



Report on POGO-AMT GreenSeas fellowship for research cruise training 2012

Trainee's Report

Name of Trainee: Ms Priscila Lange **Supervisor (Parent Institution):** Dr Virginia Tavano Garcia

Supervisor (Host Institution): Dr Gavin Tilstone **Dates of Training:** 16/09/2012-21/12/12

Subject of Training: Contribution of micro-phytoplankton to total primary production in the subtropical Atlantic Gyres

1) Please provide a brief description of activities during the training period:

Before the cruise, Dr. Gavin Tilstone presented his main objectives and past research on primary production that based our project. The pre-cruise activities included training in measurement and fitting of PE curves and inherent optical properties (i.e. absorption coefficient & fluorescence of CDOM), calibration of the spectrophotometer and tests in the performance of the in situ filtration rig, preparation of the material for the cruise (collecting and packing the equipments and consumables), medical examinations (ENG1 certificate) and Sea Survival Course required for the cruise. Also, during the meeting of the Green Seas Partnership at PML, I presented the project made under supervision of Dr. Michael Lomas (Bermuda Institute of Ocean Sciences - BIOS) as part of the NF-POGO Training Course in Observational Oceanography (2011-2012).

During the cruise, I measured phytoplankton photosynthesis (PE curves), filtering in different pore-sized filters in order to acquire the photosynthetic parameters of three different size classes: 0.2-2 μ m, 2-10 μ m and >10 μ m. I also analyzed size-fractionated chlorophyll required to normalize carbon incorporation to chlorophyll and helped filtering for PABS (samples are still on the ship). The PE incubations were made once a day, at two depths (surface and DCM) during the "noon CTD" (around 13:00). I also helped Dr. Tilstone to process (filter) the simulated in situ primary production, which also considered these three phytoplankton size classes. I did not participate in the CDOM measurements but Dr. Tilstone showed me how to do these.

The last four weeks of the fellowship were dedicated to the project (see subject of training). Our objective is to evaluate the latitudinal variation of primary production of microphytoplankton (cells larger than 10 μ m) in the Atlantic Ocean, focusing on the contribution of this size class in the oligotrophic gyres. To this end, during this last period I prepared the dataset of previous AMTs (temperature, salinity, phytoplankton microscopy and flow cytometry counts, primary production and productivity, data provided by the British Oceanographic Data Centre (BODC)), searched references in this topic, and created the figures that will be inserted in this manuscript.

During this period in the UK, I had also the opportunity of visiting potential advisors for a PhD:

- a) Dr. Mark Moore, National Oceanography Centre Southampton (NOCS), who I visited prior to the AMT. He showed me the laboratories and we could discuss the project I can apply for;
- b) Dr. Heather Bouman, Oxford University, who I visited after the AMT. She was very kind, showed me the city, the University and the laboratories, and we also discussed the projects I am applying for;
- c) Dr. Gavin Tilstone, Plymouth Marine Laboratory, who besides being my instructor during the present programme, showed interest in being my advisor/co-advisor in the PhD project, exposing great and very original ideas that can be added to the prior projects or generate a new one.

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

The experience acquired, contact with other scientists and techniques learnt during the AMT cruise (primary production measurements) are very important to Brazil, as there are not many people in the country making primary productivity measurements in oceanic areas nowadays. This will allow me to contribute with the expansion of the Brazilian oceanographic research in a near future. I intend to start my PhD in 2013, and I am trying to create a connection between FURG and the University I will study at, by including both in my PhD project and having supervisors of both institutions. Also, if possible, I want to relate this project with projects of other Brazilian graduate students, to strengthen even more international collaborations and possibly help training these students in the techniques I learnt in PML.

3) Please provide your comments on the Fellowship Programme.

