International Cooperation:

1. **GEO**: The meeting re-affirmed the POGO strategy to work with GEO towards raising the profile of oceans at the ministerial level within GEO and GEOSS. Specifically, it is proposed to submit an overarching Task to GEO that straddles across various societal benefit areas of GEO, with focus on oceans. Action: Secretariat.

   **Report**: The POGO Secretariat submitted a proposal to the GEO Secretariat for an over-arching task on oceans that would encompass existing activities and programmes within GEO (ChloroGIN, SAFARI, GOOS) and other activities not currently represented in GEO (CPR, OceanSITES…) as well as emerging initiatives (e.g. IQOE). The proposal was discussed at the GEO Work Plan Symposium in May 2011 (attended by a representative of the POGO Secretariat) and this led to the creation of Task SB-01 “Oceans and Society: Blue Planet” in the version of the GEO Work Plan that was approved by the Plenary at GEO-VIII in Istanbul in November 2011 (also attended by a representative of the POGO Secretariat). The Secretariat invested considerable effort into the creation of this Task and ensuring that it was included in the Work Plan. The relationship between POGO and the GEO Secretariat has improved considerably throughout the year as a result.

2. **OceanObs’09 Task Team Report**: POGO to comment on Task Team Report (“Integrated Framework for Sustained Ocean Observing”). POGO members collectively to promote an element of ocean observations over the next 2-3 years, both with advocacy and in practical matters related to implementation. Initial focus: OceanSITES. Specific action: promote common framework of observations; facilitate establishment and maintenance of an international coordinating office. Action: Member Directors. Coordinator: Tony Knap.

   **Report**: The POGO Secretariat circulated a request for comments on the Framework to the POGO membership. A technical coordinator has been appointed by JCOMM to manage the OceanSITES programme, and a Steering Committee Meeting and Data Management Meeting were convened at SIO in December 2011. POGO supported the attendance of a member from a developing country (Brazil). See presentation by Bob Weller et al. and supporting documents.

3. **Ocean observatories**: organise an international workshop of system engineers involved in ocean observatories to promote interoperability. Action: Bob Weller, Kiyoshi Suyehiro and Secretariat.

   **Report**: The OceanSITES Steering Committee Meeting and Data Management Meeting convened at SIO in December 2011 were to start discussing plans for this workshop.

4. **Recommendation to IOC**: POGO to request that IOC investigate procedures within the intergovernmental mechanism to formally endorse core observations. Action: Secretariat.

   **Report**: This is already an activity that has been underway on an informal basis. IOC has received on a number of occasions requests to write letters of support from the point of view of GOOS regarding a specific proposal for the start or maintenance of in situ or satellite observations. As long as these are consistent with adopted GOOS planning documents, IOC has been happy to provide these. POGO members should be made aware that IOC is open to writing such letters on their behalf.
Disasters:

1. POGO to raise awareness of lessons learned from recent disasters about the value of an ocean observing system. Action: Member Directors. Coordinator: Jim Luyten.

2. POGO to help COPAS with its post-earthquake and tsunami recovery efforts, through (a) helping them to find potential funding sources; (b) continuing support of the COPAS Austral Summer Institute; Action: Member Directors. Coordinator: Carina Lange.

Report: POGO sponsored the Austral Summer Institute XII, Carina Lange will report on this ASI at POGO-13. The University of Concepcion has also put efforts into recovering a small lab in Dichato, in the old Biogeochemical building. This lab is for embarkation and disembarkation purposes only (e.g. preparing equipment for the cruise, filtering samples upon return, etc). It is used on a temporary basis, and no expensive equipment is stored there. The university authorities are seeking funds for the future new coastal station. They already have the land and the architectural project. Progress in attaining funding has been slowed by some bigger problems in the educational system in Chile which includes schools and universities. There have been no undergraduate classes for the past 5 months so priorities have been shifted. But they will continue with efforts regarding funding for the new station. The RV Cabo de Hornos that was damaged by the tsunami is being repaired at the shipyard ASMAR, huge progress is being made and plans are to have it in the water in 2013.

Science coordination:

1. POGO, in coordination with Oceans United, to begin developing plans to convene a meeting of ocean-interest organisations and institutions on world scale to take leadership role on ocean matters. Action: Secretariat and Executive.

Report: Discussions on this were initiated during a meeting of the Chairman and POGO Secretariat in early December 2011. Further discussions took place between the POGO Secretariat and Douglas Cripe from the GEO Secretariat about convening the meeting as a “Blue Planet” Symposium in conjunction with the 9th GEO Plenary in Foz do Iguacu (22-23 Nov 2012).

2. POGO to help University of São Paulo respond to request for advice from government of Brazil on benefits to society of ocean observations. Action: Member Directors, as required. Coordinator: Edmo Campos.

Report: the scientific community managed to convince the government that instead it would be better to invest in building oceanographic ships. Edmo Campos to report on this during the meeting.

3. POGO to develop a strategy document for next 3 to 5 years, including a 1-page summary of POGO success stories and priorities for possible production of briefing papers for policy makers. Action: Secretariat and Executive.

Report: A document was drafted by the Secretariat and circulated to the Executive in October 2011.


Report: To be provided by Weidong Yu during the meeting.
5. Expo Yeosu 2012: POGO to liaise with other exhibitors in the Expo 2012 to see what contribution POGO can make, jointly with other exhibitors, to the OCBPA part of the Expo. Action: Secretariat.

The Secretariat has been busy collating material from the members to provide the Expo designers with, and discussing the exhibit concept and design with the company appointed by the Expo. Secretariat members met with the designers on several occasions. The exhibit plan was drafted in November. It is anticipated that a site visit will be possible in February 2012. See presentation by Sophie Seeyave and associated briefing.

6. Continue to support the International Quiet Ocean Experiment, in particular the Open Science Meeting to be held in August-September 2011. Action: David Farmer and Sophie Seeyave.

Report: The Secretariat has continued to support this initiative, by participating in the planning of, and attending the OSM at IOC-UNESCO in August-September 2011. The OSM brought together members of the community (~75 participants from 15 countries) to draft the Science Plan that will guide the project over the next decade. The meeting was funded by the Sloan Foundation. A proposal was also submitted to the European Co-Operation in Science and Technology (COST) programme in March, and re-submitted in September, to obtain funding for a series of workshops over the next 4 years, however the proposal has not been successful. The Executive Summary of the Science Plan has been submitted to the POGO members as part of the meeting documents. The Executive Committee is expected to agree on a process for reviewing the Science Plan. A side meeting of relevant parties (Sloan Foundation, SCOR, POGO, Co-Chair of IQOE…) will also take place during POGO-13.

Capacity Building:

1. POGO to offer coordination of selected training courses in the ocean arena and to contribute to IOC/IODE/SCOR compilation of existing training programmes. Action: Secretariat.

POGO participated in a capacity building workshop organised by SCOR in Izmir, Turkey, in April 2011. As a result of the previous workshop in Bremen (also attended by POGO), a web portal on summer schools and other training opportunities in ocean science has been created by IODE, with sponsorship by POGO and SCOR. The POGO Secretariat has an administrator account to add opportunities to this website. POGO members are invited to advertise this portal within their institutes, and to contact the Secretariat if they wish to add training courses to it. The Executive Director of SCOR has also been invited to the POGO Meeting and will give a presentation on the potential collaborations between SCOR, POGO and IOC.

2. POGO to continue its sustained capacity building efforts: Advertise, select candidates, coordinate and support NF-POGO Centre of Excellence Year IV. Action: Secretariat.

Report: POGO has continued its capacity building efforts (POGO-SCOR fellowships, POGO Visiting Professorship, NF-POGO Centre of Excellence, UCT Postgraduate Bursary, Austral Summer Institute). In addition, it has continued the development of its NF-POGO Alumni Network for Oceans (NANO), which brings together over 200 trainees from past NF-POGO programmes. A NANO Meeting was held in Abingdon, UK, in September 2011, where project proposals were prepared for four NANO regions (Latin America, Africa-Europe, East Asia and Indian Sub-Continent). POGO also proposed to sponsor a scientist from a developing country to attend the Phytoplankton Taxonomy Training Course in Plymouth in July 2012.
3. **POGO to work with IOC/GOOS-AFRICA to support dedicated African capacity building initiatives in operational oceanography at marine science institutes and universities within Africa.** Action: Secretariat.

   **Report:** The Secretariat has been in communication with Justin Ahanhanzo (IOC) regarding this, and has initiated discussions between Justin, Kurt Hanselmann (SCOR Visiting Scholar who spent time teaching in Namibia) and Lisa Levin and David Checkley (POGO Visiting Professors who spent time teaching in Namibia). Justin is planning a Symposium and training course to be held in conjunction with the POGO-14 meeting in Cape Town.

4. **POGO to work with IODE to formalize an arrangement for IOC/IODE support for NF-POGO Centre of Excellence training module on data management.** Action: Secretariat.

   **Report:** This is underway. See presentation by Peter Pissierssens.

5. **POGO to request IOC to make existing online training material, and related access information, available to POGO Members.** Action: Secretariat and Boram Lee.

   **Report:** The material is already available on-line, but we need to discuss how it could be made more useful to POGO members (see presentation by Peter Pissierssens).

6. **POGO to discuss with IOC the possibility of future POGO involvement in capacity building for UN Regular Process.** Action: Secretariat and Boram Lee.

