophyll and primary productivity; (3) during my last month at PML, after the cruise, I was mainly involved in doing a literature review on the subject of size fractionated primary productivity as well as processing the data and fitting the PE curves.

As an early career student, involved in ocean remote sensing, through this opportunity I got a chance to learn to make in-situ measurements as well as to get exposed to high quality research work carried out internationally.

I also interacted with several scientists of international repute in the field of ocean colour, for which I feel fortunate. Moreover, as an Indian participating in an international cruise, this was a memorable experience which I will cherish for a lifetime. I thank POGO for this fellowship through which young researchers like me get to learn pertinent skills and techniques in oceanography which is very beneficial for their career development in the field of ocean science."

POGO-AMT Fellowship 2014



The successful candidate for the POGO Visiting Fellowship for training on-board an Atlantic Meridional Transect (AMT) cruise in 2014 is Rafael Rasse from Instituto Venezolano de Investigaciones Cientificas, Venezuela. The title of his project will be "Investigating empirical relationships between particulate organic carbon concentrations and inherent optical properties across biogeographical provinces of the Atlantic Ocean". The programme, now in its 7th year, has proved to be very successful in providing sea-going experience to young scientists from developing countries, and the opportunity for them to be involved in an internationally renowned scientific programme. Rafael will visit Plymouth Marine Laboratory (PML), UK, for 1

month prior to the start of the cruise to participate in cruise preparation and planning; will go on the cruise (12 Sept-28 Oct 2014) from UK to South America; and after the cruise will spend one additional month at PML, learning to analyse the results statistically and interpret them.



Rafael Rasse

POGO Capacity Building News (cont'd)

POGO Visiting Professorship 2013

Report from Visiting Professorship in South Africa

The 2013 POGO Visiting Professorship was successfully completed in December 2013 when Dr. Declan Schroeder (Marine Biological Association, Plymouth, UK) visited Dr. Hans Verheye (Oceans and Coasts Research, Department of Environmental Affairs (DEA), Cape Town, South Africa). A combination of taught and hands-on practical sessions, within the format of a lab-based workshop was used to illustrate "best practice" in acquiring molecular data from archived marine samples. Twenty eight students from six countries took part including South Africa, Namibia, Madagascar and Tanzania; in addition there were also two participants from as far afield as Costa Rica and Australia who attended this workshop. The workshop started with a Public Lecture on the 27th November entitled "The Virus, the Sea and the Honeybee Conundrum – Virus Ecology: implications for honeybee health and marine ecosystem function", where Dr. Schroeder provided the wider context behind using molecular-based methods to describe key biological processes.

The remainder of the course was laboratory-based and the participants were taught the "What's, Why's and How's" of molecular technologies such as DNA extraction and PCR and Sequencing (including next-generation sequencing). The course was designed for marine biologists and biological oceanographers with limited or no experience in molecular techniques. Participants had at least a BSc Hons (or equivalent 4-yr degree) and had to justify in their applications why they would benefit from the course. They had been encouraged to bring their own preserved sample(s) to analyse during the workshop. The focus was on ethanol and buffered formalin-preserved samples such as tow silks from the Continuous Plankton Recorder (CPR), water samples containing phytoplankton, as well as various other biological specimens or parts thereof, including sponges, fishes (inter alia coelacanth!), sharks, and dolphins. This training course helped disseminate and standardise research-based molecular protocols applied to existing environmental samples such as the South African CPR sister survey, whilst also introducing technologies developed elsewhere for other purposes (e.g. the medical field). A 40-page methods manual was also developed and distributed to the course participants. On 3rd December Dr Schroeder gave an additional seminar, this time to the local marine research community (including the course participants), entitled "Is *Emiliana huxleyi* responding to a rapidly changing world?", which was hosted under the auspices of SANCOR (South African Network for Coastal and Oceanic Research).

An overall aim of the course was to ensure that future requirements for technique and instrumentation development were appreciated by all relevant parties. By holding the workshop in Cape Town, it was possible to use the high-quality laboratory facilities of the Molecular and Cell Biology (MCB) Department at the University of Cape Town (UCT), to work on samples from a range of marine environments. This work will be able to be extended well after conclusion of the course, through the establishment of an MoU between the two research institutions.

Grants for this course were received from POGO and SCOR, whilst costs for laboratory supplies and chemicals were borne by DEA. In addition to these, costs for the use of laboratories and equipment as well as for the printing of manuals were covered by UCT's MCB and Marine Research Institute (MaRe) respectively.