The programme was well elaborated and organized, and working with Dr. Gavin Tilstone was very good. He is patient, creative, very experienced and loves to teach, so it was very mind-blowing and constructive for me as a student. His enthusiasm is really contagious and made the hard work become something fun and pleasant. The periods before and after the cruise were very important for the practical and operational training. The AMT was the longest scientific cruise I have participated, but the ship (R/V James Cook) is the largest and the most comfortable ship I have sailed on. The relationship between the scientists and the crew was fantastic, as well as amongst scientists, and everybody was very cooperative and kind all the time. It was an amazing experience!

I am currently applying for PhD positions in different places in the United Kingdom, through initiatives from the Brazilian Federal Government created to stimulate Brazilian students to perform their studies in foreign centres of excellence in science (i.e. Science Without Borders and partnerships between the National Council for Scientific and Technological Development - CNPq - and both the University of Southampton and Oxford University). In this perspective, this fellowship was very important as it allowed me to be in touch with scientists that are kindly supporting me in the search and application for PhD positions, like Dr. Trevor Platt and Dr Shubha Sathyendranath.

The scientists I met during this experience added a lot in my life in terms of advices, instructions and ideas. This was a great opportunity I had to start my future career, and I am very happy and pleased for this amazing and constructive journey! Thank you POGO and Green Seas!

4) Please provide details as to how your contribution towards living expenses was spent. Attach receipts for all major expenses.

I spent most of the stipend with the rent of accommodation and food. Some of the stipend was also spent to fund the train tickets to Oxford to meet a possible supervisor for my DPhil project, which is being created through collaboration between Oxford University, National Oceanography Centre Southampton (NOCS) and Plymouth Marine Laboratory (PML).

This fellowship was funded by POGO and the EU FP7 project GreenSeas (no. 265294), with in-kind contributions from the AMT programme.

Please return completed form by facsimile to [+44 1752 633101](tel:+441752633101)

OR send by e-mail to: pogoadmin@pml.ac.uk

IMPORTANT: Please also mail the completed form with attached receipts to:

POGO Secretariat
Plymouth Marine Laboratory
Prospect Place
The Hoe
Plymouth
PL1 3DH
UNITED KINGDOM



Report on POGO-AMT GreenSeas fellowship for research cruise training 2012

Supervisor's Report (Parent Supervisor)

Name of Trainee: Ms Priscila Lange **Supervisor (Parent Institution):** Dr Virginia Tavano Garcia

Supervisor (Host Institution): Dr Gavin Tilstone **Dates of Training:** 16/09/2012-21/12/12

Subject of Training: Contribution of micro-phytoplankton to total primary production in the sub-tropical Atlantic Gyres

1) Please provide an evaluation of the training received.

Based on the detailed reports by Ms Priscila Lange, I found the training very intensive and very effective. The experience of preparing equipments and material, and learning new techniques prior to the cruise and then all the practical work during the survey, were valuable for her future career. Also, the period after the cruise was spent on preparing a potential proposal for a PhD application, after discussing mainly with her supervisor Dr. Tilstone, but also having input from many investigators she had contact with during her training period.

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

Certainly, the intensive practical training on primary production measurements, including fractionated phytoplankton biomass and production, using different methods, was very useful for future activities and projects not only in my institution, but in other marine study institutions around the country.

3) Is this exchange likely to lead to future collaboration with the host institution?

The exchange allowed Priscila to make contact with British investigators, leading to her application for a PhD in Oxford, where she has been accepted. The Brazilian program "Science without borders" will most certainly finance her studies in England. During the future development of her PhD program, it will be possible to make arrangements for her to take part in cruises planned in the scope of multi-institutional projects carried out between FURG, Federal University of Rio, University of Sao Paulo and others.

4) Please provide your comments on the Fellowship Programme.

The Fellowship Programme is an excellent opportunity for students and young scientists to be in contact with state-of-the-art techniques and methods to study marine biogeochemical and physical processes. Further, the intensive practical work during the cruise is quite effective in training them for future studies and also for teaching other students and investigators in their home country. Particularly in Brazil, the Oceanography field has been expanding, including development of several graduation programs and the creation, starting this year, of a National Centre for Marine Studies, sponsored by the government. Therefore, this type of training will be extremely useful for implementing new courses and integrate these future programs and activities.

