Partnership for Observation of the Global Oceans

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Report on the 2012 POGO-SCOR Fellowship Programme

This year saw the twelfth fellowship programme implemented using POGO funds with supplementary financial support from SCOR. The application process was brought forward this year, to allow more time for applications, and to ensure that all fellowships were conducted during 2012. The announcement was posted on 16 November 2011, with a closing date of 15 January 2012.

This year saw a total of 75 applications, which was 38 more than the previous year and 53 more than in 2010. This was possibly a result of a broader advertisement (making use of the NF-POGO Alumni Network for Oceans, in particular), combined with the longer application period. Applications were received from 32 countries, which was 11 more than the previous year.

The 12 selected candidates hail from around the world, namely Russia, Poland, Cape Verde, South Africa, Kenya, Bangladesh, China, Chile and Mexico. The host institutions are also located in a wide variety of countries (Belgium, Germany, Denmark, Norway, UK, France, Italy, Australia and USA).

The applications were screened independently by a committee of six, with representation from SCOR and POGO. In making their selection, the committee considered the following factors:

- quality of the application;
- relevance of the application to the priority areas identified in the fellowship announcement;
- evidence that the training will lead to improved sustained observations in the region, or improved applications of such data;
- evidence that the training would lead to capacity-building with potential lasting impact on regional observations, and
- the need to maximise regional distribution of the awards.

This year, twelve fellowships were offered to oceanographers from developing countries and economies in transition.

One successful candidate from South Africa received a scholarship from the University that she had planned to visit for her fellowship, therefore it was no longer appropriate for her to receive support from POGO. The POGO Executive decided to find a replacement and the next most highly ranked candidate after the initial cut-off line enthusiastically accepted the award. Unfortunately, another successful candidate had to drop out because the host was unable to find accommodation at a cost that could be covered by the fellowship. It was too late by that stage to offer the fellowship to another candidate so the funds were put towards a new fellowship scheme, the POGO-PAP-GreenSeas fellowship for research cruise training.

POGO and SCOR commend the efforts from all the supervisors and colleagues at the various host institutions who agreed to devote time and energy required for the training. The programme would not have been viable without such efforts from prominent scientists and their teams.

All the people involved in each fellowship (the fellowship holder, the supervisor at the parent institute and the supervisor at the host institute) were requested to submit short reports at the end of the training period. A number of reports are expected to be received by the end of the year, but those received so far have been enthusiastic. They indicate that these exchanges should lead to effective capacity building at the host institute and facilitate longer term collaborations between the institutes concerned. All conclude that the programme serves a useful purpose.

There is tremendous interest in the fellowship programme at all levels, both in the oceanographic institutions of the developing nations, as well as among leading scientists who are eager to contribute to this initiative. It is seen to be filling a niche in capacity building through specialised training that is not filled by intensive courses or by participation in scientific meetings. It helps improve the *esprit de corps* among oceanographic institutions around the world, and serves as a stepping stone to building collaborations.

Furthermore, the POGO-SCOR fellowship scheme is increasingly seen by other organisations as a model in capacity building, and similar schemes have been set up by other programmes based on the success of the POGO-SCOR model (e.g. EU projects, the Europe-Africa Marine Network, EAMNet; and the EUROMARINE consortium of European Networks of Excellence). The POGO Secretariat is often approached for help/advice on setting up similar fellowship schemes, or proposals to partner up with other organisations.

