

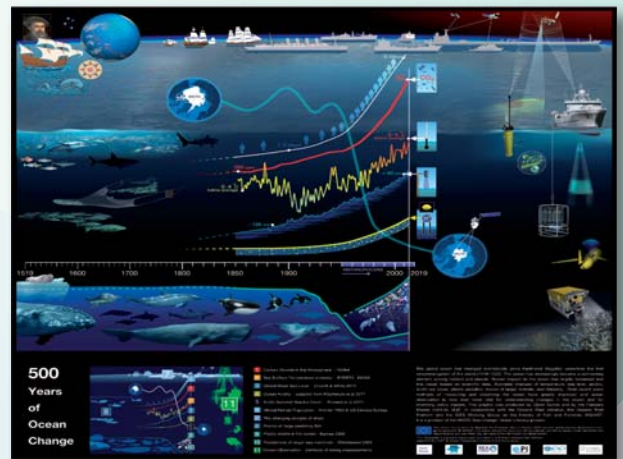
News from the POGO members

New 'Sea Change' Resource shows how the World Ocean has changed over 500 years

Many of the detrimental changes that are occurring in the ocean are out of sight and, therefore, out of mind. Recently, the EU-funded Sea Change project has launched a number of original and inspiring resources that help foster a deeper understanding of how human activities impact on ocean health. Ocean health and human health are intrinsically linked and, by helping the general public to understand how their activities affect the ocean, Sea Change calls on all citizens to take responsible action to support a healthier ocean. Jan Seys of the Flanders Marine Institute (VLIZ), one of the work-package leaders of Sea Change, says "The ocean is crucial for our planet and is constantly in a state of change. When rather abrupt and human-induced changes are at stake, scientists and educators should feel responsible and share their knowledge as much as possible with the public. Only by informing and engaging citizens can we build Ocean Literacy, encourage well-informed decisions, and change behaviour for the sake of a healthy planet".

One of the new resources demonstrates the symptoms of anthropogenic change and includes rising sea temperatures, sea-level rise, changing pH or acidity levels, plastic debris and melting ice-caps, as well as pressures facing marine biodiversity. This powerful new Sea Change infographic, developed by British Illustrator Glynn Gorick and VLIZ in collaboration with the Oceans Past Initiative and the Oceans Past Platform, shows recorded measurements of the dramatic changes the ocean has undergone since Ferdinand Magellan embarked on his voyage around the world 500 years ago (1519-1522). It also illustrates the remarkable development of ocean observing systems worldwide: <http://seachangeproject.eu/images/SEACHANGE/OurOceanOurHealth/500-yrs-high-res.jpg>.

All of the Sea Change resources have been developed to foster a deeper understanding amongst European citizens of how their activities impact on ocean health: <http://seachangeproject.eu/ouroceanourhealth/ocean-literacy-resources>.

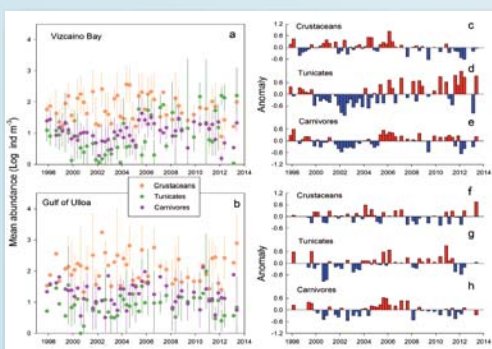


500 years of ocean change. For full screen view: <http://seachangeproject.eu/images/SEACHANGE/OurOceanOurHealth/500-yrs-high-res.jpg>.

Image credit: Sea Change Project, Glynn Gorick et al.

This article was provided by Jan Seys, Head of the Communications, VLIZ (Flanders Marine Institute - Belgium), chair of the European Marine Board Communications Panel.

IMECOCAL surveys shed light on regional zooplankton responses to changing climate



Trophic zooplankton groups (Crustaceans, Tunicates, Carnivores) in the coastal shelf of the Baja California peninsula. Mean abundances from Vizcaino Bay (a) and the Gulf of Ulloa (b) are shown to the left, and separated anomalies for each group are also shown to the right (taken from Lavaniegos et al., 2015).

In previous articles we have mentioned the oceanographic programme "Investigaciones Mexicanas de la Corriente de California", better known as IMECCAL (see POGO Newsletter July 2016). This programme, which carries out oceanographic cruises along the Mexican sector of the California Current System (CCS), focuses on three key fields of study: physical oceanography, biogeochemical processes (nutrients, primary productivity), and biology (zooplankton, fisheries oceanography). One of the main objectives of the biological part of the IMECCAL programme is to characterize the marine biota in the subtropical sector of the California Current. Although this has been studied in the past, it is possible that the distribution and abundance of zooplankton species may have been affected by climate change. In order to gain a better understanding of the ecosystem, continuous monitoring is required to develop time series of species abundances. Such data will, in turn, allow evaluation of species composition and the effect of climatic perturbations on the zooplankton.