   **Report:** To be discussed (see presentation by Wendy Watson-Wright).

**Liaison with IOC:**

1. **POGO to request IOC to name a POGO point of contact within the IOC to become effective after Boram Lee moves to WMO.** Action: Secretariat.

   **Report:** the new POGO contact is Albert Fischer.

2. **POGO to participate in the 2011 IOC Assembly.** Action: Secretariat.

   **Report:** Trevor Plat attended the Assembly.

3. **POGO to review I-GOOS proposal for GOOS governance when the IOC Action Paper is issued in April, and provide comments to the IOC.** Action: Secretariat and Executive.

   **Report:** The proposal was circulated to the members and feedback was incorporated into the POGO response.

4. **POGO to complete transfer of Oceans United website.** Action: Secretariat.

   The website is available at [www.oceans-united.org](http://www.oceans-united.org) and the previous (IOC) version has been modified so that it only includes a members-only section on outreach, and a link to the new website.

5. **POGO to develop a new Oceans United mailing list.** Action: POGO Secretariat.
POGO:

1. **Revise the by-laws of POGO as and when required.** Action: Secretariat and Executive.
   
   **Report:** the by-laws were revised by the Secretariat and circulated to the members. The changes were approved by the entire membership.

2. **In coordination with the Nippon Foundation, organise and deliver the first NF-POGO Scholars Alumni Meeting in Tokyo in September 2011.** Action: Secretariat.
   
   **Report:** Following the earthquake and tsunami in Japan, the Alumni Meeting was postponed indefinitely, however a Network Meeting was convened instead (see Capacity Building item 2). Much progress has been made during the year in the development of the NF-POGO Alumni Network for Oceans.

3. **Finalise and distribute Seoul Declaration via mailing lists and website.** Action: Secretariat.
   
   (members to send to funding agencies and Ministers, as appropriate).
   
   **Report:** Seoul declaration was revised and distributed.

4. **Hold an Executive Committee Meeting before POGO-13.** Action: Secretariat and Executive.
   
   **Report:** A meeting between the POGO Secretariat and the POGO Chair took place in early December 2011 in Kiel, Germany. Furthermore, the Secretariat had the chance to meet or speak with several members of the Executive on an opportunistic basis to discuss strategic matters. It was not deemed necessary or practical to hold a meeting of the full membership of the Executive.
POGO Capacity Building

POGO is universally admired for its suite of capacity-building programmes which provide advanced training in ocean observations, especially for personnel from developing countries and economies in transition, through a series of fellowship schemes and a Centre of Excellence. It comprises:

- The Nippon Foundation-POGO Centre of Excellence in Ocean Observations (Bermuda Institute of Ocean Sciences) – see separate document.
- The POGO-SCOR Fellowship Programme, annually, under which scientists from developing countries can spend up to three months training in a major oceanographic institution. POGO awards about a dozen of these each year. The programme is over-subscribed by a factor of up to eight. To date, more than 100 young scientists have been trained under this scheme - see below and full reports in Ancillary Documents.
- The POGO Visiting Professor Programme under which one senior scientist, annually, visits a developing country to conduct training in ocean observations - see below and full reports in Ancillary Documents.
- The POGO-AMT Fellowship Programme, under which one scientist annually can participate in a major oceanographic cruise (the AMT cruise), and spend time at a participating major oceanographic institute before and after the cruise to experience cruise preparation and data analysis. In 2011, this programme was over-subscribed by a factor of fifty – see below.
- The POGO-UCT Bursary Programme under which one African graduate student, annually, is supported to study at the University of Cape Town, South Africa – see separate document.
- Travel support for participants from developing countries attending Austral Summer Institute courses at the University of Concepcion, Chile – see separate document.

All in all, this suite of training programmes is making a very significant contribution to reducing the deficit in trained observers of the ocean in developing countries. Under POGO capacity-building schemes, over 300 young scientists from about 50 countries have received advanced training. The massive over-subscription for POGO training schemes provides ample proof that the effort is responding to a genuine need. Feedback from both host supervisors and the 8 trainees themselves is highly positive.

POGO-SCOR Visiting Fellowships 2011

Out of 37 applications received, ten POGO-SCOR Visiting Fellowships were awarded for 2011. The successful applicants were selected on the basis of the quality of their application, relevance of the proposed training to POGO and SCOR, and demonstration that it will lead to sustained capacity building at the host institute. The selection committee also had to strive to achieve regional balance in the final selection. The awardees are from Argentina, Brazil, Croatia, Estonia, India, Peru and Sri Lanka. The host institutions include Australia, USA, UK and France.

POGO-AMT Fellowship

This year’s POGO-AMT fellow was Dr. Alaa Younes, from the National Institute of Oceanography and Fisheries (NIOF) in Alexandria, Egypt. He was working with Dr. Gavin Tilstone, from Plymouth Marine Laboratory, on the effect of CO₂ enrichment on plankton community structure, photosynthesis and primary production in the Atlantic Ocean. He arrived at PML at the end of August to receive training prior to the cruise, then embarked on RRS Discovery on 29 September with the rest of the AMT scientific party. The 6-week cruise started in Avonmouth (UK) and end in Punta Arenas, at the southern tip of Chile. Dr. Younes will then spend a further 4 weeks at PML carrying out some post-cruise analyses.

POGO Visiting Professorships

Last year’s Visiting Professorships were awarded to Profs. Lisa Levin and David Checkley, both from Scripps Institution of Oceanography, who spent 6 months (Jan-June 2011) of sabbatical leave teaching and mentoring at the National Marine Information and Research Centre (NatMIRC).

They spent an intensive seven days with 37 UNAM Biology and Fisheries students in March. They lectured at the University of Namibia in Windhoek on general marine ecology, bioinvasions, ocean observing, and climate change and fisheries. The students were taken to the Henties Bay marine facility where they sampled four salt
ponds, reflecting a salinity gradient from 35 to 200 ppt. Measurements, collections, and observations included water and sediment properties, planktonic and benthic algae and invertebrates, and birds.

The collections provided material for lab work over the next two days and assignments emphasized pond characterizations (species composition, abundance diversity) and ecosystem-level processes. Group presentations were given and discussions were held by the students. Additional activities at Henties Bay included two lectures on climate change (covering deoxygenation, acidification, natural and anthropogenic fisheries variations) and a rocky shore field trip to illustrate concepts given in lecture in Windhoek.

During their stay, they spent a lot of time mentoring students and scientists, including their hosts, Drs. Bronwen Currie and Anja Kreiner. This included advice on benthic survey/sampling design, sampling methods, isotope analyses and species identification, advice on the Continuous Underway Fish Egg Sampler (CUFES) and discussion of Northern Benguela ecosystems and fisheries.

They also established a Friday afternoon lecture series at NatMIRC. During the regular Friday seminars, all interested staff members (typically 15-20) were invited and joined discussions on several aspects of the pelagic system in the Northern Benguela. These seminars were very popular and provided an excellent opportunity at NatMIRC to exchange ideas on a regular basis.

They also spent one week at the University of Cape Town (UCT), hosted by Prof. Coleen Moloney. They taught, lectured, and interacted with students and staff in the Departments of Zoology and Oceanography.

“Prof. Checkley showed great interest and understanding for the challenges faced at NatMIRC,” commented Dr. Anja Kreiner. “I consider ourselves very fortunate that he spent six months at our institute and I am sure that many of the ideas sparked through discussions with him will be taken further and contribute to a better understanding of our marine system and improved management of our fisheries.”

The next year’s Visiting Professors have now been selected. Prof. Walker Smith (Virginia Institute of Marine Science, USA) will be visiting Lam Ngoc Nguyen at the Institute of Oceanography in Nha Trang, Vietnam, for 4 weeks in March 2012. Training will be on the use of fluorescence in oceanographic studies of coastal waters of Vietnam.

Map showing movements of POGO-SCOR visiting fellows (red), POGO-AMT fellow (orange) and POGO visiting professorship.
NF-POGO Centre of Excellence in Observational Oceanography

Introduction

The Bermuda Institute of Ocean Sciences (BIOS) has been hosting the Nippon Foundation-POGO Centre of Excellence (CofE) in Observational Oceanography since 2008. The Centre offers a 10-month programme of study to 10 students from around the world every year. To date, 40 students from 24 different countries have participated in the programme.

The (CofE) is intended to benefit the oceanographic community in regions or countries where ocean science is less advanced, and to improve the networking between scientists working in well-established and developing institutes of oceanography, by providing opportunities for human resource development in a sustained manner. A secondary goal is to provide continuing educational opportunities to the people who have been trained under the Nippon Foundation – POGO Visiting Professorship Programme, and to facilitate networking among the trainees and professors of the Visiting Professorship.

Bermuda Institute of Ocean Sciences has made an outstanding job of creating and maintaining the Centre of Excellence. The calibre of the scholars is very high, and increases every year. The programme is over-subscribed by a factor of about ten, although the number of applications has been decreasing in the last two years concomitantly with an increase in their quality. BIOS subsidises the annual budget of the Centre by a very substantial amount.

Timeline

The 4th Centre of Excellence programme is running from 1 August 2011 to 31 May 2012. Applications for the 5th Centre of Excellence (2012-2013) are now being accepted. The Selection Committee Meeting will take place at the end of January 2012 in London to select the successful candidates for Year 5.