Demography of Fellowships

Parent Institutions of Successful Candidates:

Bangladesh	University of Chittagong
Cape Verde	CVOO - Instituto Nacional de Desenvolvimento das Pescas
Poland	University of Warsaw
Chile	University of Concepcion
South Africa	University of Cape Town
Kenya	Kenya Meteorological Department (cancelled)
China	First Institute of Oceanography
New Zealand	University of Auckland
Russia	P.P. Shirshov Institute of Oceanology of the Russian Academy of Sciences
China	National Marine Environmental Forecasting Centre
Poland	Institute of Oceanology, Polish Academy of Sciences
Mexico	The National Commission for the Knowledge and Use of Biodiversity (CONABIO)

Host Institutions:

Italy	University of Ferrara
Germany	GEOMAR Helmholtz Centre for Ocean Research Kiel
UK	University of East Anglia
France	Observatoire Océanologique de Banyuls sur Mer

UK	British Antarctic Survey
Australia	Centre for Weather and Climate Research, Bureau of Meteorology & CSIRO
USA	NOAA/Pacific Marine Environmental Laboratory
Belgium	Flanders Marine Institute
USA	University of Rhode island
Denmark	Danish Meteorological Institute
Norway	University of Nordland
USA	University of South Florida

Gender distribution
Female: 4
Male: 7

2012 Fellows

Elizandro Lima Rodrigues – Cape Verde

Parent supervisor and institution: Dr Óscar Fonseca Melício, CVOO - Instituto Nacional de Desenvolvimento das Pescas, Mindelo, Cape Verde.
Host supervisor and institution: Dr Arne Körtzinger, GEOMAR, Germany.
Fellowship period: April 1 to July 1 2012 (3 months)
Topic: Laboratory and State-of-the-Art Training for Sustained Oceanographic Observations at the Cape Verde Ocean Observatory (CVOO)

Elizandro Rodrigues is a graduate student of Marine Biology and Fisheries at the University of Cape Verde (Uni-CV) in Mindelo, São Vicente Island. He started in 2008 and aims to achieve his degree this year (Licentiate equivalent to B.Sc.). He is currently doing a curricular course at the National Institute of Fisheries Development (INDP) in Mindelo, São Vicente, Cape Verde, which is the logistical base of the CVOO (Cape Verde Ocean Observatory). This enables him to get an excellent insight into the management of the observatory on a day-to-day basis.

The establishment of the CVOO commenced in 2004 and has been extended permanently since. In order to assure the long-term management of the observatory it is required that there be sufficient manpower both in Germany and Cape Verde. Elizandro wanted to be introduced to the handling of state-of-the-art instrumentation and techniques for measuring and analysing physical and biogeochemical parameters. This opportunity will be an asset to his future research and enable him to work in the laboratory of the CVOO and become a full member of the CVOO team in close cooperation with his host institution in Kiel, Germany.

Mohammad Uddin – Bangladesh

Parent supervisor and institution: Dr Mohammad Zafar, Institute of Marine Sciences and Fisheries, University of Chittagong, Chittagong, Bangladesh.

Host supervisor and institution: Dr Paolo Ciavola, University of Ferrara, Italy.
Fellowship period: April 23 to July 15 2012 (3 months)
Topic: Coastal observation and modelling.

Since October 2011 Mohammad has been enrolled on a PhD programme aiming at flood early warning system development for a number of case study sites on the eastern GBM Delta.
In this first part of his research he is becoming familiar with suitable coastal morphological and hydrodynamic modelling tools relevant for the coastal area of Bangladesh which is very prone to cyclonic storm surges and flooding. Remote sensing and GIS are also some of the major tools to be used for the collection and management of bathymetric, topographic and hydrographic data for his PhD area. This information will assist him in understanding the presence of trends in the changes of the eastern BGM delta coast due to historical storm events and floodings.

The training was developed along three main lines:

1) Competence in GIS and Remote Sensing data processing. The candidate will attend the course in Techniques for Remote Sensing in Earth Sciences given by the supervisor during the second semester for the Master in Earth Sciences. He will also attend a same level course in River Dynamics to develop competence on processes at river mouths.
2) Competence in field data collection. The candidate will learn how to install, maintain and interpret data from tide gauges. He will also learn how to undertake coastal surveys using DGPS and traditional topographic equipment (e.g. Total Stations).
3) Competence in numerical modelling. The candidate will learn the basics of model set-up and compilation for simulating hydrodynamics using the X-beach model.