Participants' Testimonials:

"The lectures and background information presented in lectures were very informative. It provided a useful introduction into genetic methods and theory behind them."

"After completion of the course, I feel confident to repeat the procedures with the methods given to us in the course material."



Participants of the POGO Visiting Professorship course with Dr. Schroeder & Dr. Verheye
Photo credit: Anon, UCT

"The workshop holistically was very informative and mind opening. I liked every bit about the workshop, I wish we could do another just so to get used to the whole molecular mining discipline."

"I found everything extremely useful. It was the first time I have worked with genetics and this will be very important for my PhD and future research endeavours."

*This article was provided by Hans Verheye (Department of Environmental Affairs)
and Declan Schroeder (Marine Biological Association)*

News from the POGO members

Crowning glory for Plymouth Marine Laboratory

PML wins the Environment and Conservation category at the 15th Annual Charity Awards



This spring, scientists and staff from Plymouth Marine Laboratory (PML) were delighted to win the Environment and Conservation category at the 15th Annual Charity Awards, for the Europe-Africa Marine Earth Observation Network (EAMNet) project. The Charity Awards is Civil Society Media's annual awards programme held to identify, recognise and reward those organizations doing exceptional work in all areas of charitable activity.

PML led the EAMNet project, a collaboration linking Earth observation information providers, user networks and centres of excellence in Europe and Africa in the area of coastal and marine observations. Partners of the programme included other POGO members: National Oceanographic Centre, Southampton (UK) and University of Cape Town (South Africa).

It aims to provide African nations with the resources they need to manage their aquatic environments more effectively and ensure long-term sustainable development in the region, to help in the alleviation of poverty. The EAMNet Fellowship programme was tailored after the POGO-SCOR Visiting Fellowship Programme.

Steve Groom, EAMNET Project Co-ordinator, commented: "I am delighted that the EAMNet project has won the Environment and Conservation Charity Award since it recognises the valuable work that PML and its African and European partners have done in training, research collaboration and satellite data provision to Africa. It is gratifying that many activities including data deliveries are continuing whilst the bilateral contacts established will allow collaboration in the future. In particular I would like to thank Jenny Lockett and Dr Marie-Fanny Racault as EAMNET Project Managers for the successful running of the project."

PML's Chief Executive, Professor Stephen de Mora, who collected the award, commented: "We are overjoyed to have won this category at the Charity Awards. To have been shortlisted from so many other worthwhile charities was an honour but to win! We are absolutely over the moon. EAMNet is just one of the many projects where we are sharing our knowledge and expertise with others around the world to help maintain healthy and sustainable seas for the benefit of all."

The EAMNET project received funding from the European Union's Seventh Framework Programme under Space Call SPA.2009.3.2.01 International Cooperation.



This article was provided by Helen Murray, Communications Administrator, Plymouth Marine Laboratory

Texas A&M launches gliders to study hypoxia

Hypoxia in Gulf of Mexico to be monitored with the aid of gliders

Texas A&M oceanographers deployed for the first time four gliders along the Texas-Louisiana coast this summer to test levels of hypoxia.

"This is the first step in using gliders to determine if we can autonomously and continually monitor the dead zone in real time," said Steve DiMarco, principal investigator and one of the world's leading experts on the hypoxic conditions in the ocean.

Ten scientists and four crew members aboard the NOAA-operated R/V Manta participated in the five-day cruise. DiMarco is a professor of oceanography in the College of Geosciences and ocean observing team lead with the Geochemical and Environmental Research Group. DiMarco and his team have researched hypoxia (low oxygen conditions in seawater), due to continental run-off for more than a decade. In addition to measuring oxygen levels, the gliders can provide valuable data for other ocean hazards and threats, including harmful algal blooms, oil spills and ocean acidification," he said.

"With gliders, the goal is to operate in the ocean for longer periods of time when compared to conventional ships. The hope is this will lead to more data and better understanding of societally relevant processes such as coastal hypoxia."

Most gliders, DiMarco said, operate in much deeper water, which helps their mobility. To measure hypoxia, however, the gliders move more slowly because they are taking measurements at depths of 60 feet or less, leaving them vulnerable to the strong currents and heavy fishing activities found in the Gulf of Mexico. Of the four gliders deployed, two continue to operate in the Gulf, transmitting key information back to shore every six hours about ocean temperature, salinity, chlorophyll fluorescence, and dissolved oxygen concentrations. The next glider cruise is set to deploy in mid-August.