In the twenty years since September 1997, we have collected around 4300 zooplankton samples by deploying bongo nets during cruises in this area, making it possible to detect important fluctuations in zooplankton taxa. For example, in Vizcaino Bay (28-29°N) the amount of crustacean grazers (copepods and euphausiids) has decreased in recent years while gelatinous tunicates (salps, doliolids, pyrosomes and appendicularians) increased. Why has this trend confined to the bay? Could something similar spread to the oceanic region in the future?

In order to understand why the observed tendencies are located in Vizcaino Bay and adjacent regions, the oceanic monitoring must continue off Baja California. Climatic events occurring in the CCS, such as El Niño and El blob, or long-term oscillations as the PDO and the NPGO, affect the zooplankton in different ways in particular regions. In addition, the increase of gelatinous tunicates suggests important changes in the particle size of phytoplankton, and the cascading ecological effects could have an impact on fisheries and economic activities.

Reference: Lavaniegos B.E., Molina-González O. y Murcia-Riaño M. 2015. Zooplankton functional groups from the California Current and climate variability during 1997-2013. *Océanides* 30(1):45-62.

This article was provided by Bertha E. Lavaniegos, IMECCAL, Biological Oceanography Department, CICESE.

News from the POGO members (cont'd)

The Helmholtz Association is setting up a flexible, mobile measuring system for Earth observation



Climate Modeling Icon.
Photo credit: AWI/ Martin Künsting.

Over the next five years, nine research centres of the German Helmholtz Association will collaborate to create a flexible, mobile measuring system for Earth observation: MOSES – Modular Observation Solutions for Earth Systems. The Helmholtz Centre for Environmental Research – UFZ leads the project in which the Alfred Wegener Institute and the GEOMAR participate.

How does flooding change terrestrial ecosystems and coastal regions? How do ocean eddies influence marine energy transport and food chains? Global change will affect the Earth system and environment in the short and the long term, both locally and globally. However, there is a lack of knowledge as to how dynamic events limited in space and time impact on the long-term development of Earth and environmental systems. The new MOSES observation system is designed to close this gap. Over the next five years, the Helmholtz Association is investing almost €28 million in the creation of MOSES, reinforcing its leading role and visibility in international Earth system research.

“The MOSES project will allow us to demonstrate in an impressive way the Helmholtz Association’s particular strengths,” says Prof. Otmar D. Wiestler, President of the Helmholtz Association. “Nine centres in two research fields, firstly Earth and Environment and secondly

Aeronautics, Space and Transport, will be working together on big questions affecting the future of our society. In this interdisciplinary collaboration, they will be able to pool their expertise in a way that uniquely benefits Earth system research as a whole.

The new infrastructure will be designed as a ‘system of systems’. The participating centres will develop, miniaturise and automate sensor and measuring systems, which will then be combined to form specific observation modules. These will record energy, water, greenhouse gas and nutrient cycles on the land surface, in coastal regions, in the ocean, in snow and ice regions, and in the atmosphere – but especially the interactions between Earth systems.

This article was provided by Susanne Hufe, Public Relations, UFZ, and Dr. Ute Weber, MOSES Coordinator, UFZ

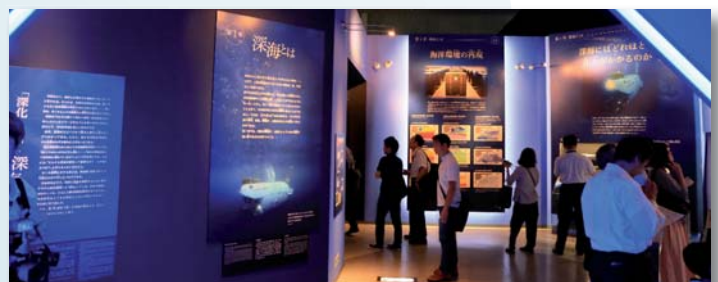
Special Exhibition “DEEP OCEAN” held at the National Museum of Nature and Science

A Special Exhibition “DEEP OCEAN”, of which JAMSTEC was one of the organisers, was held at the National Museum of Nature and Science (Kahaku).

“DEEP OCEAN”, which ran for 79 days, ending on 1 October 2017, attracted a total of 617,062 visitors* and became one of the most popular special exhibitions in the history of the National Museum of Nature and Science.



Special Exhibition “DEEP OCEAN” poster.
Photo credit: JAMSTEC.