Following the fellowship it is planned that the host supervisor will visit the trainee in his own country to help him setting up a coastal monitoring programme and an early warning system for surges. It is envisaged that the tutor will apply at a later stage for a POGO fellowship of for EU funding to spend time in Bangladesh with the trainee.

Dariusz Baranowski – Poland

Parent supervisor and institution: Prof. Szymon Malinowski, Institute of Geophysics, University of Warsaw, Warsaw, Poland.
Host supervisor and institution: Dr Adrian Matthews, University of East Anglia, UK.
Fellowship period: June 7 to August 7 2012 (2 months)
Topic: Air-sea interactions during MJO events in daily to intraseasonal timescales.

Dariusz's research focuses on air-sea interactions in tropics in particular on oceanic mixed and warm layers. He studied interaction between tropical cyclones and ocean in Western Pacific and Indian Oceans. Argo floats were used to study climatology of ocean cold wakes associated with tropical cylones during his M.Sc. He also has experience with numerical models of both ocean and atmosphere, and developed tools based on Argo profiles and other observations to validate US Navy COAMPS model and conducted numerical experiments with ocean mixed layer models (Price-Weller-Pinkel type). In 2011 he participated in field project related to Madden Julian Oscillations - DYNAMO, together with Dr Adrian Matthews from the University of East Anglia

(UEA). He now focusses on analysis of data collected, including Argo. To succeed, he needs to develop a set of analytical skills based on the tools he's familiar with: upper ocean profiles and models. This requires training in data acquisition, data management, quality control, datasets homogenization and analysis of daily to intraseasonal signals in the ocean.

The training consisted of SeaGlider piloting, quality control, management techniques and analysis of the data. Realisation of this project will contribute to overall goal of understanding of how ocean response contributes to the Madden Julian Oscillation initialization. This training will benefit the fellow's research through the development of new skills, as well as contributing to his Ph. D. thesis. It will help with data merging with other existing in-situ datasets such as Argo floats, nearby ship and buoys data as well as state of the art coupled COAMPS model. This combined dataset will provide a unique opportunity to study air-sea interactions on timescales from daily to intra-seasonal. The scholarship will provide seed money for subsequent interaction between the UAE and University of Warsaw on coupled ocean-atmosphere problems including joint publications as well as multidisciplinary research on atmosphere-ocean interactions.

Claudia Soraya Muñoz – Chile

Parent supervisor and institution: Dr Camila Fernandez, University of Concepcion, Concepción – Barrio, Chile.
Host supervisor and institution: Dr Fabien Joux, Observatoire Océanologique de Banyuls sur Mer, France.
Fellowship period: June 25 to August 27 2012 (2 months)
Topic: Use and calibration of the PUV2500 profiler radiometer (Visible and UV radiation) at the center of oceanology of Banyuls sur Mer (France, LOMIC UMR CNRSUPMC).

Since 2010 Claudia has been working on the International Associated Laboratory in Marine Biogeochemistry at University of Concepción, Chile. The lab is mainly focussed on the response of microbial communities involved in the nitrogen cycle to environmental change in the central southern part of Chile (36°S). Currently her lab is working on the effect of solar (Visible and UV) radiation on marine nitrifying comunities and on the effect of UV radiation on organic matter degradation in the ocean. For this they use a multi-spectrum radiometer (Grobel, Germany ®) with automatic acquisition card that allows them to follow the incident radiation in the water column of the Bio Bio region, Chile. They also perform experiments with a UV irradiation system. One of the main constraints of their project is their limited capacity for estimating the penetration of incident radiation in the ocean. Their current system allows a 1m depth measurement in the water column and it is therefore important to explore new technologies. The PUV2500 spectroradiometer currently available at Banyuls sur Mer is a high frequency, powerful tool that will improve our observational and survey capabilities. The training will be applied on their own system via technological transfer as field measurements in Chile are planned for 2013 with the same instrument.