Texas A&M hypoxia research is funded by the National Oceanographic Atmospheric Administration (NOAA), the National Ocean Service, and the Center for Sponsored Coastal Ocean Research.

The glider data are made available to the public by the Gulf of Mexico Coastal Ocean Observing System (GCOOS) and the NOAA Integrated Ocean Observing System (IOOS). Both GCOOS and IOOS are providing funding for the glider aspects of this experiment.

This article was provided By Eliana Mijangos, Communications Specialist, College of Geosciences



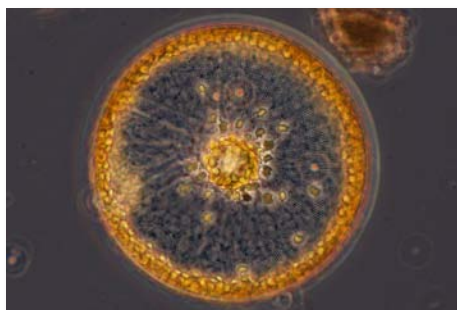
Several gliders and one autonomous surface vehicle will be deployed as part of the hypoxia monitoring experiment in summer 2014.
Image credit: GERG, TAMU

News from the POGO members (cont'd)

Microbial monitoring in global ocean proposed

Call for an international Marine Biodiversity Observation Network

Bigelow Laboratory for Ocean Sciences scientists William Balch and Michael Lomas joined colleagues from the National Oceanic and Atmospheric Administration, University of Southern Florida, Oregon State University, and the Monterey Bay Aquarium Research Institute in calling for the creation of an international Marine Biodiversity Observation Network (MBON) to provide regular monitoring of ecosystem function at the microbial level.



Coscinodiscus is found throughout the global ocean and is one of the largest solitary diatoms in the Gulf of Maine.
Photo Credit: Dr. P. Countway, Bigelow

In a commentary by Muller-Karger *et al.* in the June, 2014 issue of *Oceanography*, they make a compelling case for how an MBON could provide key data to help identify problems and design solutions for ongoing changes in the global ocean.

The group proposes to standardise metrics and monitor vital signs of ecosystem function by focusing on microorganisms because of the important role they play in maintaining balance in the global ocean and overall planetary health. They were also chosen because human pressures are affecting microbial assemblages, and these can be measured and their impacts assessed.

Such ongoing changes in microbial communities have a boomerang effect, bringing with them changes in fishery catch potential, patterns of harmful algal bloom occurrences, dispersal of invasive species, and possibly other shifts in marine habitats around the world.

The group has a plan to implement a coordinated, international monitoring effort with the goal of "understanding ecosystem function - that array of biogeochemical and ecological interactions within a system, as well as the services that ecosystems may provide." The first step would be to determine the minimum set of observations to define microbial biodiversity. The next, and perhaps more difficult, step, would be to connect existing international programs and standardise methodologies so data could be compared on local, national, regional, and global scales. This would require the integration of existing time series and commitment of governments around the globe to provide funding so what is happening at large ocean scales can be foretold by assessing its tiniest and most fundamental inhabitants.

This article was provided by Darlene Trew Crist, Director of Communications, Bigelow Laboratory for Ocean Sciences

New study links dredging to diseased corals

Australian Scientists find increased incidence of coral disease at dredging sites

Scientists have published research on July 17 in the journal, PLoS, showing that dredging activity near coral reefs can increase the frequency of diseases affecting corals.

"At dredging sites, we found more than twice as much coral disease than at our control sites," said the lead author of the study, Joe Pollock, a PhD candidate from the Australian Institute of Marine Science (AIMS), the ARC Centre of Excellence for Coral Reef Studies (Coral CoE) and James Cook University (JCU).

"Corals require both light and food to survive and unfortunately, dredging impacts corals on two fronts: increased turbidity means less light for photosynthesis, while increased levels of sediment falling onto the coral can interfere with their ability to feed," Pollock explained.

Already low on energy, the corals then must spend further energy cleaning the extra sediment from their surface. Such an energy imbalance can lead to chronic coral stress.

"Just like in any other organism, it seems that chronic stress can lead to increased levels of disease in corals," added Pollock.

In the past 20 years, the frequency of coral disease has risen across the world, and has become a significant factor in global coral reef decline. In the Caribbean, disease has diminished coral cover by as much as 95 percent in some locations.