Description of training provided

Training aims to promote excellence in integrated, multidisciplinary oceanography on a global scale and includes:

- Ship-board training on the R/V Atlantic Explorer, with the goal to provide numerous days at sea for each participant;
- A program that emphasizes Core Skills required by scientists (e.g. communication skills, both written and oral, numeracy, information technology, and science management);
- Observational Oceanography training using state-of-the-art instrumentation from BIOS faculty and staff involved in the eight BIOS time-series/observatory programs;
- Observational Oceanography workshops delivered by previous NF-POGO Visiting Professors including Drs. Trevor Platt, Robert Frouin, and others; and
- Guest lectures/workshops by the numerous research scientists who visit BIOS each year for work on the R/V Atlantic Explorer.

Long-term outputs

The opportunity for scientists and graduate students to interact closely with leading experts in their field can be extremely inspiring. The Centre of Excellence allows many trainees to be exposed to this opportunity at the same time. The legacy of a successful CofE is long-term; an entire group of scientists are trained from various parts of the world, and they in turn will return to their home countries, and will be in a position to train newcomers to their institutes.

The CofE has a direct and immediate impact on scientific capabilities in oceanography in developing countries. It brings the experience and status of major institutions to students and trainees who otherwise would not have that exposure. It enhances the effectiveness of POGO in advancing the goal of an integrated global ocean-observing network for the benefit of society worldwide.
Furthermore, collaborations between institutions are likely to be stimulated through the Centre of Excellence. Such collaborations enable institutions from developing countries to establish joint programs and secure funding that might not otherwise be available.

**Relationship between POGO and Nippon Foundation**

Nippon Foundation is POGO's biggest sponsor, by far. Their annual support at present exceeds $600K per annum. POGO has cultivated with care its working relation with the programme officers at NF, and it may be said that these interactions are on the highest level of mutual trust. The principal joint initiatives between POGO and NF are the Centre of Excellence in Ocean Observations at BIOS (Bermuda) and the network (NANO) of former scholars trained under NF-POGO programmes (including the former NF-POGO Visiting Professor scheme).

In addition to the training in Bermuda, each year the Centre organises regional training at a (movable) site outside Bermuda. This regional training lasts from two to four weeks, and builds on the presence at the chosen site of scholars who have already taken the Bermuda training, thus increasing the impact of the investment in the Centre. Regional training courses have been held in Brazil and in Viet Nam. Future courses are planned for South Africa and India.

POGO and the Nippon Foundation expect the former scholars of the Centre and other NF-POGO training schemes to remain engaged by participation in a world-scale network (NANO) of former scholars. The pool of former scholars has now reached a critical mass (209). The network is under active development and has just issued its first newsletter (see Briefing Document on NANO).

**Summary of funding received from Nippon Foundation Grants:**

- $381,000 for Year 1 of NF-POGO Visiting Professorship Programme;
- $241,000 for Year 2 of NF-POGO Visiting Professorship Programme;
- $281,000 for Year 3 of the NF-POGO Visiting Professorship Programme.

- $495,000 for Year 1 of the NF-POGO Centre of Excellence Programme (2008).
- $495,000 for Year 2 of the NF-POGO Centre of Excellence Programme (2009).
- $522,800 for Year 3 of the NF-POGO Centre of Excellence Programme (2010).
- $99,200 for NF-POGO Alumni Network preparatory meeting (2010)
- $522,800 for Year 4 of the NF-POGO Centre of Excellence Programme (2011).

**Requested for Year 5:**

- $522,800 for Year 4 of the NF-POGO Centre of Excellence Programme (2011).
- $125,000 for activities of the NF-POGO Alumni Network for Oceans (NANO)
Background

The Nippon Foundation, through its partnership with POGO, has provided professional training in observational oceanography to over two hundred young scientists from around the world, the majority from developing countries, between 2005 and 2011. Networking was always a priority for the joint NF-POGO initiatives and both the NF and POGO wanted the benefits of the training to extend beyond the formal training period.

The idea of forming a network of former scholars, or “alumni” thus emerged and matured into a plan to hold a meeting of selected alumni to formulate plans for the network. This meeting was held in London in October 2010, involving selected scholars and instructors, and Nippon Foundation and POGO representatives. The vision for the Network established during this meeting was "Integrated Observations of a Changing Ocean” and the common thread that would hold the network together was a common interest in, and commitment to, ocean science, and the common will to communicate scientific results to the general public. The network was named NF-POGO Alumni Network for Oceans, or NANO.

Objectives

The main objectives of NANO are:
- to establish regular communication between the Nippon Foundation, POGO and their former scholars,
- to provide them with further support, and
- to organize new activities that will involve professional collaboration between the Alumni.

It is also expected that:
- Regional Coalitions will be established (initially Asia, Latin America and North Africa/Europe and sub-Saharan Africa) whose activities will include regional co-ordination, workshops, information exchange and assistance with placement for prospective graduate students.
- There will be a free and vigorous exchange of information between and within Coalitions.
- There will be research projects carried out by NF-POGO Alumni and coordinated by NANO. Regional proposals for these projects should be written with due regard for local culture and customs, engaging senior managers in the Region from the outset.
- Research projects will focus on global and regional monitoring of biological, chemical and physical changes in the ocean, aiming at better understanding of interactions and feedbacks in the ocean. The concept is to observe locally at selected time-series stations around the global ocean, and network the time-series stations to obtain a global vision.
- These projects are to be run in collaboration with existing projects and aim to contribute to, rather than compete with, existing research programmes in developing countries.

Progress to date

Since the London meeting significant progress has been made in bringing the alumni into the network, establishing communication channels, and preparing for the future activities of the network. To undertake this work, it was essential to engage former scholars to assist the Secretariat. Thus, NF-POGO fellowships were awarded to former scholars from the second year of the Centre of Excellence: Lilian Krug (Brazil) and Olga Shatova (Ukraine), who were identified during the London Meeting as enthusiastic and excellent contributors, and at the time were seeking opportunities to further their research careers. Lilian’s fellowship was for 8 months (Jan-Sept 2011), and Olga’s for 3 months (April-June 2011). In both cases, the fellowships ended once the fellows had found a research or postgraduate (PhD) position that would further their career development. Both are currently continuing their support of NANO through part-time (20% FTE) fellowships. These fellowships have been supported by residual funds carried over from previous years of the NF-POGO programme.

The first step was to contact the alumni and gather their contact and career information to create a database of alumni. In total 209 questionnaires have been sent out to date, to alumni of the six NF-POGO Visiting Professorships (India, Fiji, Sri Lanka, Brazil, Tunisia and Viet Nam), the four years of the CoE, and the two regional CoE programmes (Brazil and Viet Nam). As of Dec. 2011, nearly two
thirds of the questionnaires have been returned, which is a very positive result considering that most of these alumni were trained 4-6 years ago and many will have moved on and changed e-mail address. There is a fairly good gender distribution among those who returned the questionnaire. The majority are from India, Brazil and Vietnam (VP host countries that had the best response). In terms of education, as of Sept. 2011, 84% had an MSc and 31% had a PhD. The most prominent research areas were Biological Oceanography and Remote Sensing.

The next major task was the creation of a website. Wikispaces was chosen as it is user-friendly, adopts a social networking approach (i.e. membership of the website, discussion forums, etc) and can easily include different types of media (e.g. maps and videos). The website was developed in Spring and announced in June. The URL is: http://www.nf-pogo-alumni.org. There are a number of pages open to the public, however all the pages containing personal information on the alumni are open to members only. Thus, te website is a virtual platform for communication within network, as well as providing information on NANO to the general public.

The website includes a private database of the alumni, whereby everyone who returned the questionnaire has a profile page (short CV) including education, professional achievements, research interests and publications. With the aim to facilitate collaboration, research theme pages were created as well as regional pages listing the alumni by research interest and by region, respectively. A page has also been created for “NANO friends”. The Opportunities page, where alumni can post jobs, scholarships, meetings and other announcements, is one of the most visited. As of Sept. 2011, nearly half of the alumni were members of the Wiki. This active response indicates a strong interest in participation in NANO projects. The website receives an average of forty unique visitors per day and visitors are from all over the world (see Figure 1). This shows that the alumni are very keen to be active members of the network and can see the benefits that will accrue from being part of NANO.

Figure 1. Map showing locations of NANO website visitors. Size of red dots is relative to number of visitors.

The most recent development has been the creation of the NANO newsletter. Once again, this initiative has been led by an alumnus, Kanthi Yapa from the Visiting Professorship in Sri Lanka. The idea for a newsletter was initiated at the London Meeting to open dialogue, develop and exchange research ideas and disseminate information to society at large. The first issue was released in September 2011, including articles by the newsletter “patrons” (from the POGO Secretariat and Nippon Foundation) and 6 articles by alumni outlining their research interests. An editorial board was nominated, and input was sought for a name and cover page ideas. See http://www.nf-pogo-alumni.org/NANO+Newsletter.
3 INFORMATION FOR SOCIETAL BENEFITS

SB-01 Oceans and Society: Blue Planet

Task implementation is supported by the Coastal Zone Community of Practice and Ocean Community of Practice

Related GEOSS Strategic Targets (from GEO-VI Document 12 Rev1)

**Climate**: Improved scientific understanding, modelling and prediction of climate. Accessibility of all the observational data needed for climate monitoring and services in support of adaptation to climate variability and change. Availability of all Essential Climate Variables needed by the WCRP, the IPCC and the UNFCCC.

**Ecosystems**: Increased operational monitoring of major marine and coastal ecosystems on an annual basis including properties such as extent, water temperature, salinity, pH and pCO2, phytoplankton species composition and productivity and marine resource stocks, based on remote sensing and sampled in-situ observations using internationally agreed standards.