The main objective of this training at the Banyuls Oceanographic Center is to complement Claudia's current expertise in the area of solar-UV radiation monitoring. The international Associated laboratory MORFUN between France and Chile promotes technological transfer that will allow measuring for the first time the penetration and effect of solar radiation in waters of central southern Chile, one of the most impacted areas by incident UV due to sustained

stratospheric ozone decrease. Her current line of work involves the use and interpretation of data obtained through a multispectrum radiometer with limited penetration capacity in the water column. It is therefore likely that our current monitoring survey is underestimating the impact of UV radiation in the marine environment. The use in 2013 of the PUV2500 spectroradiometer in Chilean waters will open a new line of research in this system. Her training in this technique will largely contribute to the succes of this technlogical transfer.

The program of this training includes: 1) Calibration and data acquisition using the PUV2500 spectroradiometer in marine waters; 2) VIS-UV data treatment and interpretation; 3) Profiling and high frequency moniroting; 4) trouble shooting and electronic functioning of optical instruments; 5) Experimental applications of PUV2500 in the frame of Time Series observations. Field work will be conducted in the MOLA Time Series of OOB and in the framework of the project AMMONITE (ammonium and nitrite coupling in the euphotic zone, Fernandez C and Joux F, PIs).

Anne Treasure - South Africa

Parent supervisor and institution: Dr Isabelle Ansorge, Department of Oceanography, University of Cape Town, Cape Town, South Africa.
Host supervisor and institution: Dr Eugene Murphy, British Antarctic Survey, UK.
Fellowship period: Aug 11 to Sept 25 (1.5 month)
Topic: Ecosystem responses to the shifting sub-Antarctic Front (SAF) in the inter-island region of the Prince Edward Islands: a modelling approach.

Anne's research aims to use an ecosystem approach to model the impacts of the shifting sub-Antarctic Front (SAF) on the biological systems in the inter-island region of the Prince Edward Islands (PEIs). The SAF displays a high degree of latitudinal variability due to the southwards migration of the Antarctic Circumpolar Current (ACC) in response to global warming. Changes in frontal dynamics are likely to alter both species distribution and total productivity within the Southern Ocean.

The PEIs provide an opportunity to investigate these processes due to their location between the main frontal systems bordering the ACC and their relatively easy accessibility from South Africa. While studies have already indicated impacts to chlorophyll concentrations, phytoplankton, zooplankton, fish and top predators, an ecosystem approach has not yet been implemented to model these impacts. In order to do this, she needed to receive training and guidance on how to build and analyse ecosystem models.

Anne received training in ecosystem modelling, including how to build and use models that can include both biological (from phytoplankton to top predators) and physical data. She learnt how to build optimum models and how to use the associated software. This will benefit her current research enormously, as the root of her research question lies with using a suitable ecosystem model, and the quality of her research output relies on how well she can build such a model. She would like to continue with this field of research into the future, so learning how to build models properly at this early stage of her career was very beneficial, and will improve the quality of any future output.

This project has promoted collaboration between scientists both nationally, within South Africa, and internationally. Due to the nature of the project, she needs to establish collaborations between various research groups and universities within South Africa to collate the physical and biological data. International collaborations between South Africa and the United Kingdom (specifically the British Antarctic Survey) have also be established.

John Mungai – Kenya

Parent supervisor and institution: Dr Samwel Marigi, Kenya Meteorological Department, Nairobi, Kenya.
Host supervisor and institution: Dr Gary Brassington, Ocean & Marine Forecasting Group, Centre for Weather and Climate Research, Bureau of Meteorology & CSIRO, Australia.
Fellowship period: August 20 – Sept 14 2012 (1 month)
Topic: Ocean Modelling using Regional Ocean Modelling System (BlueLink/ROMs), HYCOM and Wave Watch-III Models for Operational Marine Forecasting of the Western Indian Ocean.