This is the first study to examine the link between dredging and coral disease in nature. It was conducted near Barrow Island, off the West Australian coast. The site is close to where an 18-month, seven-million cubic metre dredging project took place, developing a channel to accommodate ships transporting liquefied gas to a nearby processing plant. The site was in otherwise very good condition.

The most common diseases affecting corals after dredging events are the 'white syndromes', where the coral tissues fall off, leaving behind exposed, white coral skeletons. These coral diseases are chronic, and there are fears that they may linger well after the completion of dredging operations.

This article was provided by Georgina Kenyon, AIMS Communication, the Australian Institute of Marine Science



Corals with white syndrome.
Photo credit: AIMS

News from the POGO members (cont'd)

Iconic Research Submersible "Alvin" Turns 50

The deep submersible Alvin turns 50 this year



Alvin
Image credit: WHOI

We know more about the surface of other planets than we do about Earth's ocean. And *what is* known about our ocean would not have been possible without the deep-sea submersible *Alvin*, one of the hardest working, most reliable vehicles for oceanography. *Alvin*, the iconic research submersible owned by the U.S. Navy and operated by Woods Hole Oceanographic Institution (WHOI), turns 50 this year. Christened on June 5, 1964, the sub has been a workhorse for U.S. scientists, safely taking approximately 2,600 researchers on nearly 4,900 dives, and enabling countless scientific discoveries.

"As the U.S.'s only deep-diving research submersible, *Alvin* is a national asset," said WHOI President and Director Susan Avery. "*Alvin* has not only enabled the routine exploration of the ocean and helped discover hundreds of previously unknown species, but it has also ignited a passion for science and marine life in people of every generation."

Following work in 2010 investigating the impacts of the Deepwater Horizon oil spill on deep-sea coral communities in the Gulf of Mexico, *Alvin* received the most extensive upgrade in its history—funded largely by the National Science Foundation. It returned to service in 2014 with enhanced components and capabilities: a new, larger personnel sphere with improved interior ergonomics; five viewports (instead of the previous three) to improve visibility and provide overlapping fields of view; new lighting and high-definition imaging systems; new syntactic foam providing buoyancy; and an improved command-and-control system.

"*Alvin* is a unique and important resource," said Adam Soule, a geologist and the newly-appointed scientific lead with the National Deep Submergence Facility at WHOI. "As chief scientist for deep submergence, I am passionate about enabling direct observations and sampling in the deep ocean by scientists across disciplines from genetics to geology, as I have experienced first-hand the remarkable insights that can be achieved by the small team of pilot and observers conducting science on the seafloor."

To mark the anniversary, WHOI is asking people to send birthday messages to *Alvin* which will be posted on a new *Alvin* 50th anniversary website and Facebook page for everyone to see. The website also contains milestones in *Alvin*'s history, videos of *Alvin* through the years, activities for kids, and a virtual tour of the sub.

This article was provided by Stephanie Murphy, Woods Hole Oceanographic Institution

UK scientists invited to Washington D.C.

"Our Ocean" Conference hosted by the U.S. Department of State



Discussion Panel at the "Our Ocean" conference
hosted by the U.S. Department of State
Image Credit: Richard Thompson.

In June, three of the UK's top environmental scientists were invited to address the delegates of the "Our Oceans" Summit convened by the US Secretary of State, John Kerry, in Washington D.C. They were amongst fewer than thirty scientists from around the world, providing hard-hitting messages about the need for closer global cooperation to overcome the challenges facing our oceans.

PML's Dr Carol Turley explained the chemistry, scale and unprecedented speed of ocean acidification. She commented, "The science is clear - we know that nearly 30% of the carbon dioxide released by human activities has already been absorbed by the ocean, causing acidification of its surface waters. We have just a decade or so to act to prevent major acidification, I hope that this conference is the first step in a global action to do so". Dr Phil Williamson (Natural Environment Research Council and the University of East Anglia) argued the need for more ocean acidification data, on a worldwide basis, to improve understanding, short-term forecasting and long-term projections. Professor Richard Thompson (Plymouth University) discussed the problems of marine plastic litter.

The conference had many high profile attendees such as actor Leonardo DiCaprio, as well as world renowned leaders in ocean science such as Dr Margaret Leinen, Director of Scripps Institution of Oceanography at UC San Diego and Member of the POGO Executive Committee.