Entrance of the Special Exhibition “DEEP OCEAN”
Photo credit: JAMSTEC.

The exhibition featured “bioluminescence”, “giant creatures” and “hadal zone” with a variety of specimens and films. It also included recent research on gigantic earthquake disasters and energy resources.

*Second-highest visitor count for a special exhibition in the history of National Museum of Nature and Science

This article was provided by Jin Tachihara, International Affairs Division, JAMSTEC.

News from the POGO members (cont'd)

Scientists have identified how coral reefs, hundreds of miles apart, are connected by ocean currents. Observing these networks from space may prove vital for their conservation.

Coral reefs are among the most biodiverse ecosystems on the planet. They occupy less than 0.2% of the world's oceans, but support a treasure trove of life - around 35% of all known marine species are found on and around reefs. They are, however, under threat; climate change, ocean acidification and a range of human activities are all affecting these fragile ecosystems. Resilience to these threats is stronger when the reefs are better connected, sharing a flow of life and genes between them that helps to maintain healthier populations, but such connections are not easy to identify.

By bringing together satellite observations, genetic population data and model simulations, a team led by Plymouth Marine Laboratory (PML) scientists has now traced this connectivity. Dynamic circulation features in the Red Sea, such as eddies and currents, form pathways along which marine life can flow. And at the source of these pathways are invaluable 'mother reefs' spreading life to other Red Sea reefs. These 'mother reefs' are perhaps the most important reefs of all when considering management and conservation strategies, suggests lead author Dionysios Raitsos, of PML.

"Essentially, these reefs are 'population donors', enhancing gene flow around the Red Sea, and their conservation should be prioritised over other reefs," said Raitsos.

Initial conclusions were based on the connectivity between reefs observed from satellites in space. To establish if these findings had any real ecological substance, the team tested the results against the genetics of the Red Sea's anemonefish (*Amphiprion bicinctus*) population. The predictions of connectivity were remarkably consistent with population data, demonstrating how currents and circulation form pathways for larval stages of marine life around the Red Sea.

Connectivity models often require costly approaches and data that are difficult to collect. This research instead showcases a cost-effective tool and method, using freely available satellite data-sets to enable the estimation of connectivity remotely, and guide more effective management of waters where oceanographic information may be in short supply.

"Discovering how coral reefs are connected and how water circulation in the Red Sea carries life to distant reefs is vital in furthering our understanding of these vulnerable ecosystems," said Raitsos. "Our findings and cost-effective approach can benefit conservation and management efforts on coral reefs around the world."

Original papers:

<https://www.nature.com/articles/s41598-017-08729-w>

<http://www.natureasia.com/en/nmiddleeast/article/10.1038/nmiddleeast.2011.119>

<https://www.newscientist.com/article/2145901-mother-coral-reefs-are-breathing-life-into-their-neighbours/>

This article was provided by Nik Hubbard, Communications Officer, PML.

Global Mapping of Ocean Ecosystem Health by FAU Harbor Branch and NASA

Scientists at Florida Atlantic University's Harbor Branch Oceanographic Institute (HBOI) along with other members of NASA's Plankton, Aerosol, Cloud, ocean Ecosystem (PACE) Investigation Team are on a mission to map ocean ecosystem health from space. HBOI's Drs. James Sullivan and Michael Twardowski are part of the PACE Science Team, a group of scientists coordinating the science plan for a next generation satellite, launching into space in 2022.

Once active, PACE will be the most advanced global ocean color and aerosol mission ever launched and will add to climate data records while unveiling new insights on life in our ocean. Ocean color from space is the only way scientists can map critical ocean health parameters on a global scale. PACE's data will reveal interactions between the ocean and atmosphere, including how they exchange carbon dioxide and how light and nutrients fuel phytoplankton growth in the surface ocean. Extending and expanding NASA's 40 year record of satellite observations of our living planet will allow scientists to take the Earth's pulse in new ways for decades to come.

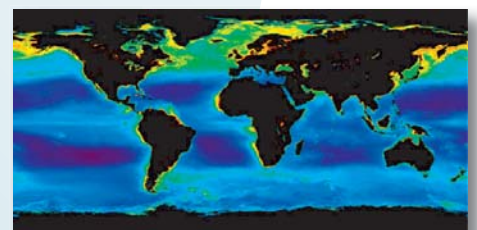
By observing the biosphere from space, scientists can learn more about climate change, air quality and about issues closer to home, like harmful algal blooms in the Indian River Lagoon. Through the imagery, scientists can see the distribution of algal blooms, determine what kind of phytoplankton is responsible for the disturbance, and create predictive models. Since the 1970's, ocean color satellite data has provided direct benefits to society in areas such as water resources monitoring, fisheries management, air quality forecasting and disaster monitoring.