This fellowship was cancelled due to the proposed cost of accommodation at the host institute (proposed accommodation was in a hotel).

Huiwu Wang – China

Parent supervisor and institution: Dr Weidong Yu, First Institute of Oceanography, State Oceanic Administration, Qingdao, China.
Host supervisor and institution: Dr Michael McPhaden, NOAA/Pacific Marine Environmental Laboratory, USA.
Fellowship period: Aug 31 to Nov 30 2012 (3 months)
Topic: Deep Ocean Buoy Observations.

Huiwu has been working on the First Institute of Oceanography (FIO)'s Indian Ocean project since 2008, under which the FIO's Bailong buoy at (8S, 100E) and a sub-surface ADCP mooring at (8.5, 106.75E) are maintained. Since NOAA/PMEL is the leading agency on tropical buoy observation, he wishes to be trained there on the advanced buoy technology, in situ operation, data analysis and research application.

During the fellowship, he learnt from the several decade's experience in tropical ocean buoy observation accumulated at NOAA Pacific Marine Environmental Laboratory (PMEL). The training consisted of buoy technology briefing, best practice of data quality control and scientific implication of the buoy data. NOAA/PMEL is now leading the development of Research Moored Array for African-Asian-Australian Monsoon Analysis and Prediction (RAMA) after its successful implementation of TAO/TRITON in Pacific and PIRATA in Atlantic. As an emerging force, FIO recently also contributes to RAMA through its maintaining one subsurface ADCP mooring and one surface buoy in the tropical Southeastern Indian Ocean. The training at NOAA/PMEL enhanced FIO's contribution to RAMA. Also, one CHINA-US joint program on Indian-Southern Ocean Climate Observation, Reanalysis and prEdiction (ISOCORE) is being dicussed and expected to be launched in 2013, where FIO and PMEL will both play a critical role. His training at PMEL will surely benefit this near future collaboration.

Zeenatul Basher – Bangladesh

Parent supervisor and institution: Dr Mark Costello, Leigh Marine Laboratory, University of Auckland, Auckland, New Zealand.
Host supervisor and institution: Dr Ward Appeltans, Flanders Marine Institute, Belgium.
Fellowship period: September to October 2012 (1 month)

Topic: Capacity building for deploying and developing regional marine biodiversity database portals.

Basher is using location records from surveys, Global Biodiversity Information Facility (GBIF), Ocean Bio-geographic Information Systems (OBIS) and literature to map species distribution in Southern Ocean ecosystems with species distribution models (i.e. Maximum Entropy, Boosted Regression Trees and Gradient Forest). His current research is primarily focused on building up marine ecosystem models by using deep-sea decapods as an example species. Alongside developing distribution models, he is also looking at their scale of interaction with organisms at different trophic levels. He is using GIS tools in the preparation of environmental data at regional to global scales, of different kinds (biological, physical and categorical) and spatial resolutions.
One of the main issues he has observed during his research is the lack of publicly available marine biodiversity data from both developed and developing countries. In many cases data could only be accessed by knowing the right contact person in the relevant museums or government departments. This phenomenon is observed widely in developing countries. Often the lack of proper infrastructure to publish the data or lack of knowledge about the existence and/or process to publish in one of the above well-known global biodiversity databases were mentioned by experts as the reasons behind this restricted data availability. Some initiatives were taken by Non-Government Organizations or individuals to collate records into a single database in some developing countries (i.e. Flora & Fauna database of Bangladesh by Asiatic Society) but mostly they have been few, and either focused on a single species of interest, or not well structured for proper query.

A publicly accessible standardized biodiversity database from a single source with some advanced analysis functionality is becoming a necessity in today's world. These databases would not only be beneficial for local, regional researchers but also for international researchers working on a global scale.