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Report on POGO-AMT GreenSeas fellowship for research cruise training 2012

Supervisor's Report (Host Institution)

Name of Trainee: Priscila Lange Garcia

Supervisor (Parent Institution): Dr Virginia Tavano

Supervisor (Host Institution): Dr Gavin Tilstone

Dates of Training: 16/09/2012-21/12/12

Subject of Training: Latitudinal variations of phosphorus assimilation by phytoplankton in the Atlantic Ocean

1) Please provide a brief description of the activities during the training period.

Experimental design,
Sea Survival Training,
ENG1 Medical,
Radiochemical Safe working practice induction,
Health and Safety induction course,
COSHH and RISK assessments,
Experimental design, definition of hypotheses and objectives,
Training in the spectrophotometric analysis of CDOM,
Training in the spectrophotometric analysis of phytoplankton absorption coefficients,
Training in the fluorometric analysis of size-fractionated Chla,
Training in photosynthesis-irradiance curves and primary production measurements using ¹⁴C,
Training in data visualisation,
Training in data processing, curve fitting, statistical methods.

2) Please provide your comments on the performance of the trainee.

Priscila's POGO fellowship was composed of three components:

1. 16 Sept to 03 Oct 2012 for Sea Survival training, ENG1 medical, cruise packing and mobilisation and to learn analytical techniques.
2. On board training on AMT20 from 6 Oct to 24 Nov 2012.
3. 26 Nov to 21 Dec 2012 data processing, visualisation and statistically analyses of AMT22 data.

The following data sets were collected:

- A. Size-fractionated biomass along an Atlantic Meridional transect.
- B. Size-fractionated photosynthetic parameters along an Atlantic Meridional transect.

During her time both at PML and on board RRS James Cook, Priscila worked diligently and conscientiously. She is hard working and motivated and carried out the analyses with precision. The end result is that Priscila has not only i.) gained experience in the measurement of photosynthesis and primary production, ii.) was trained in a number of analytical methods and techniques, iii.) but also undertook novel research that will hopefully be published in a high impact factor peer reviewed journal. The strength of the fellowship was in the training Priscila in a number of techniques that she will be able

to use in her immediate career in her PhD and in her future research in Brazil. The data she has collected has already contributed to peer-review research papers and will also be used in a third paper during 2013. This POGO fellowship was evidently a great success!

3) Is this exchange likely to lead to future collaboration with the trainee's parent institution?

As mentioned above, the data she has collected has already contributed to peer-review research papers: The first paper is in prep (all of the data has been analysed and figures have been prepared) and is envisaged to be sent out for review in May 2013. The second paper used the size-fractionated biomass measurements that Priscila analysed and will be submitted for publication in March 2013:

1. **Lange P**, Tilstone G. Contribution of micro-phytoplankton to total primary production in the Atlantic gyres. **Status:** in prep.
2. Brewin R, Sathyendranath S, et al. incl **Lange P**, Tilstone G. Modelling phytoplankton size structure in the Atlantic Ocean. **Status:** In prep.

A third paper which will use the data that Priscila collected is also planned for submission in 2013 on 'Variability in pico-phytoplankton primary production in the North and South Atlantic sub-tropical Gyres from satellite ocean colour'.

4) Please provide your comments on the Fellowship Programme.

This fellowship will undoubtedly lead to strong links between UK and Brazil institutes. The fellowship programme has undoubtedly provided the fellow with a unique opportunity to further her future career which will ultimately benefit Brazil. The data set she collected is very novel, has already contributed to two peer review publications and will contribute to more papers in the future. This also provides a strong foundation for the fellow to build on her future research. I wish her every success for her future.

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