The project is funded by NASA Ocean Biology & Biogeochemistry (OBB) Program. To learn more, visit <https://pace.gsfc.nasa.gov/>

This article was provided by Kayla Egbert, Communication Coordinator, FAU Harbor Branch Oceanographic Institute.



Red Sea coral reef.
Image credit: Dreamstime



Global phytoplankton abundance. Credit: NASA
Source: https://pace.oceansciences.org/gallery_more.cgi?id=890

News from the POGO members (cont'd)

Marine scientists conduct UK seabed health check



Creatures like this common starfish live on the UK seabed but it is the sediment below that can tell scientists about the true health of the ocean. Photo credit: SAMS

A group of UK scientists has published extensive research following a large-scale health check on the UK's seabed.

The researchers looked into how industry and environmental change are affecting our seafloors and concluded more work must be done to safeguard these complex ecosystems and the benefits they provide.

As part of a large research consortium involving eight UK institutions and organisations, an intensive sampling campaign included three scientific cruises in just six months to examine areas of ocean located on the UK continental shelf. This helped scientists understand the sensitivity of these systems to human activities. The societal importance of these ecosystems extends beyond food production to include biodiversity, carbon cycling and storage, waste disposal, nutrient cycling, recreation and renewable energy.

The research findings are published in a special issue of the journal *Biogeochemistry* <https://link.springer.com/journal/10533/135/1/page/1>

Martin Solan, lead principal investigator and Professor in Marine Ecology at the University of Southampton, said: "Our seafloors are teeming with life, from microscopic organisms, to larger creatures such as fish and crabs. All interact as part of a complex system which plays a vital role in maintaining

the health of the seabed and the rest of food web.

"Human intervention, such as fishing, pollution and activities causing climate change are all affecting these finely balanced ecosystems. Collectively, our research provides us with a new perspective on how the seafloor is being modified, for better or for worse, – but more research is now needed to understand the longer-term consequences of such change for the wider environment and for society at large."

As part of the project, scientists at the Scottish Association for Marine Science (SAMS) measured how oxygen concentrations varied within the seafloor of the Celtic Sea. The researchers measured how levels of oxygen changed over the seasons and between the different sediment types.

Importantly, their results gave valuable information on the importance of the seafloor in removing carbon dioxide from the atmosphere.

This article was provided by Euan Paterson, Communications and Media Officer, SAMS.

Widespread interest in Netherlands expedition 'Changing Oceans'



Dutch Research Vessel RV Pelagia
Photo Credit: ©NIOZ

During the first half of 2018, NIOZ Royal Netherlands Institute for Sea Research and NWO-Science (Netherlands Organisation for Scientific Research) will jointly organize a multidisciplinary scientific expedition with the Dutch national research vessel RV Pelagia. The preliminary title of the expedition is *Netherlands Initiative Changing Oceans* (NICO). Based on research questions from a wide variety of Dutch universities, applied knowledge institutes, and industry, the expedition aims to provide the Netherlands with a better understanding of changing seas and oceans, crucial for climate stability and sustainable economic activities (including food, energy, resources, transport and tourism).

There is widespread interest in this Dutch expedition, as was apparent from the 40 research proposals that were pitched during the first workshop on September 29th. Before the next workshop, on November 14th, research proposals will be selected and combined to make the 6-month-expedition route as efficient and productive as possible. RV Pelagia will sail from its home port of Texel, via the North Sea and Central Atlantic Ocean, to the Caribbean Region.

A source of inspiration for the expedition is a policy document recently published by the Dutch Government (*Oceanennotitie, Future-proof oceans*, in Dutch). The publication outlines the national view on ocean policies, and emphasises that healthy and resilient oceans are of prime relevance to the Netherlands, including the Caribbean parts of the Kingdom.

This article was provided by Kim Sauter, Head of Communications, NIOZ.

News from the POGO members (cont'd)

The Second Meeting of IOCAS & YICCAS International Scientific Advisory Board was held in Qingdao, China

The Second Meeting of the International Scientific Advisory Board of Institute of Oceanology and Yantai Institute of Coastal Zone Research, Chinese Academy of Sciences (IOCAS & YICCAS) was held in West Coast Campus IOCAS, Qingdao, China from 10-11 Oct 2017.

The IOCAS & YICCAS International Scientific Advisory Board is comprised of 15 world-class scientists from America, Australia, Canada, Germany, Japan, New Zealand, Russia, and the United Kingdom. The board meeting, which is held every other year, serves as a platform for the directors and scientists of IOCAS & YICCAS to share information on their research progress and activities with the board members, and to discuss potential research directions and strategic plans for the coming years.