As part of this fellowship Basher received training from a renowned Global Biodiversity Database Hosting organization in the fields of:

- Standards and procedures used in marine environmental, biological and geographic data management with structural requirement for establishing such databases from scratch

- Developing skills to deploy regional biodiversity databases in any locations with resources available from local or regional organizations

- Technologies and know how involved with the possibilities of integrating species distribution models (SDM) as add-on data product with existing biodiversity databases.

Although Basher's primary research is concentrated on Southern Ocean, he has been working together with other researchers on the prospect of global marine ecosystem classification using recently available environmental layers and species records from OBIS, GBIF, and the literature. Integrating unpublished records extracted from archives in developed countries will enrich the quality and diversity of data available in these databases for future research.

The GBIF Secretariat developed an Integrated Publishing Toolkit (IPT) to facilitate the efficient publishing of biodiversity data on the Internet, using the GBIF network. Faster transfer of existing data using IPT to biodiversity databases required knowledge about data management standards. In developing countries where availability of these databases is mostly unheard of, knowledge about data standards are not expected to be practiced as norms. To fill up this

knowledge and expertise gap, he intends to train first with the technologies involved with establishing a regional biodiversity data portal or integrating existing regional databases with current central data portals. After familiarisation with the standards, technologies and data management practices involved with existing databases, he plans to work in collaboration with the host organization to explore the possibilities of integrating SDM with their existing databases.

Immediately after completing the fellowship he expects to initiate a collaboration between his research group and the host institute, where his research group could act as advisor to their partner organizations or universities based in developing countries about the opportunities of publishing and analyzing their unpublished data through the above mentioned data portals. They will be able to assist them with methodological and technical expertise to achieve their goal of ocean biodiversity assessment and observations in the long term. As the new data comes into light due to these newly initiated regional data portals there will be plenty of new research ideas to look into various aspects of diversity of marine species at regional and global scales.

In addition, Basher is interested to work in the development of an integrated web server based on data analysis tools (similar to Aquamaps or KGS Mapper) which would utilize quality assured global environmental and biological datasets (that he is in the process of compiling) with these biodiversity records to propose a classification of global marine ecosystems which could be used for guiding policy development by MPA managers or Government policy makers around the world.

Tatiana Bukanova – Russia

Parent supervisor and institution: Dr Vadim Sinkov, P.P. Shirshov Institute of Oceanology of Russian Academy of Sciences, Kaliningrad, Russia.
Host supervisor and institution: Dr Igor Belkin, The University of Rhode island, USA
Fellowship period: Sept 19 – Dec 19 (3 months)
Topic: Automated detection of chlorophyll and thermal fronts from satellite imagery: A case study of the South-Eastern Baltic Sea.

Tatiana's goal is to explore the capabilities of remote sensing for environmental monitoring of the Baltic Sea. Since 2009 she has been developing regional algorithms for precise estimation of chlorophyll concentration (Chl) and total suspended matter concentration (TSM) from satellite ocean color data in the Russian sector of the South-Eastern Baltic. The study includes validation of the standard algorithms with in situ data such as Chl, TSM and long-term measurements of spectral radiometric characteristics in the South-Eastern Baltic. New, corrected bio-optical algorithms for MODIS and MERIS satellite data have been developed providing a better accuracy of Chl and TSM estimation in comparison with the standard algorithms.
The basic training requirement includes the possibility to collaborate with Prof. Igor M. Belkin, one of the world's foremost experts on oceanic fronts and operational oceanography.

Tatiana acquired an advanced knowledge of front detection from satellite data. The feature-oriented, context-sensitive algorithm for automated front detection in satellite imagery (Belkin and O'Reilly, 2009, Journal of Marine Systems) was applied to the South-Eastern Baltic. The skills and expertise obtained during the training will enhance the current research of coastal-offshore exchange and upwelling events that affect ocean color and thermal fronts' geographical distribution, physical structure, and temporal variability. She investigated the frequency of the frontal zones' occurrence in SST and optical properties of water (resulting from chlorophyll and suspended matter content) and their time persistence (stability), explored the interactions

between physical and biological oceanic processes, analyzed the spatiotemporal correlations between fronts in ocean color and SST, and carried out the first-ever remote sensing survey of thermal and ocean color fronts in the South-Eastern Baltic from high-resolution satellite imagery. Relations between the observed SST fronts and fronts in other water parameters such as salinity, density, nutrients, and chlorophyll were investigated.