**Agriculture**: Improved collaboration and coordination on the use and applications of Earth observations for fisheries and aquaculture.

**Biodiversity**: Increased routine collection of long term in-situ and remotely sensed biodiversity observations. Increased information sharing on biodiversity conservation and sustainable use of biodiversity resources. Increased availability of biodiversity information necessary to respond to and support related topics (ecosystems, health, climate, etc).

Description

Provide sustained ocean observations and information to underpin the development, and assess the efficacy, of global-change adaptation measures (such as those related to vulnerability and impacts of sea-level rise). Improve the global coverage and data accuracy of coastal and open-ocean observing systems (remote-sensing and in-situ). Coordinate and promote the gathering, processing, and analysis of ocean observations. Develop a global operational ocean forecasting network. Establish a global ocean information system by making observations and information, generated on a routine basis, available through the GEOSS Common Infrastructure. Provide advanced training in ocean observations, especially for developing countries. Raise awareness of biodiversity issues in the ocean.

Components

C1 Global Ocean Information Coordination and Access

**Leads**

EC (GMES), Germany (Bremen University), CEOS, GOOS, IOC (a.fischer@unesco.org), IEEE, POGO

**Priority Actions**

- Promote the implementation of the Global Ocean Observing System (GOOS), a scientifically designed international system for gathering, processing, and analyzing ocean observations, and distributing data products
- Support and provide access to GOOS products which describe the state of the ocean globally at regular intervals. In particular, develop access to GOOS Essential Ocean Variables datasets through the GEOSS Common Infrastructure building upon the GEOWOW project
• Continue to establish data management and communications systems (e.g. Regional Alliances) for interoperability among monitoring systems and data integration. Promote the development of internationally- and intergovernmentally-agreed coastal ocean observation standards, data sharing, and data management arrangements

• Establish a Global Ocean Information System (GOIS), building on existing capabilities such as GMES MyOcean and forging close links between data providers (in situ and satellite-based) which already have effective monitoring, forecasting, and other information tools available, and potential users

• Promote activities of the International Ocean Colour Coordinating Group (IOCCG) and applications of remotely-sensed ocean-colour data through coordination, training, liaison between providers and users, advocacy and provision of expert advice. Coordinate with CEOS climate activity plans to optimize its marine elements

• Develop vulnerability and integrated management of coastal zones in order to inventory, protect, and monitor coastal lands in the context of climate change and associated risk. Form links with disaster management activities (see also DI-01)

• Provide advanced training in ocean observations and services, especially for personnel from developing countries and economies in transition, through a series of fellowship schemes, pilot projects (e.g. MARINEMET, EAMNet) and a Centre of Excellence

**C2 Operational Systems for Monitoring of Marine and Coastal Ecosystems**

*Leads*
Canada (Dalhousie University, tplatt@dal.ca), Estonia (University of Tartu), UK (PML), USA (NOAA, WHOI), CEOS, GOOS, IEEE

*Priority Actions*

• Support the implementation of OceanSITES, a worldwide system of deepwater time-series stations, featuring capabilities such as surface moorings (observing air-sea interactions), and subsurface moorings (that can carry instrumentation down to the sea floor). OceanSITES complement satellite imagery and Argo float data by adding dimensions of time and depth

• Promote rapid development of a global high frequency radar network to measure coastal surface currents. High frequency radar is recognized as a cost-effective solution to augment in-situ measurements and provide increased spatial and temporal resolution

• Establish a global coastal network of observations and modeling that target sentinel and reference sites for rapid detection of changes in ecosystem states caused by land-based sources of pollution, fishing and climate change

• Promote the Chlorophyll Global Integrated Network (ChloroGIN) project which coordinates in-situ measurement of chlorophyll and related bio-optical properties of the ocean, in combination with satellite derived estimates of the same. ChloroGIN is a network of regional networks

• Develop and expand global plankton biodiversity monitoring, building upon 80 years of phytoplankton and zooplankton biodiversity data obtained in the North Atlantic by means of the “Continuous Plankton Recorder” survey (see also BI-01)

• Support the development of the “International Quiet Ocean Experiment” to quantify global ocean sound (natural/anthropogenic) and measure the effects of changing sound exposure on marine life. Implement essential acoustical applications within existing ocean observing systems (e.g. GOOS)

• Fully engage with the four ocean-related CEOS Virtual Constellations: Ocean Surface Vector Wind, Ocean Surface Topography, Ocean Colour Radiometry, and Sea Surface Temperature (see also IN-01)
C3 A Global Operational Ocean Forecasting Network

Leads
Denmark (DMI), EC (GMES), UK (MetOffice, mike.bell@metoffice.gov.uk), IOC/WMO (JCOMM), POGO

Priority Actions
• Support the continuation of the GODAE OceanView international programme for the consolidation and improvement of global and regional ocean forecasting systems, including development and scientific testing of the next generation of systems extending from open-ocean into shelf-seas and coastal waters, covering biogeochemistry and ecosystems, and using multi-model ensemble forecasting techniques
• Build upon forecasting systems, information and services developed in the framework of the GMES projects MyOcean and MyOceanII
• Establish a global operational oceanography network, connecting advanced operational forecasting centres in developed countries and quasi-operational centers in Asia, Africa and Latin America. Promote and extend international collaboration, and establish regional cooperation projects between advanced and less-developed operational centers
• Support assessment of observing system impact on ocean forecasting for the various components of the international ocean observation system
• Support events which provide a platform for communication and collaboration between national ocean forecasting systems to allow wide exchange of knowledge and expertise. Promote initiatives aiming to exploit operational ocean forecasting services for greater societal benefit

C4 Applications of Earth Observations and Information to Sustainable Fishery and Aquaculture Management

Leads
Canada (CSA, Dalhousie University, shubha@dal.ca), Estonia (University of Tartu), Nigeria (NASRDA), UK (PML), FAO

Priority Actions
• Facilitate the application of rapidly-evolving satellite technology to fish harvesting and fish health assessment. Accelerate the assimilation of Earth observation into fisheries research and ecosystem-based fisheries management on a global scale, through international coordination and outreach. Support the development of the Societal Applications in Fisheries and Aquaculture using Remotely-Sensed Imagery (SAFARI) project
• Design and implement a suite of ecological indicators with a view to detecting changes in ocean ecosystems (e.g. due to climate change, overfishing). Design and implement indicators responsive to seasonal and interannual changes in ocean ecosystems (see also EC-01)

To Be Implemented in Connection with
DI-01 Informing Risk Management and Disaster Reduction
CL-01 Climate Information for Adaptation
CL-02 Global Carbon Observation
EC-01 Global Ecosystem Monitoring
BI-01 Global Biodiversity Observation (GEO BON)
All “Infrastructure” and “Institutions and Development” Tasks
The OceanSITES Data Management Team and Scientific Steering Committee met at SIO in La Jolla for four days, November 29 – December 2, 2011. This face-to-face meeting had been preceded by virtual meetings of the Data Team. The meeting at SIO was very successful, marking a maturation and growth of OceanSITES. OceanSITES is moving from advocacy and coordination of diverse, individual sites to forging a coordinated global network and demonstrating its value to society. This growth has been made possible in large part by the continuing support of POGO and in particular by the support of staff at the JCOMM office in Toulouse. POGO in 2011 contributed to support that staffer.

Over 40 participants from 14 countries and two U.S. agencies participated. In response to people moving on and the maturation of OceanSITES, a new interim Data Management Team (T. Carval, M. Pagnani, N. Galbraith, R. Curry, M. Lankhorst, and J. Zhou) and Executive Committee (U. Send, R. Weller, D. Wallace, M. Honda, K. Stroker, R. Lampitt, T. Trull, V. Murty, R. Lukas, and A. Boetius) have been stood up.

OceanSITES sought the participation of Eric Lindstrom at the recent meeting and will work so that the path forward meshes with the post-OceanObs 09 framework developed internationally. Work on the website and in the OceanSITES team will be to address the value and purpose of OceanSITES, the added value of a coordinated global array, and the need for requirements to drive the sustained observing. Part of this effort will be to address more coordinated sampling of the essential ocean variables, including broadening the ecosystems observations made at our sites. Due to the success of the Data Management Team and the support of the National Data Buoy Center in the U.S. and CORIOLIS at IFREMER in France, OceanSITES is well positioned with over 50 variables being named and effective data submission and distribution.

The focus of OceanSITES on sustained, Eulerian time series with high temporal resolution was reaffirmed by the group. Long-term goals remain to secure sustained support, upgrade existing stations to multidisciplinary sampling, install new stations in key unsampled regions, and make the data rapidly available to the scientific community and the public. OceanSITES will begin to develop metrics for the completion and effectiveness of the network, working with diverse groups that use the data, such as the operational weather forecasting and modeling centers and the IPCC teams.

To demonstrate the value of OceanSITES, each site will develop key products, with attention to potentially key or iconic results (e.g. the Keeling time series of CO2 increase). The Scientific Steering Team will then look for the next level of products; those that draw from more than one site and demonstrate the additional impact of the array. OceanSITES will also seek to facilitate addition of new sensors and defining best practices that can be shared across existing and potential new site operators.

OceanSITES has set two near-term objectives. First, it advocates the establishment of a core, backbone network with homogeneous, multidisciplinary instrumentation. Second, in response to an identified need (workshop in Paris in 2011), OceanSITES is moving to deploy deep (deeper than 2,000 m) temperature/salinity recorders at as many sites as possible. The support of POGO is sought on these two initiatives.