The invited lectures of this meeting were (1) An introduction to the University of Plymouth Marine Institute, by Dr. Martin Attrill, Director of the Marine Institute, University of Plymouth. (2) The Strategic Plan of the Institute for Marine and Antarctic Studies, University of Tasmania, by Dr. Millard Coffin, Executive Director of the Institute for Marine and Antarctic Studies, University of Tasmania. (3) "What JAMSTEC aims for -- Our Vision and Long-term Plan", by Dr. Wataru Azuma, Executive Director for Development and Operation, JAMSTEC, Japan. (4) Examples of the utility of coastal science - drawn from work at the Institute of Coastal Research, HZG, Germany by Dr. Hans von Storch, Senior Scientist and former Director of Institute of Coastal Research, HZG, Germany. (5) Challenges and Opportunities: Mega Science Centre for Oceanography, CAS, by Dr. Fan Wang, Director of the Institute of Oceanology and Yantai Institute of Coastal Zone Research, Chinese Academy of Sciences.



The Second Meeting of IOCAS & YICCAS International Scientific Advisory Board Group Photo
Photo Credit: Shaoqing Wang, IOCAS

Members of the Scientific Advisory Board listened to the reports from the leaders of six CAS Key Laboratories (Experimental Marine Biology; Marine Ecology & Environmental Sciences; Ocean Circulation and Wave; Marine Geology & Environment; Marine Environmental Corrosion & Bio-fouling; Coastal Environmental Process & Ecological Restoration) and one Centre (Centre of Deep Sea Research). The members also visited the West Coast Campus and Research Vessel "Kexue".

The IOCAS & YICCAS is committed to comprehensive basic research and technology development in marine science, focusing on marine environment safety, sustainable utilisation of biological resources, and deep-sea exploration, to build an open-sharing, world-class marine scientific research and innovation centre.

This article was provided by Yanwei Li and Fengfan Yang, International Cooperation Office, IOCAS

Dr Tony Worby has been appointed as Director of CSIRO Oceans and Atmosphere. He took up the position in August 2017, and he is based in Hobart. Dr Worby is responsible for managing the organisation's marine and atmospheric scientists across Australia.

Dr Worby was the Chief Executive Officer of the Antarctic Climate and Ecosystems Cooperative Research Centre from July 2014 to July 2017.

Prior to this appointment, he was a Deputy Chief with the CSIRO Division of Marine and Atmospheric Research (2011-14). Before that, he held the role of Program Leader for the Australian Antarctic Division's Ice, Oceans, Atmosphere and Climate research program (2009-11).

Dr Worby completed his undergraduate studies at Flinders University (SA), with majors in oceanography and meteorology, before moving to Tasmania to pursue a career in polar science. He undertook an Honours program studying the surface heat budget of the Antarctic sea ice zone, before commencing a PhD focused on sea ice physics and the role of Antarctic sea ice in the global climate system. He worked for many years as a research scientist with the Australian Antarctic program and has authored more than 60 peer-reviewed scientific papers.

Dr Worby has visited Antarctica 17 times and participated in more than a dozen multi-disciplinary marine science programs in the sea ice zone. He was Voyage Leader or Chief Scientist on many of these voyages and has a deep understanding of marine science operations. He is a member of the Australian Academy of Science's National Committee on Antarctic Research, and the Earth Systems and Climate Change Steering Committee for Australia's National Environmental Science Program. He also serves on the Tasmanian State Government Antarctic Advisory Group and is a committee member of the Tasmanian Polar Network.

Dr Worby was a Fulbright Scholar at NASA/Goddard Space Flight Centre in Washington DC in 2000. On his return to Australia he held the post of National President of the Fulbright Alumni Association for 5 years and was instrumental in the development of the Tasmanian Fulbright state scholarship program.



Dr Tony Worby.
Photo credit: CSIRO.

This article was provided Tony Worby, Director of CSIRO Oceans and Atmosphere.

News from the POGO members (cont'd)

Study finds 2015/16 Tasman Sea marine heatwave a sign of things to come

A new study has found that human induced climate change was almost certainly responsible for a marine heatwave in the Tasman Sea in the summer of 2015/16, and similar events are increasingly likely worldwide in coming decades.

Published in the international journal Nature Communications, the research found the heatwave affected an area more than seven times the size of Tasmania for 251 consecutive days, reaching a peak intensity of 2.9 degrees Celsius above expected summertime temperatures.

A research team led by scientists from IMAS and the ARC Centre of Excellence for Climate System Science found the heatwave was driven by a surge of warm water in the East Australian Current, which has been getting stronger in recent decades.

Lead author Dr Eric Oliver said impacts were felt across industries and ecosystems, and industries and governments should prepare for an increase in such events throughout the 21st Century.