The proposed training will foster integration of satellite observations into the coastal zone management and water resources monitoring and assessment in the South-Eastern Baltic Sea since remote sensing of oceanic fronts appears as a highly effective tool for integrated assessments of physical and biological conditions. The expertise and knowledge gained during this project could be applied to the remote sensing of coastal seas around the world, particularly in the European Seas, East Asian Seas, Bay of Bengal, Gulf of Mexico and other marginal seas where river runoff and suspended sediments significantly impact the upper mixed layer. The University of Rhode Island is the world's leader in remote sensing of oceanic fronts, and she hopes to develop collaboration with Prof. Belkin on a variety of projects.

Qinglong Yu – China

Parent supervisor and institution: Dr Hui Wang, National Marine Environmental Forecasting Centre, Beijing, China.
Host supervisor and institution: Dr Jun She, Danish Meteorological Institute, Denmark.
Fellowship period: Sept 19 – Dec 30 (3 months)
Topic: Verification and intercomparison of two (pre)operational HYCOM models.

Both DMI (Danish Meteorological Institute) and NMEFC (National Marine Environment Forecasting Centre, China) use HYCOM for their operational forecasting. DMI and NMEFC has signed a MoU on joint development of HYCOM/CICE model. NMEFC starts HYCOM global modelling in 2011. Qinglong has already simulated the global circulation based on the HYCOM 2.2.37 and the climatological simulation has been completed. However, the results in the Arctic are not satisfactory. DMI has a more advanced HYCOM/CICE coupled model for the Arctic but yet to be fully validated. The intention is to learn the Arctic ocean-ice modelling technique from DMI, using unique Arctic observation dataset from DMI to validate the two HYCOM models, and identify the prons and cons of the two models.

The proposed project strengthened the bilateral cooperation between Denmark and China, as agreed in the DMI-NMEFC MoU. The project included a training period (2 weeks) and a joint research period (2.5months). During the training, Qinglong learnt to use the DMI version of the HYCOM model, the existing observation datasets and DMI's supercomputer. During the remaining 2.5months, he validated DMI HYCOM and NMEFC HYCOM against observations, and also inter-compared the two models. The performance together with the strengths and weaknesses of the two model setups in the Arctic and North Atlantic were evaluated and recommendations for further improvements were made.

Emilia Trudnowska – Poland

Parent supervisor and institution: Assoc. Prof Katarzyna, Institute of Oceanology Polish Academy of Sciences, Sopot, Poland.
Host supervisor and institution: Dr. Sünnje Linnéa Basedow, University of Nordland, Norway.

Fellowship period: Sept 7 – Nov 4 2012(1 month)
Topic: The application of biomass spectrum theories to Arctic LOPC data for zooplankton productivity estimation: cross-system comparisons.

Emilia's Ph.D. thesis deals with zooplankton distribution and structure based on results obtained with a high technology equipment – Laser Optical Plankton Counter (LOPC). This in situ sensor autonomously provides a reliable abundance and community size-structure of plankton. Her work is focused mainly on the impact of climate on Arctic marine pelagic community structures and food webs. The calculation of production capabilities of different water masses based on size spectrum analyses is the next step. Therefore she applied to the Polish Scientific Council for research project and obtained the funding, which covers mostly her scholarship to finish her Ph.D. studies. Her training requirements consist of the establishment of a conceptual and mathematical approach to software adaptation for the calculation of algorithms. She definitely needs extensive guidance from LOPC users to establish the integrated and sustained methodological system for zooplankton analyses.