Planning for the workshop to coordinate ocean observatories, proposed at the January 2011 POGO meeting in Seoul, is underway; and a draft prospectus for that workshop will be presented at the Hawaii meeting.
POGO Exhibit Expo 2012

1. **Ocean observations: how have we been observing the ocean over the last century?**
   Display of historical and new equipment (real objects as well as photos) to show the evolution of ocean science and development of new technology.

   1.1. **Timeline of ocean explorations and development of POGO**
   Time line showing major landmarks in ocean exploration and ocean observations, and the year of foundation of all POGO member institutes.

   1.2. **The Continuous Plankton Recorder (CPR)**
   - Explanatory text
   - Photos of Alister Hardy deploying the CPR in 1932 and CPR retrieval in 2009.
   - A cut-out CPR (provided by SAHFOS) will show the inside mechanism and explanatory diagram.

   1.3. **Evolution of instruments for measuring temperature in the ocean**
   - Nansen bottle with reversing thermometer (provided by IFM-GEOMAR) – in existence since 1910.
   - Bathythermograph (since 1938; 1975 model provided by IFM-GEOMAR)
   - FSI Conductivity Temperature Depth (CTD) – 1994
   - Niskin bottle and “messenger” used to trigger it (this will be demonstrated to the visitor).

   1.4. **Evolution of instruments for measuring currents**
   - Current meter - 1930’s
   - Aanderaa Recording Current Meter (RCM) - 1980s - Version with a magnetic tape drive.
   - Interocean S4 electromagnetic current meter (1990s) - Measures changes in the electromagnetic field.

2. **POGO member institutions: who is carrying out these observations? (also why, where and when?)**

   Digital display showing:
   2.1. **Videos introducing the 37 POGO member institutions**
   2.2. **Videos highlighting the issues that are being tackled** (e.g. climate change, ocean acidification, depletion of fish stocks, natural disasters etc)
   2.3. **Videos showcasing projects/cruises/expeditions led by the POGO member institutions**.
3. Experiencing the ocean through the five human senses

Interactive and fun displays, aimed primarily at children, to demonstrate how the ocean looks/sounds/feels/smells/tastes.

3.1. How does the ocean look?
- Looking from space: satellite images
- Looking through a microscope: images of phytoplankton (real microscope and cultures could also be provided).
- Animation of the ocean as “seen” by the Continuous Plankton Recorder (provided by SAHFOS).
- Video footage taken from underwater cameras

3.2. How does the ocean sound?
- Computer with CD-ROM from “DOSITS” project (same as website http://www.dosits.org/audio/interactive/#/86)

How does the ocean feel?
- Laboratory water baths where water is maintained at different temperatures representative of e.g. the Arctic (0 deg), the Mediterranean (20 deg) and an upwelling system (10 deg).
- An explanation of why seawater doesn’t freeze at 0 degrees C.

3.3. How does the ocean taste?
- Beakers of “artificial seawater”, i.e. water with added salt at different concentrations representing estuarine, oceanic, and melt water with possibility of tasting.
- Explanation of why the sea is salty and how different organisms are adapted to different salinities.

3.4. How does the ocean smell?
- Culture of dimethylsulfide-producing phytoplankton Phaeocystis.
- Explanation of the implications of DMS for cloud formation and climate.
<table>
<thead>
<tr>
<th>Name of exhibition</th>
<th>Classification</th>
<th>Estimated price (₩)</th>
<th>Share of expenses</th>
<th>Participants</th>
<th>Organizer</th>
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<td>0</td>
<td>320,000,000 + Transportati on cost</td>
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1. Financial support is executed in kind.
2. Total price is based on the design plan, and subject to change slightly during construction.
3. The designated company is working on Production/Installation and Operation with financial support by the Organiser.
The Yeosu Declaration

Under the theme of “The Living Ocean and Coast”, we, the organizers, participating countries, international organizations, specialized agencies and experts, gathered at the International Exposition Yeosu Korea 2012 organized under the auspices of the Bureau International des Expositions from 12 May to 12 August 2012 to discuss the role of the ocean in meeting the sustainable economic, environmental and social goals of the global community;

Recalling the Rio Declaration on Environment and Development (1992) and its follow up in 2012 (Rio+20) as commenced in the Stockholm Declaration on the Human Environment in 1972, the Nairobi Declaration on the State of the Worldwide Environment (1982), and the Johannesburg Declaration on Sustainable Development (2002);


Emphasizing that the ocean and coasts comprise more than 71 per cent of our planet, provide nutrition and generate income to billions of people depending primarily on ocean ecosystem goods and services for their livelihood, and must be cared for by all nations, and shared by present and future generations;

Acknowledging the objectives embodied in the sub-themes of the International Exposition 2012 Yeosu Korea: “Coastal Development and Preservation,” “New Resources Technology,” and “Creative Maritime Activities”;

Declare that:

I. The ocean, coasts and islands constitute a rich repository of diverse biological and non-biological resources and ecosystem goods and services that are a foundation for human civilization and survival. A key consideration for civilization is to increase our awareness of the importance of the ocean and ensure that it can continue to serve as a source of well-being and prosperity of humankind for today and tomorrow.

II. The global marine ecosystem, including the seabed, is faced with significant threats of declining biodiversity and increasing stresses due to human impacts such as overfishing, excessive discharge of land and sea-based pollutants and debris, destruction of habitat and the introduction of invasive alien species. Understanding that such impacts are not confined to a single country or region, but have global implications, concerted efforts are required to minimize and reverse the damage brought upon the ocean ecosystems.

III. Extreme weather events, changes in sea level, and loss of polar ice cover exacerbated by climate change, as well as ocean acidification, have reached unprecedented proportions and pose considerable challenges to our civilization and socio-economic well-being. In order to address these challenges, international efforts and coordination are needed to augment scientific data and knowledge and to minimize the potential human and environmental damage.
IV. In preserving the marine environment, governments’ commitment, resolution, and policy action are essential. Concurrently, the public and private sector’s appreciation and understanding of the ocean, as well as their voluntary contributions and actions are indispensable.

V. Amid a growing population and limited land-based resources coupled with escalating intensity of climate change, and food security concerns, the ocean and coasts are emerging as a new driver of economic growth. Green growth should be pursued by fostering innovative industries that use marine resources and energy in a sustainable and responsible manner, and ensuring that industries do so as well. At the same time, policies that promote a shift towards green growth in ocean-related issues should be encouraged.

VI. The ocean is a major conduit for trade and exchange, spanning the entire world. Considering the interconnection of the ocean as a single body of water, all nations around the world should strive to make the ocean a source of well-being and prosperity of humankind for today and tomorrow.

VII. The ocean, coasts and islands have fostered cultures throughout human history. Best efforts are needed to promote maritime cultures in order to help them conserve marine resources sustainably and to ensure their quality of life for present and future generations.

VIII. As economies grow and coastal areas become increasingly populated, the demands placed on the ocean are rising. Mutual cooperation to care for these resources through capacity building and education on responsible use of the marine resources is needed for sustainable development and for the conservation of the marine environment and ecosystems.

IX. Development assistance and investment, whether domestic, bilateral or multilateral, can play a crucial role in supporting a move towards addressing the ocean concerns highlighted above. Thus, national and international efforts should be undertaken to place increased emphasis on them.

In this regard, we welcome the Yeosu Project designed to strengthen the capabilities of developing countries to meet the challenges related to the ocean.
Initiation of a Global Alliance of Continuous Plankton Recorder Surveys (GACS)

Dr Graham Hosie\(^1\) and Sonia Batten\(^2\)

\(^1\)Australian Antarctic Division, 203 Channel Highway, Kingston, Tasmania 7050, Australia
\(^2\)Sir Alister Hardy Foundation for Ocean Science (Canada), c/o 4737 Vista View Cr, Nanaimo BC V9V 1N8, Canada

GACS@sahfos.ac.uk

Continuous Plankton Recorders have been deployed as a sampling tool for decades in the North Atlantic providing data used to describe plankton diversity, biogeography, response to climate forcing and influence on upper trophic levels. Other regions have since been monitored with CPRs; the Southern Ocean for >20 years, north Pacific for >10 and new surveys have recently begun around Australia, New Zealand, Brazil and the Benguela Current. The CPR remains the instrument-of-choice because it offers a cost-effective way to routinely sample deep ocean basins and coastal ecosystems seamlessly, and is the only current instrument that does so while measuring biodiversity of zooplankton and larger phytoplankton. The CPR is standardised between all regional surveys and standardised over time.

Recognising the need to address global issues affecting lower trophic levels (ocean warming, acidification) a Global Alliance of CPR Surveys (GACS) was formed in September 2011 at a specially convened meeting attended by heads of regional surveys. Available key stakeholders from POGO, IOC and PICES also attended and provided much needed support and advice. A Memorandum of Understanding was signed by the regional representatives and witnessed by the stakeholders.

The general goal of GACS is to understand changes in plankton biodiversity at ocean basin scales through a global alliance of CPR surveys. By “understand” we mean characterise, analyse and interpret. GACS has a number of specific aims which include:

- development of a global CPR database,
- production of a regular Ecological Status Report for global plankton biodiversity,
- ensuring common standards and methodologies are maintained,
- providing an interface for plankton biodiversity with other global ocean observation programmes,
- to set up and maintain a website for publicity and data access,
- to facilitate new surveys and develop capacity building procedures, and
- to facilitate secondments of CPR scientists between GACS institutions.