"Scientists are inherently conservative about making grand claims, but we can say with 99 per cent confidence that anthropogenic climate change made this marine heatwave several times more likely, and there's an increasing probability of such extreme events in the future," Dr Oliver said.

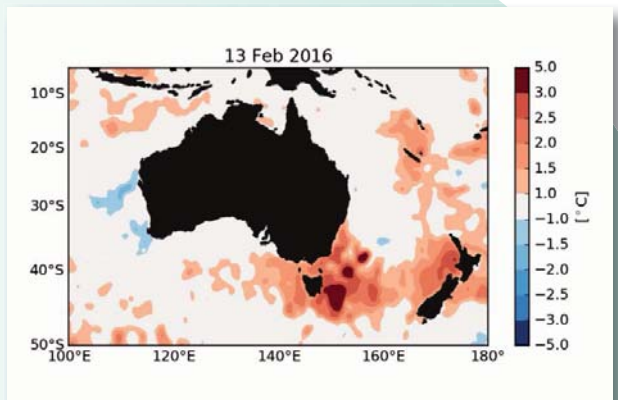
"The 2015/16 event was the longest and most intense marine heatwave on record off Tasmania and significant impacts were felt across marine ecosystems."

Co-author Associate Professor Neil Holbrook said ongoing monitoring and research was needed to enable the early identification of future heatwaves and to support adaptive management of marine resources.

"The evidence shows that the frequency of extreme warming events in the ocean is increasing globally," Associate Professor Holbrook said.

"In 2015 and 2016 around one quarter of the ocean surface area experienced a marine heatwave that was either the longest or most intense recorded since global satellite records began in 1982."

This article was provided by Andrew Rhodes, Communications Manager, IMAS, University of Tasmania.



Extent of the Tasman Sea marine heatwave in February 2016.
Photo Credit: IMAS

Capacity Building updates

2017 Special POGO Visiting Fellowship for Ship-board Training on an Atlantic Meridional Transect (AMT) Cruise



Cristabel Macrina Fernandes and Hashan Niroshana Kokuhenadige with Ian Brown on RRS Discovery
Photo credit: Andy Rees.

The Atlantic Meridional Transect (AMT) is a multidisciplinary programme which undertakes biological, chemical and physical oceanographic research during an annual voyage between the UK and destinations in the South Atlantic.

POGO-AMT Fellow Cristabel Macrina Fernandes and NF-POGO Fellow Hashan Niroshana Kokuhenadige (see previous issue of POGO Newsletter) have just reached the Island of South Georgia and are due to arrive in the Falkland Islands on the 5th of November.

After the cruise Cristabel and Hashan will spend approximately one additional month at PML, learning to analyse the results statistically and interpret them.

Follow AMT-27 updates on Twitter

Capacity Building updates (cont'd)

Ocean-Colour Data in Climate Studies - NERC Advanced Training Course Testimonials

Aditi Mitra from CSIR-NIO (India) and Daniel Brieva from COPAS Sur-Austral (Chile) were the two selected POGO funded candidates who attended the NERC Advanced Training Course on Ocean-Colour Data in Climate Studies that took place in Plymouth, UK, from the 18th to 22nd September 2017. See article by Dr Marie-Fanny Racault on the following page.

The quotes below are taken from Aditi and Daniel's reports.

What applications of the training received do you envision at your parent institution?

Aditi: "During the training program in PML, I have gained practical skills on ocean colour applications. I have learned to apply python program to develop algorithms for rectification of satellite data. In my parent institute, we are used to use corrected satellite image and we spend a lot for the satellite image correction. Hereafter, I will try to use my knowledge for image rectification which will not only help saving the money but will also increase our competence. I have learned to use the ESA BILKO module to monitor phytoplankton seasonality based on phenological indices and their importance for coral reef biology and to monitor ENSO with the help of SST, sea level variations and wind field. I would like to use these parameters for estimating the climatic variability of India".

Daniel: "We hope to implement:

- Improve the description of coastal marine circulation and dynamic along the Chilean Patagonia
- Use observations along the Chilean Patagonia to estimate the differences with estimations of Ocean Colour and other Remote Sensing products
- Ocean colour (remote sensing) data assimilation in numerical models representing different places along the Chilean Patagonia".

How will you disseminate the knowledge acquired in your institute/region?

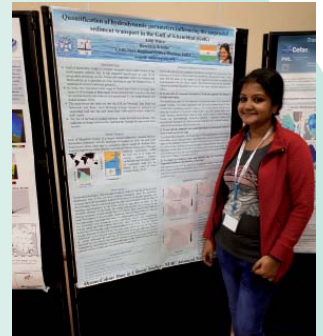
Aditi: "I already have started spreading my knowledge to my fellow researchers of my lab. I am planning to give a presentation on what I have learned so that researchers from other divisions could also take interest to use ocean colour data. Most importantly, I would help others to use open source ocean colour data, instead of purchasing, based on my experience gained in the course work".