She hopes to obtain extensive help in preparing the principles and calculation methodology for LOPC data collected for her Ph.D. thesis and to conduct a research project entitled 'Estimation of mesozooplankton productivity on the West Spitsbergen Shelf based on biomass size spectrum analysis (ProSize)'. The sophisticated character of new, advanced LOPC method requires a lot of help from more experienced users, as everyone has to write his own software for data processing. It definitely should be widely discussed with other LOPC users to prepare a uniform calculation methodology. The cooperation with Sünnje Basedow enabled her to carry out the analyses and interpretation of LOPC data properly. Moreover, she is a scientist who widely collaborates with very prestigious and experienced research groups working on oceanographic observations. Thanks to this fellowship she has developed her skills in various aspects of LOPC data usage and will try to collaborate with the group which is now working on extending the Global Ocean Observing System (GOOS) by defining the Essential Ocean Variables for biological and ecological processes in the ocean.

Sergio Cerdeira Estrada – Mexico

Parent supervisor and institution: Dr Rainer Andreas Ressl, The National Commission for the Knowledge and Use of Biodiversity (CONABIO), Mexico City, Mexico.
Host supervisor and institution: Dr Frank E. Müller-Karger, University of South Florida, USA
Fellowship period: Oct - Nov 2012 (2 months)
Topic: Understanding the detection of red tide events using satellite sensors.

From 2008 to 2011, Sergio developed the Ocean Monitoring Satellite System SATMO. It is an automatic, near-real time system to monitor the surface temperature and ocean color (chlorophyll-a, total suspended material, diffuse attenuation coefficient and chlorophyll fluorescence) in the Gulf of Mexico, the north-eastern Pacific Ocean and the western Caribbean Sea from MODIS satellite imagery at 1 km spatial resolution, received at the receiving station CONABIO. The system also includes the analysis of time series of ocean products (July 2002-June 2011) as well as abnormalities in function of the climatology of the nine years. Leader institution: CONABIO. Funding: CONABIO. [http://www.biodiversidad.gob.mx/pais/mares/satmo].

From 20 Aug. to 31 Dec., 2011, he led a project on the in situ study of bio-optical properties of algal blooms in the Yucatan Platform. Other participating institutions were UABC-Ensenada, Instituto de Geografía de la UNAM, CINVESTAV-Mérida, México; EOMAP GmbH & Co.KG.,

Germany, and IMaRS-University of South Florida, USA, with funding from GoM-LME, Integrated Assessment and Management of the Gulf of Mexico Large Marine Ecosystem and CONABIO. [http://www.biodiversidad.gob.mx/pais/mares/contaminacion/mareas_rojas/bio_optico/descripcion.html].
From Aug. 13, 2011 to Aug. 13, 2012, he participated in a project on Monitoring of the seas of Mexico through satellite remote sensing and in situ data as a basis for early warning system of occurrences of red tides. The lead institution was CONABIO, and participating institutions CINVESTAV-Mérida, México; EOMAP GmbH & Co.KG., Germany; e IMaRS-University of South Florida, USA. The funding was from FOPREDEN - Secretaría de Gobernación, México. The expected result is the installation, in June 2012, of a meteorological-oceanographic buoy-water quality in the northeast of Cabo Catoche, Mexico.

The training focused on understanding the methodology and theoretical concepts for the detection of red tide events using satellite sensors. This training will contribute to advancing our understanding of the conditions that cause Harmful Algal Blooms (HABs) events in the Gulf of Mexico, in the Mexican portion, integrating current and historical spatial-temporal environmental variables measured both in situ and through the processing of satellite images. This will allow the creation of an early warning system on red tide events.

As part of the study, and in order to better understand red tide events, Sergio studied the variation in spatial-temporal environmental parameters and the variation of the spatial distribution of marine productivity using MODIS-Aqua images that are received and processed at CONABIO and relate them to red tide events verified in situ by Centro de Investigación y de Estudios Avanzados (CINVESTAV-Mérida).