GACS brings together the expertise of approximately 50 plankton specialists, scientists and technicians, from 12 laboratories around the word, towing a common and consistent sampling tool, the CPR, from about 50 vessels. Working together, pooling our data and resources, was considered essential in order to understand the effects of environmental changes on plankton biodiversity at a global level. Numerous local and regional monitoring/observational programmes have been established in the past, but to date we have lacked a holistic perspective on plankton biodiversity in response to global events such as global warming and ocean acidification. GACS will provide that perspective using CPR data. It will also allow us to assess changes and events at a local or regional level in a world-wide context. The heart of GACS is the development of the global database of CPR data that will allow us to make such assessments of local, regional and global changes.

A Board of Governance was established, comprising the regional heads of CPR Surveys, with Dr Graham Hosie (SCAR Southern Ocean CPR Survey) as the first Chair and Dr Sonia Batten (North Pacific CPR) as Vice-Chair. Working groups are being developed and will address the formation of the global CPR database, and maintaining standards and methodologies.
An update on SOOS activities in 2011

The Southern Ocean Observing System (SOOS) is an initiative of SCAR, SCOR, POGO and other international bodies, with the mission to establish a multidisciplinary observing system to deliver the sustained observations of the Southern Ocean. These observations are needed to address key challenges of scientific and societal relevance, including climate change, sea-level rise, and the impacts of global change on marine ecosystems. This document highlights the achievements of the SOOS in 2011, and upcoming planned activities.

1) The International Project Office (IPO)
The IPO opened in late August. The IPO is hosted by the Institute for Marine and Antarctic Studies (IMAS), University of Tasmania (Australia). The Australian Antarctic Division (AAD) will also provide some support for the SOOS IPO for the 2011/2012 financial year. The role of the IPO is to act as a central contact point for SOOS, monitor progress towards SOOS goals, facilitate coordination of field work, assist in the organisation of workshops, and synthesis activities, and coordinate a Website and other activities to advertise the aims and achievements of the SOOS.

2) Executive Officer
IMAS hosting also includes support for an Executive Officer to run the IPO and associated SOOS activities. The Executive Officer selected was Dr Louise Newman, who started the position with the opening of the SOOS IPO in August.

3) Budget
SCAR and SCOR provide support for the annual Scientific Steering Committee (SSC) meeting, up to 10,000 USD each.

A budget for the running of the IPO has been developed for 2011 and 2012. This budget was a conservative estimate of expected costs of the IPO in its first year. The budget needs are being met predominantly by IMAS, with some additional support by the AAD promised for the current financial year. AAD support beyond this is not secured. In the absence of continued AAD support, there is a shortfall of ~10,000 AUD for 2012 IPO activities. Development of the IPO budget beyond 2012 will be done through discussions with the SOOS SSC and IMAS. For the SOOS to grow the budget and support will also need to grow.

A key activity for the Executive Officer over the coming year is to secure more IPO funding. Advice from POGO Directors is welcomed concerning possible sources. The budget does not include any costs of running workshops etc. Funding for these sorts of activities will be sought on a case-by-case basis.

4) SOOS Initial Science and Implementation Strategy
This document is now finalised and is currently being printed. It will be available for download from the SCAR, SCOR and SOOS websites and also available in hardcopy by request to the SOOS IPO. A link from the POGO website would be desirable.

5) Governance Structure –see Figure. (Note: This figure is a draft and needs final approval by the Scientific Steering Committee. Advice is welcome concerning where POGO would like to reside in this structure).

6) SOOS Scientific Steering Committee (SSC) –see Table.
The SSC was recently selected, following an international call for nominations. Note: Because of a move to a new position, John Gunn will step down from the Co-Chair (and SSC) in February 2012

7) The first SSC meeting
The first meeting of the SOOS SSC will take place on the 18-19 February 2012 in Salt Lake City (Utah, USA), to coincide with the Ocean Sciences Meeting. Key agenda items include:
- Defining SOOS objectives
- Operating model (and Terms of Reference) for the committee, IPO and initiative as a whole
- Objectives for data management, and development of a data policy
- Cross-programmatic, -disciplinary, -national links
- SOOS funding
- Development of detailed steps towards implementation of objectives
- Workshops
- Communication strategy
- Endorsements (for and by SOOS)

8) Communication
The communication strategy is currently being developed. A number of activities that contribute to this have been initiated:
- Website: The address is www.soos.aq and the design has been finalised and the programming is currently underway. It will be online by the mid-February 2012 SSC meeting. (Note that aq = Antarctica)
- SOOS flyer: In the design phase, expected to be available for distribution at the Ocean Sciences Meeting (20 Feb 2012)
- SOOS newsletter: Currently in concept phase, first issue likely by April 2012
Advice concerning additional communications opportunities is welcomed.

9) Data Management
A Data Management Sub-Committee is in development, led by Kim Finney the data management expert on the SSC. The role of the committee will be to develop the SOOS data portal, liaise with international and national data centres, and push forward with the development of important data products. The SOOS data portal will be one of the central features of the system.

The organisational structure of the SOOS, including internal components (green), links to external communities (blue) and main sponsors (red).
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<thead>
<tr>
<th>Name</th>
<th>Affiliation</th>
<th>Role</th>
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<tbody>
<tr>
<td>Stephen Ackley</td>
<td>Uni. of Texas San Antonio, USA</td>
<td>SSC Member</td>
</tr>
<tr>
<td>Parli Venkateswaran Bhaskar</td>
<td>National Centre for Antarctic &amp; Ocean Research, India</td>
<td>SSC Member</td>
</tr>
<tr>
<td>Angelika Brandt</td>
<td>Uni of Hamburg, Germany</td>
<td>SSC Member</td>
</tr>
<tr>
<td>Daniel Costa</td>
<td>University of California, USA</td>
<td>SSC Member</td>
</tr>
<tr>
<td>Kim Finney</td>
<td>Australian Antarctic Division</td>
<td>SSC Member, Data Manager</td>
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<tr>
<td>Alberto Naveira Garabato</td>
<td>National Oceanographic Centre, UK</td>
<td>SSC Member, WCRP SO Panel ex-officio</td>
</tr>
<tr>
<td>John Gunn</td>
<td>Australian Antarctic Division</td>
<td>Co-Chair</td>
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<tr>
<td>Jiping Liu</td>
<td>Chinese Academy of Sciences</td>
<td>SSC Member</td>
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<tr>
<td>Mauricio Mata</td>
<td>Fed Uni. Of Rio Grande, Brazil</td>
<td>SSC Member</td>
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<tr>
<td>Michael Meredith</td>
<td>British Antarctic Survey, UK</td>
<td>Co-Chair, <strong>POGO ex-officio</strong></td>
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<tr>
<td>Steve Rintoul</td>
<td>CSIRO, Australia</td>
<td>SSC Member, WCRP SO Panel ex-officio</td>
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<tr>
<td>Oscar Schofield</td>
<td>Rutgers University</td>
<td>SSC Member</td>
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<td>Sebastiaan Swart</td>
<td>Uni. of Cape Town, South Africa</td>
<td>SSC Member</td>
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<tr>
<td>Bronte Tillbrook</td>
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<td>SSC Member</td>
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<tr>
<td>Anna Wahlin</td>
<td>Uni. of Gothenburg, Sweden</td>
<td>SSC Member</td>
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**Ex-Officio members**

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<tr>
<th>Name</th>
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<tr>
<td>Tosca Ballerini</td>
<td>Centre d'Oceanologie de Marseille, France</td>
<td>APECS Ex-officio</td>
</tr>
<tr>
<td>Andrew Constable</td>
<td>Australian Antarctic Division</td>
<td>ICED-Sentinel Ex-officio</td>
</tr>
<tr>
<td>Mike Sparrow</td>
<td>SCAR Secretariat</td>
<td>SCAR Ex-officio</td>
</tr>
<tr>
<td>Ed Urban</td>
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**International Project Office**

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<tr>
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<tbody>
<tr>
<td>Louise Newman</td>
<td>University of Tasmania, Aus</td>
<td>Executive Officer</td>
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</tbody>
</table>
Institute for Marine and Antarctic Studies
University of Tasmania

The University of Tasmania’s Institute for Marine and Antarctic Studies (IMAS) is at the vanguard of a new era in Australian marine and Antarctic research and education. Established in 2010, IMAS is building a critical scientific concentration of internationally recognized expertise and leadership in quantitative research and education, both at the University and via strengthened relationships with the major Commonwealth of Australia marine and Antarctic research organizations in Tasmania—Australian Antarctic Division (AAD), and Commonwealth Scientific and Industrial Research Organisation (CSIRO)—and with the State of Tasmania. IMAS builds upon more than two decades of University leadership in cooperative Antarctic research, and aspires to a similar leadership role in temperate marine and Southern Ocean research.

IMAS takes a truly multidisciplinary, whole-of-system approach to research, education, and outreach. It builds upon marine and Antarctic expertise at the University, at AAD, and at CSIRO, all enhanced by new direction and priorities and developed through initiatives that achieve integration and synergies. Current core research and education capability at IMAS consists of significant and internationally recognized expertise in three foundation research themes: climate & ocean change; marine ecology & biodiversity; and fisheries & aquaculture. To meet integrative and multidisciplinary research goals, these themes will be complemented by two key emerging research themes: integrated ocean-Earth system science, and ocean & Antarctic policy, socio-economics, & governance.