Daniel: "We are planning to create short workshops for students at under and postgraduate courses".

What are your future aspirations?

Aditi: "In institutional level, we always knew that we could develop our knowledge ocean colour data. This training program has given the knowledge as well as some motivation to work on satellite data which I will continue in future for my PhD. We were encouraged to create some good contacts with the researchers of PML and also to remain as a team which will help us to solve any future difficulties. The poster presentation on my research topic has helped me a lot to gather advises from pioneers of oceanographic research which I will definitely incorporate in my future research".

Daniel: "We hope to improve representations of the marine Chilean Patagonia region on the remote sensing products, including ocean colour".



Aditi Mitra at poster presentation session. Photo credit: Aditi Mitra.

NF-POGO CofE-AWI Year 5

The NF-POGO CofE Year 5 officially started on Monday 25th September. The ten Year 5 scholars comprise of 5 males and 5 females, from a range of academic disciplines, including 2 from Latin America, 3 from Africa, 2 from the Indian Sub-Continent and 3 from South-East Asia.

The scholars spent the first week at the AWI in Bremerhaven, before travelling to Helgoland and completing their registration and other formalities. In the following week they gave introductory presentations on their individual backgrounds, then received lectures in general oceanography. They then travelled to the island of Sylt where they have attended lectures on geological processes and food webs, and will remain there until the end of November.



Left to right: Ajin Ambika MADHAVAN (India), Annette Wilson (AWI), Felipe AMORIM (Brazil), Willy Karol ABOUGA BODO (Cameroon), Yet Yin HEE (Malaysia), Josselyn Nathaly CONTRERAS ROJAS (Chile), Gay Amabelle Gultiano GO (Philippines), Shahasrakiranna SAMBODJO (Indonesia) and Marwa BALOZA (Egypt) boarding the ferry to Helgoland.

Pogo Working Groups & Professional Training Initiatives

Ocean-Colour Data in Climate Studies - International Training Course at PML

An International Training Course on "Ocean-Colour Data in Climate Studies" has been held at PML over five days from 18-22 September 2017. A total of 32 PhD and early career researchers from 14 countries attended the course. The course was composed of a combination of lectures and computer-based practical classes covering the topics of: 1) Ocean-colour fundamentals; 2) Modelling primary production; 3) Ocean-colour applications for ecosystem state assessment; 4) Climate impacts and feedbacks; 5) Ocean colour in data assimilation; 6) Datasets archive, management, visualisation and analysis.



Group photo.

Photo Credit: Plymouth Marine Laboratory (PML).

PML ocean-colour experts from the science areas of Earth Observations and Modelling provided excellent teaching materials, complemented by lectures from POGO executive director Dr. Sophie Seeyave on ocean policy relevant information, and the International Oceanographic Data and Information Exchange (IODE, UNESCO) Training Coordinator Dr. Claudia Delgado on data management and the OceanTeacher Global Academy.

The course was funded primarily by a NERC Advanced Training Short Courses (ATSC) grant, and with international fellowship bursaries from POGO, IODE UNESCO, and Copernicus EUMETSAT.

Course feedback has been overwhelmingly positive, with high-satisfaction reported by the trainees. The course leader Marie-Fanny Racault says: "It has been a brilliant and stimulating experience to share knowledge, and exchange ideas on ocean-colour research with the new generation of marine scientists. I was very impressed by the breadth of research topics studied by the trainees, and their eagerness to learn about ocean-colour science and applications. The course ran very smoothly thanks to active support from POGO secretariat, PML science support office and to most passionate and dedicated lecturers".

This article was provided by Dr. Marie-Fanny Racault, Senior Scientist, Earth Observation Science and Applications, PML.

Observing and Modeling the Meridional Overturning Circulation in the South Atlantic (SAMOC) Working Group

The South Atlantic Meridional Overturning Circulation (SAMOC) program is an effort carried out by an international group of researchers to study the role of the South Atlantic in the Meridional Overturning Circulation (MOC).

The SAMOC WG Fact Sheet has been finalised, and is now available on the POGO website (<http://ocean-partners.org/wg-samoc>).

The SAMOC-WG was created with overall the goal to expand the international participation in the SAMOC initiative, for the enhancement of the general moored array, to help in the conduction more intense samplings of hydrographic properties along the whole extent of the SAMBA line and to conduct and analyze the results of numerical experiments.