The event took steps towards recognising the need for a unified global ocean policy, and the responsibility all nations have in safeguarding "our ocean". In a follow-up statement, Ambassador David Balton (US Deputy Assistant Secretary for Oceans and Fisheries) remarked that the event "exceeded even our greatest expectations".

This article was provided by Helen Murray, Communications Administrator, Plymouth Marine Laboratory

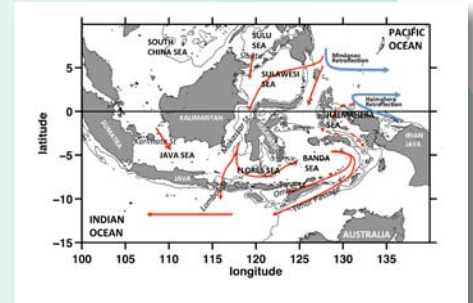
News from the POGO members (cont'd)

A New Understanding of a Key Ocean Passageway

Indonesian Throughflow linking Pacific Ocean to Indian Ocean is acting differently because of changes in climate system

The passageway that links the Pacific Ocean to the Indian Ocean is acting differently because of climate change and its altered behaviour could in turn affect climate in both ocean basins in new ways.

Researchers led by physical oceanographer Janet Sprintall of Scripps Institution of Oceanography at UC San Diego have found that the flow of water in the Indonesian Throughflow – the network of straits that pass Indonesia’s islands – has changed since the late 2000s under the influence of dominant La Niña conditions. The flow has become more shallow and intense like water that flows through a kinked hose. The study, published in Nature Geoscience, suggests that human-caused climate change might make this characteristic a more dominant feature of the throughflow, even when El Niño conditions return.



The mean pathway of the Indonesian throughflow is shown by red lines, and the contribution to the throughflow from the South Pacific is shown by the dashed lines.
Image credit: Scripps



Deployment of Acoustic Doppler Current Profilers (ADCPs), instruments that measure the current speed and direction in the water column, in the Ombai Strait, 2006.
Image credit: Scripps

Sprintall and colleagues have spent more than a decade understanding the dynamics of the throughflow, an ocean region that acts like a cable sending information between two electronic devices. The Indonesian seas are the only tropical location in the world where two oceans interact in this manner. The throughflow has an effect on the climate well beyond its boundaries, playing a role in everything from Indian monsoons to the El Niño phenomena experienced by California.

Sprintall said this research begins a new chapter in the history of the throughflow, one characterised by the changed variables created by global warming.

“Now that we have a better understanding of how the Indonesian Throughflow responds to El Niño and La Niña variability, we can begin to understand how this current behaves in response to changes in the trade wind system that are brought on through anthropogenic climate change,” Sprintall said. “Changes in the amount of warm water that is carried by the throughflow will have a subsequent impact on the sea surface temperature and so shift the patterns of rainfall in the whole Asian region.”

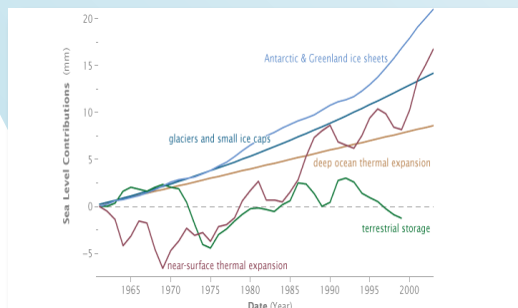
This article was provided by Robert Monroe, Communications Officer, Scripps Institution of Oceanography, UC San Diego

High Level Briefing in Washington D.C. on Ocean Observing

Dr. Robert Gagosian (one of the founding fathers of POGO) and Dr. Anthony Knap (POGO Executive Committee member) were selected by the US President’s science advisor to make a presentation to the President Obama’s Council of Advisors for Science and Technology (PCAST) in Washington D.C. on July 11, 2014. PCAST consists of senior scientists and technologists who help provide guidance on Science and Technology for the President and the Executive Office. The theme of the event on July 11th was the oceans and consisted of a presentation on the US National Ocean Policy, presented by Beth Kertulla, a presentation by Bob Gagosian entitled “the Impact of a Changing Climate on the Ocean” and a presentation by Tony Knap entitled “The Future of Ocean Observing: Challenges and Opportunities”.