IMAS is the locus of academic marine and Antarctic research and education in Australia, and indeed the entire Southern Hemisphere. With 135 staff members, of whom 70 are academics, and 100 post-graduate students, IMAS has an annual budget of $18 million (2011), and plans to grow significantly over the next five years. Together, IMAS, CSIRO Marine and Atmospheric Research, and AAD comprise approximately 1,000 staff, placing Hobart among the global leaders in terms of critical mass of marine and Antarctic researchers. As one indicator of Hobart’s world-leading expertise and prominence, three of the 29 coordinating lead authors of the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report Working Group I—The Physical Science Basis chapters are based at Hobart institutions, a distinction that no other city possesses.

Environments on Earth are dynamic, and the Southern Ocean and Antarctica are particularly in flux, demanding that we prepare for a different future. IMAS will work assiduously to address the major questions in marine and Antarctic science through new collaborations, novel interdisciplinary investigations, and intellectual vigor. IMAS is poised to become an internationally recognized center of excellence for marine and Antarctic research and education, developing environmental understanding, and facilitating sustainable development for the benefit of Australia and the world.

Contact: Prof MF Coffin, Executive Director, IMAS (mike.coffin@utas.edu.au)
Executive summary

The International Quiet Ocean Experiment (IQOE) will create an international global program of research, observation, and modeling to better characterize ocean sound fields and to promote understanding of the effects of sound on marine life. The effect of anthropogenic sound on marine life is a large gap in our current knowledge; the resulting scientific uncertainty is leading to the implementation of precautionary legislation with potentially large economic consequences.

A central feature of the IQOE will be an International Year of Ocean Acoustics (IYOA), which will focus the participating scientific, industrial, environmental, and naval communities on the goal of an intense period of scientific activity, coordinated across regions to create a global program. The IYOA will raise awareness of the effects of sound in the ocean within the participating communities and in the broader public realm.

The IQOE will address 5 key questions:

1. What are the current levels and distribution of anthropogenic sound in the ocean?
2. What are the trends in anthropogenic sound levels across the global ocean?
3. What are the effects of anthropogenic sound on important marine animal populations?
4. What was the global ocean soundscape before humans arrived?
5. What are the potential future effects of sound on marine life?

The IQOE has been motivated by evidence of increasing sound levels from human activities. Considerable evidence exists that the human contribution to ocean sound has increased during the past few decades and that anthropogenic sound has become the dominant component of marine sound in some regions. Anthropogenic sound levels are likely to be directly correlated with the increasing industrialization of the ocean, thus making the measurement of ocean sound fields an important tool for assessing industrial presence in the ocean.

Sound is an important factor in the lives of many marine organisms and increasing theory and observations suggest that human-generated sound in the ocean could be approaching levels at which negative effects on marine life may be occurring. Certain species already show symptoms of the effects of sound. Although some of these effects are acute and rare, chronic sub-lethal effects may be more prevalent, but are difficult to measure.

The IQOE will mobilize the participating communities to investigate sound in the ocean in a way that will be useful for mitigation and for management of sound sources. The IQOE will (1) ensure that the measurement of the sound field becomes an integral part of global ocean observations; (2) develop a global approach to investigating ocean sound, including a community-based approach to research; (3) support innovation in ocean observing systems; (4) support data management and the development of data standards; (5) develop acoustic models; (6) support the planning and implementation of regional experiments; and (7) ensure constructive engagement with industry and the public.

To achieve these goals, the IQOE will be implemented across four themes:

1. The **Ocean Soundscapes** theme will describe ocean soundscapes from regional to global scales. This theme will include the identification of sound sources, the modeling of acoustic propagation, and the validation of these models using ocean observation systems. This theme will be the main focus of efforts to measure trends in ocean sound and to define sound budgets within regions. It will also investigate soundscapes and examine the concept that the conservation of soundscapes may be an appropriate objective for the integrated management of the marine environment.

2. The **Effects of sound on marine organisms** theme will plan and carry out experiments. This theme will include experiments to quiet regions and to observe the responses of marine organisms. This theme will include the use of planned experiments as well as opportunistic studies using post-hoc statistical modeling to test for effects. This theme is the main vehicle through which the biological significance of sound will be assessed and, where possible, the IQOE will focus on measuring dose-response relationships so that assessments of the effects of sound can be predictive, with special emphasis on the Population Consequences of Acoustic
Disturbance (PCAD) approach. Much of this theme will rely upon the use of a small set of representative species.

3. The *Observing sound in the ocean* theme will be the primary focus for addition of sound measurements to existing and future observing systems and will encourage technical innovation. This theme will develop data standards—where these do not exist—and will promote observation of the key biological and physical variables. Much of the synthesis, data management, and acoustic modeling needed by the IQOE will be managed from within this theme.

4. The *Industry and Regulation* theme will develop the methodology for “noise” monitoring within regulatory regimes. This theme will examine the operational management of sound in the ocean through risk analysis by, among other approaches, defining appropriate thresholds for disturbance and damage to marine life. It will also help regulators to measure compliance, and industry to maintain its activities, by providing innovative solutions to barriers presented by regulation. The theme will organize and establish the communications strategy for the IQOE.

Each of these four themes will be important in preparations for the IYOA.

The IQOE will be implemented under the governance of the Scientific Committee on Oceanic Research (SCOR) and the Partnership for Observation of the Global Oceans (POGO). The project will be managed by a Steering Committee that will be supported by a secretariat. Two standing committees, the Scientific Committee and the Data Management and Communication Committee, will be tasked with ensuring the themes are implemented and, under these, temporary *ad hoc* working groups will be established to plan and implement particular activities. The Steering Committee will be responsible for international planning and coordination of contributing national activities funded from national sources. The IQOE will plan a series of workshops in its first two years, which will lay the foundation for IQOE implementation. Particular emphasis in the early years of the project will be given to characterizing global trends in ocean sound, gaining access to existing long time series of ocean sound, specifying standards for observations and experimentation, designing a data management system, and planning for the IYOA.

To download the full draft science plan go to: [http://www.scor-int.org/IQOE/IQOE_Science_Plan.htm](http://www.scor-int.org/IQOE/IQOE_Science_Plan.htm).
Lessons

1. BIG THINGS CAN BE DONE
2. HAVE A CLEAR CHARTER
3. ENJOY THE ERA OF MACROSCOPES

4. PRACTICAL MANAGEMENT HELPS, e.g.,
   a) Consider a Baseline Report at the outset (‘the Known’)
   b) Use the unifying power of data management
   c) Value partnerships (UN, National Geographic, Google, PLoS, national governments...)
   d) Avoid (premature) policy, maintain careful relations with advocacy groups, industries
   e) Use sensible milestones
   f) Enjoy creativity & communication skills of arts & humanities
   g) Integrate education & outreach from very early
   h) Stay alert for new dimensions (Barcoding, EOL...)
   i) Commit to open access
   j) Attend to synthesis
   k) Value internal & external review processes

5. RESPECT THE POWER OF TRUST AND CONVICTION
The Mohole Project 50 Years After - scoping and feasibility of reaching the mantle frontier
Kiyoshi Suyehiro (IODP-MI)

• Initial Feasibility Study for 2017 drilling was conducted by IODP-MI.

BEAM Scoping is facilitated (2011-2013) by IODP-MI in coordination with Deep Carbon Observatory Initiative.

SWOT Exercise planned in February 2012.
Call to Action

Rome, 9 September 2011

We, the participants at the ITU, UNESCO/IOC, WMO Workshop on Submarine Cables for Ocean/Climate Monitoring and Disaster Warning: Science, Engineering, Business and Law in Rome, Italy from 8 to 9 September 2011 call upon the International Telecommunication Union (ITU), the Intergovernmental Oceanographic Commission of the United Nations Educational, Scientific and Cultural Organization (UNESCO/IOC) and the World Meteorological Organization (WMO) to establish and coordinate a joint task force composed of world renowned experts from science, engineering, business and law, which will:

i. Study and evaluate scientific, engineering, business, and societal benefits, opportunities, challenges and risks associated to the use of submarine telecommunications cables for ocean and climate monitoring and disaster warning, as well as legal aspects of such use;

ii. Develop a strategy and roadmap that could lead to enabling the availability of submarine repeaters equipped with scientific sensors for climate monitoring and disaster risk reduction such as pressure, temperature, salinity/conductivity, seismic, hydroacoustic and cable voltage in the near future;

iii. Analyze the development of projects that could include renovation and relocation of retired out-of-service cables for disaster warning, ocean and climate monitoring;

iv. Cooperate closely with the International Cable Protection Committee (ICPC) to investigate and report on the technical feasibility of incorporating the required scientific sensors into the design, manufacture, installation and operation of submarine repeaters in a safe manner without affecting cable systems and telecommunication signals, and avoiding risks that could affect the normal operation of the cables;

v. Consider a business model of how sensor data from submarine cables could be provided and could be made available for scientific purposes and societal benefit;

vi. Identify financing models and opportunities to promote the development of ocean climate monitoring and disaster warning systems by the use of submarine cables;

vii. Consider ways to further promote the implementation of the legal regime, as reflected in the United Nations Convention on the Law of the Sea (UNCLOS) and other instruments, for the protection of submarine cables, including awareness building and mobilization of support at the national and global levels;

viii. Organize similar workshops to report on the progress;

ix. Ensure that the outcomes of the above efforts/activities take into account and are consistent with international law, as reflected in UNCLOS;

x. Invite ITU to consider providing secretarial support for the joint task force.