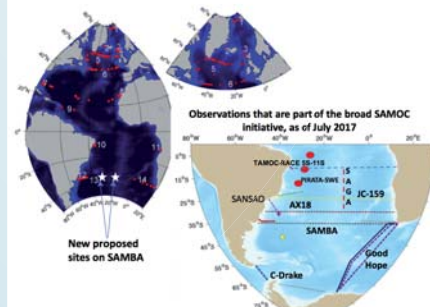
The general strategy is to strengthen the existing collaboration among South Atlantic countries and to establish closer links with the North Atlantic initiatives, allowing for inter-comparison of the array designs, data analysis techniques and methods for calculating the transports of volume, heat and freshwater, enabling best practices to be shared amongst all teams observing the AMOC.



Participants of the SAMBA/GO-SHIP Cruise in January 2017, on board the German RV Maria S. Merian. Photo credit: SAMOC.

The Atlantic Meridional Overturning Circulation Observing System

1. Fram Strait
2. Denmark Strait
3. Faroe Bank Channel
4. Faroe-Shetland Ridge
5. OSNAP: Overturning in the Subpolar NA Program
6. NOAC: North Atlantic Change
7. & 8. RAPID-MOC/MOCHA/WBTS
9. MOVE
10. 11-5/Brazil
11. 11-5/Angola
- 12., 13. and 14. SAMBA



POGO Representation at International Meetings

European Marine Science Educators Association (EMSEA) 2017 Conference, and Sea Change GA meeting, University of Malta, Valletta, Malta, 8-12 October 2017

In October, POGO Communications Officer, Fiona Beckman, represented POGO at the 5th European Marine Science Educators Association (EMSEA) 2017 Conference, in Valletta, Malta. The EMSEA meeting was followed by a Sea Change General Assembly meeting.

EMSEA is an international non-profit organisation committed to boosting ocean literacy (OL) in Europe, and provides a platform for ocean education in the different European regional seas.

The first day's presentations included parallel tracks on the themes of 'The Digital Age of OL', 'Future Scenarios for OL', and 'Promoting further Penetration of OL in School Curricula'. Fiona attended the 'digital' track, which included reports from (1) Sea Change citizen science projects (eg crab watch, which allows the public to submit data/reports via an app), (2) an outreach project using Live Streaming to connect classrooms with scientists in the field (eg an Arctic field station), (3) a research tool in development for measuring the impact of ocean literacy, and (4) a 'bring your own device' (BYOD) public engagement project which allows aquarium attendees to download an interactive app instead of borrowing audio guidebook devices.



Sea Change General Assembly group photo.
Photo credit: Fiona Beckman.

During the second morning, a Keynote from Anwi Benham (International Ocean Institute) emphasised the importance of reaching policy makers through ocean literacy projects, and students from the Malta Eco Schools network were enthusiastically received when they presented a declaration on the sustainable use of the oceans, produced during their recent Youth Summit. The delegates then self-organised into themed discussion groups for 'Open Space' sessions. Topics included the upcoming Magellan 500 anniversary celebrations, with which POGO is involved, and Ocean Literacy Communications. In the afternoon, two concurrent plenary sessions took place – one focused on 'Oceans and Human Health' and included reports from (5) ProSea sustainable fisheries education directed at fishermen, and (6) Social Innovation Participation Processes (SIPPs). The parallel session covered diverse topics relating to OL.

The conference brought together delegates from a variety of backgrounds to discuss and evaluate approaches to Ocean Literacy, with a view to improving outreach and engagement with target audiences. For more information, visit <http://www.emsea.eu/>. The next EMSEA conference will take place in Newcastle Upon Tyne, UK 2 - 4 October 2018.

Following the EMSEA conference, Fiona participated in the Sea Change General Assembly meeting, which also took place at the University of Valletta.

Sea Change is an EU H2020-funded project that aims to establish a fundamental "Sea Change" in the way European citizens view their relationship with the sea, by empowering them, as Ocean Literate citizens, to take direct and sustainable action towards a healthy ocean, healthy communities and ultimately a healthy planet. The project, which launched in March 2015, brings together 17 partners from nine European countries and is due to conclude in February 2018.

POGO is a member of the International Advisory Group (IAG) for Sea Change and this General Assembly meeting, which focused on what the project needs to complete in its final months, together with legacy actions, was the final progress update for all work packages.

Other News

Changes in the POGO Secretariat



Dr. Vikki Cheung, Scientific Coordinator for the POGO Secretariat has moved on to a new position as a Project Manager for Plymouth Marine Laboratory from mid-October. Any enquiries that would have previously been directed to Vikki should now be sent to the POGO Secretariat (pogoadmin@pml.ac.uk).

Vikki was an excellent contributor to the work of the Secretariat and to the smooth running of POGO as a whole. The POGO Members, Executive Committee and Secretariat would all like to thank her for all her hard work and dedication to POGO over the last 5 years, and wish her well in her new position.

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