The presenters were limited to 15 minutes each but the presentation was webcast and can be found via this link:

www.tvworldwide.com/events/pcast/140711/globe_show/default_go_archive.cfm?gsid=2560&type=flv&test=0&live=0



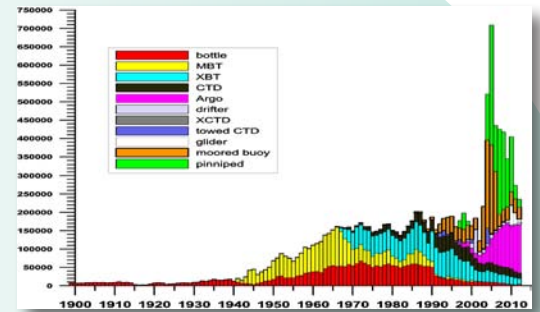
Sea level rise as a function of time.
Image Credit: NASA Earth Observations, adapted from Domingues et al., 2008.

Dr. Gagosian's presentation very much set the stage focusing on climate change and the changes in temperature of the globe. He explained changes to emissions over time and the importance of the ocean in regulating climate being the heat flywheel of the planet. He then discussed the theory and effects of ocean acidification. The main part of Gagosian’s presentation was sea-level rise as is one of the major concerns for coastal communities, using super storm Sandy as an example. Dr. Gagosian concluded with the statement that we need a co-ordinated plan to measure the oceans over time such as a Global Ocean Observing System with new sensors, new platforms and sustained funding.

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Dr. Knap followed discussing the history of GOOS and the need for sustained observations stating “You can only manage what you can measure”. This will require new technologies especially to sensors for improved measurements for Biology, Chemistry and Physics on sufficient globally distributed platforms. There needs to be a more effective Public/Private sector integration. He started with a summary stating that the system is behind schedule due primarily to funding, it is not a full operational capacity and some of the funding comes from research versus operational funding and that the deep ocean (below 2000m) is terribly undersampled. Satellites, Argo and new science such as genomics have made huge contributions, and thanks to POGO, emerging nations are getting involved. Yet we are a long way from an Integrated Global Ocean Observing system. Knap focused on the potential impacts of Ocean Heat on many aspects of societal concern. The data rate of profiles of Ocean measurements distributed to the World Ocean Database have not changed significantly since 1965. However, if it was not for Argo this would have decreased. Both Gagosian and Knap reaffirmed the importance of the ocean and the need to measure it to manage it effectively.



Ocean measurements distributed to the World Ocean Database have not changed significantly since the mid-1960's.

Image credit: World Ocean Database.

This article was provided by Anthony Knap (Texas A&M) and Robert Gagosian (Consortium for Ocean Leadership)

POGO Activities

POGO Executive Committee Meeting

The POGO Executive Committee Meeting took place on 18-19 June 2014 in London. It was attended by Executive Committee members John Field (Chair), Eduardo Balguerias, Tony Knap, Margaret Leinen, Bruce Mapstone, Yoshihisa Shirayama, Karen Wiltshire and Trevor Platt, and Secretariat members Shubha Sathyendranath and Sophie Seeyave. Apologies were received from Mike Coffin.

The members worked hard during the two-day meeting to address the many issues that had emerged from the Partners' Meeting in Hobart, in January 2014. Plans were sketched for the next POGO Meeting in Tenerife (27-29 Jan 2015), particularly with reference to themes for parallel workshops, the timing and duration of the Partners' Meeting and keynote speakers for plenary sessions. Other agenda items included the Terms of Reference for the Finance Committee, the restructuring of the dues, identification of priorities and the new POGO Strategy, Secretariat hosting and staffing, POGO's legal status and various funding opportunities and engagement with partner organisations. All in all, it was a very productive and collegial meeting, and the high attendance demonstrated the strong commitment of the Executive Committee members to the organisation.

This article was provided by Sophie Seeyave, Assistant Director, POGO Secretariat



Oceans and Society: Blue Planet Book

Book is available for purchase from Cambridge Scholars Publishing

The book, 'Oceans and Society: Blue Planet' is now available to purchase from Cambridge Scholars Publishing at the following link: www.cambridgescholars.com/oceans-and-society

To subscribe to the updates on Blue Planet activities, please complete your details at: www.oceansandsociety.org/subscribe.html



The Oceans and Society: Blue Planet now has a Twitter account @GEOBluePlanet



POGO Secretariat

Plymouth Marine Laboratory

Prospect Place

Plymouth PL1 3DH, UK

Tel. +44 (0)1752 633424

E-mail pogoadmin@pml.ac.uk

<http://ocean-partners.org>