We encourage ITU, UNESCO/IOC and WMO to bring this Call to Action to the attention of the United Nations Framework Convention on Climate Change (UNFCCC), the States Parties to UNCLOS and the United Nations Secretariat.
**The SeaOrbiter Project in a Few Words**

SeaOrbiter is a new human adventure dedicated to the Planet. It is part of the history of the great explorations of our universe led by illustrious predecessors and great adventurers such as Jules Verne, Jacques-Yves Cousteau, Jacques Piccard ...

It also constitutes a new planetary challenge. Its purpose is to foster the emergence of a new relationship between man and the sea by the awakening, awareness and action of all to meet tomorrow’s every requirement for a future based on the precepts of sustainable development, particularly related to the sea.

**Joining SeaOrbiter is thus:**
- Participating in the great adventure of human exploration in the 21st century
- Boarding to explore the last frontier on earth
- Recognizing that human survival depends on preserving the oceans
- Meeting the global challenge for a better understanding of this universe still widely unknown
- Living under the sea 24 hours a day over long periods at the very heart of the oceans
- Residing in a nomadic underwater home wandering amidst the mightiest of gardens: the ocean
- Allowing better commitment from the younger generations with regard to the planetary challenges of tomorrow
- Promoting awareness for sustainable integration of the ocean in our attitudes and behaviors to come

**Sailing with SeaOrbiter is moving from:**
- Discontinuous observation to continuous observation of the underwater world
- Erratic intrusion to a perfect symbiosis with the marine ecosystem
- Passive observation to proactive monitoring of the ocean
- Complex oceanic penetration to easy and permanent access to the underwater world
- A linear approach to the ocean to a real three-dimensional understanding of it
- The remote maritime adventure to a network of sentinels serving the Blue Planet

**SeaOrbiter hence allows:**
- Implementation of a change in relationship between man and the ocean
- Development of a planetary educational plan concerning the oceans
- Establishment of an international scientific research and technological programs
- More sophisticated understanding of the mechanisms linking the ocean and the earth’s climate
- Testing of human behavior and ability to live in space related underwater extreme environment
- Emergence of new vocations and new expertise
- Production of interactive multimedia programs accessible to all

*To bring man into "global symbiosis with the planet"*
JAMSTEC mission for the Great 2011 Tohoku Earthquake

The Great 2011 Tohoku Earthquake was one of the most gigantic earthquakes recorded in the history of earthquake observation. It is an important mission to carry out the survey of this earthquake for many scientists and engineers who engage in marine research by taking advantage of state-of-the-art research equipment. JAMSTEC has been conducting surveys by 26 cruises for 327 days in total as of December 2011. The overview of main results is described below, and the details will be introduced by presentation.

Seismic surveys of the source area

Deployed ocean bottom seismometers (OBS), and operated seismic reflection profiling and topography measurement by a multi-beam echo sounder.

Research of the continental-side slope of the Japan Trench by SHINKAI 6500

Investigated biological, geochemical and geological impacts of the earthquake on the deep seafloor environments.

Research upon governmental request

Collected seawater samples to identify the status of release of radioactive substances from the Fukushima Dai-ichi Nuclear Power Station.

Changes in sea-floor elevation between bathymetric data before and after the earthquake

The sea floor between the rupture zone and the trench axis moved approx. 50 m east-southeast toward the trench and approx. 7 m upward.

A bacterial mat (left side) and fissures (right side) observed by the SHINKAI 6500

Simulations of radionuclide dispersion from the Fukushima coastal region to the open ocean, using the Japan Coastal Ocean Predictability Experiment (JCOPE) developed by JAMSTEC

Further observation and modeling researches have been conducted to study the behavior of nuclear substances.
GEO Ocean Observations Community of Practice
Extracts from “Concept paper” written by Albert Fischer (18 October 2011)

Creation of the Ocean Observations Community of Practice
The GEO User Interface Committee (UIC) approved the creation of the Ocean Observations Community of Practice in April 2011. As with all GEO activities, participants are involved on a voluntary basis and support their own travel. The main mode of work will be through teleconferences.

Goals of the CoP

The initial focus of the Community of Practice will be to encourage:

- collaborative action in the flow of data from the ocean observing system through data management systems to scientific and operational users
- connection of ocean data streams to the GEOSS Common Infrastructure, and
- identification of how ocean data contributes to GEO Societal Benefit Areas.

Types of activities the CoP could champion

At the interface between observations and data management
Would need strong involvement of IOGE, JCOMM, observatories communities for these activities

- Clarify and publish the data management arrangements for each ocean observing network and for each variable where there is lack of clarity. Are there best practices that could be promoted?
- Encourage incorporation of ocean observatory data streams into the existing data management arrangements, feeding the generation of combined and new products.

At the interface between data management and ocean synthesis and forecasting
Would need strong involvement of IOGE, GODAE OV, CLIVAR GSOP for these, as well as stakeholders from outside the CoP.

- A 'user forum' between data management system providers and the generators of marine service information (ocean forecasting), to assess the fitness-for-purpose of arrangements and identify areas for improvement.
- A 'user forum' between data management system providers and the generators of ocean synthesis products for climate research, monitoring, forecasting and projections, to assess the fitness-for-purpose of arrangements and to identify areas for improvement.

At the interface between data management and producers of variable-based analyses
A rather successful example of a group focused on the development of a single variable-based set of products combining all available satellite and in situ data is the Group for High-Resolution Sea Surface Temperature (GHRSST). ChloroGIN is developing similar products for chlorophyll.

Are the arrangements in place for the flow of information to these producers of analyses fit-for-purpose? Would a dialogue between data managers and these product producers be fruitful?

At the interface between the 'ocean observing system' and GEO
The CoP could contribute along with representatives of the rest of the ocean observing community to the new GEO Work Plan task SB-01 in Information for Societal Benefits, ‘Oceans and Society: Blue Planet’

- Contribute to task SB-01 component C1 ‘Global Ocean Information Coordination and Access’ areas.

The Kickoff membership of the Community of Practice includes representatives from GEO, GOOS, POGO, JCOMM, IODE, IOOS, European Commission, NSF, NERC, IEEE, CSIRO, MyOcean, CSIR, Univ. Reading, Univ. Bremen, JAMSTEC, , NOAA/PMEL (see full Concept Paper for list of names).
One of the major objectives of the IODE Programme (http://www.iode.org) is to assist IOC Member States to acquire the necessary capacity to manage marine data and information, and thus become full partners of the IODE network. OceanTeacher is IODE’s capacity development tool.

The OceanTeacher e-learning platform (http://www.oceanteacher.org) has two main components: the OceanTeacher Digital Library (a collection of knowledge and resources) and the OceanTeacher OpenCourseWare (a collection of course outlines and courseware). In addition the system includes video recordings of courses that are included in the OpenCourseWare pages. OceanTeacher has become a comprehensive web-based training system structured in a way to support classroom training (face-to-face), blended training (combining classroom and distance learning), online tutoring and online self-learning. When the Digital Library and the OpenCourseWare are used together for a training event this is called an OceanTeacher Classroom.

The objective of the OceanTeacher Training Academy is to establish a facility that provides an annual teaching programme of courses related to oceanographic data and information management and related disciplines that will contribute to the sustainable management of oceans and coastal areas. The OceanTeacher Training Academy thus underpins all Ocean Data and Information Networks (ODINs) developed IOC/IODE. The development of the OceanTeacher Academy started in 2005 with the establishment of the IOC Project Office for IODE in Oostende, Belgium.

Cooperation between POGO and IODE was established within the framework of the “Nippon Foundation-POGO Centre of Excellence (CoFE) in Observational Oceanography” organized in Bermuda, to ensure that basic data management is included in academic training programmes in oceanography. The OceanTeacher e-learning platform is used for the data management module of CoFE.

From a training system that focused entirely on oceanographic data and information management, OceanTeacher has gradually developed into a multi-purpose training system focusing on several IOC (HAB, ICAM, MSP) as well as non-IOC (e.g. EUMETSAT) programmes. Ultimately OceanTeacher should be able to provide a multi-disciplinary training platform.

In six years the OceanTeacher Academy has organized nearly 50 courses for over 1000 students from 120 countries and taught by 20 lecturers. One of the main conclusions is that we cannot provide training to all those who require it from just one location. In addition the continuous increase in airfares makes the cost per student quite high. It was therefore decided to, as from 2012, further develop the distance learning functions of OceanTeacher but maybe more importantly, move towards a distributed architecture of regional training facilities. These will allow a better focus on regional and local needs, as well addressing the language issue, which has been recurring comment from students. A first regional training centre will be opened in Hyderabad, India (International Training Centre for Operational Oceanography) in 2012. Discussions have already started with other Member States in other regions to establish similar centres. Using the same baseline curriculum in OceanTeacher we will be able to reach more students in more countries. In addition, through cooperation with local Universities accredited certificates will be issued.

However the real innovation of the new model is that we will blend traditional classroom based training with distance learning. Although we want to promote a more regional/local focus we should not forget the importance of bringing together students from different regions to foster south-south and north-south cooperation. By using advanced video conferencing technology we will be able to broadcast courses taught live in one region, to one or more other regional centres or invite individual lecturers to teach a class from their own university or even home. The system will of course also allow interaction between lecturer and students and training assistants in the other regional centres will be able to provide assistance with practical exercises. Additional benefits include a more efficient time-use for lecturers, less tiring travel for students and lecturers and of course, following from this, reduced carbon emissions. POGO members will be invited to discuss ways and means to collaborate with the OceanTeacher Academy as well as to identify ways on how OceanTeacher can assist, as appropriate, their institution.