2018 NF-POGO- GEOMAR Fellowship for
Ship-board Training on-board RV Meteor cruise M148

Fellowship Report

Name of Trainee: Odilon Joel Houndegnonto
Name of Supervisor (Parent Institution): Prof. Ezinvi Baloïtcha
Supervisor (Host Institution): Dr. Marcus Dengler
Dates of Training: 24 May to 27 July 2018

Section A
(To be completed by the fellow and returned to the POGO Secretariat)
Please note Q1-Q3 will be passed on to the host and parent supervisor and made publicly available on the OTP website; Q4 will be read only by the POGO Secretariat and remain confidential

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

An oceanographic research cruise is a field of opportunity, culture and enrichment of scientific skills. The oceanographic research cruise on FS METEOR, named: **Eastern boundary circulation and upwelling off Angola, tropical Atlantic overturning circulation,** was a great way to increase our capacity in marine science. Indeed the main goals of this research campaign are: first, to quantify the variability of eastern boundary current circulation (off Angola and Namibia), second to elucidate the mechanisms sustaining upwelling off Angola during the major upwelling season in austral winter and, third to determine the strength of the tropical Atlantic meridional overturning circulation and long-term variability of deep water masses.

My strong motivation to take part in this campaign was to look for real experience of *in situ* data acquisition (method and measurement techniques) and to increase my ability of data processing, analyses, and interpretation. In keeping with these ambitions, my activities on FS METEOR vessel focused on:

- CTD watch: Preparation, deployment, and monitoring of the CTD/Rosette system;

- performing underway CTD measurements;

- sampling oceanic turbulence data using a microstructure profiler;

- preparing and deploying Argo floats;

- supervising multi-beam echo sounder data acquisition

Additionally, I also assisted the technicians to prepare and set up mooring instrumentation, pressure-inverted echo sounders, and gliders. On board training also allowed me to acquire skills for determining salinity concentrations from water samples using salinometers. Many seminars and Matlab courses were held that increase our knowledge and scientific skills.

As far as the acquisition of data processing skills is concerned, my training at GEOMAR focused on the calibration of Thermosalinographs (TSG) data (installed at the ship's edge) and the calculation of evaporation rates from latent heat flux that I determined from the Coupled Ocean-Atmosphere Response Experiment (COARE) parameterization (C. W. Fairall et al, 1996). The calibration corrects measurements made by the TSG sensors using reference salinity data (CTD salinity at 5m depth or salinity from water samples measured on board by salinometers). The figure n°1 show one of results about that. The difference between the sensor measurement and the reference data seems to be constant after about the sixth day with the second sensor, while it remains decreasing in the case of the first sensor. Figure 2 shows the evaporation rate along the

cruise line. From these maps it's noted that the evaporation rate is lower at the eastern part than western.
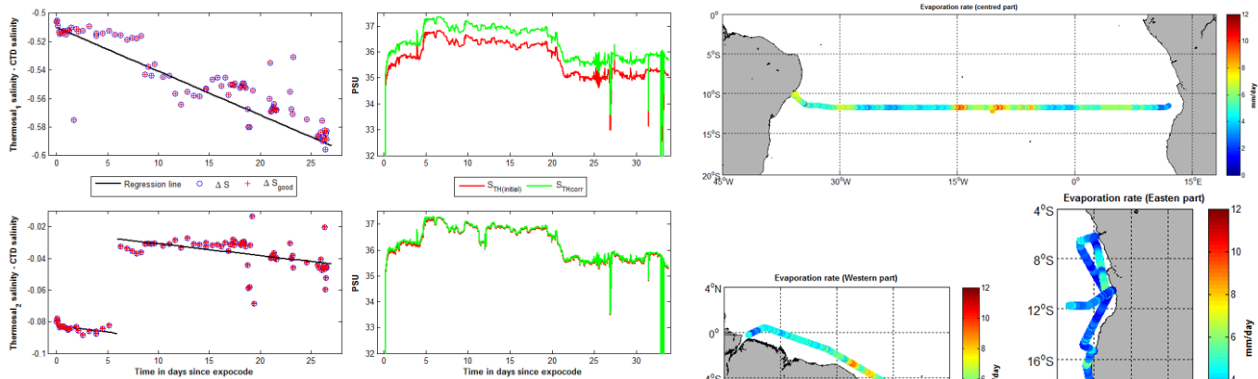

Figure n°1: Left side are regression lines plot for two TSG sensors by using CTD data, right side are the initial (red) and correct (green) TSG data plot
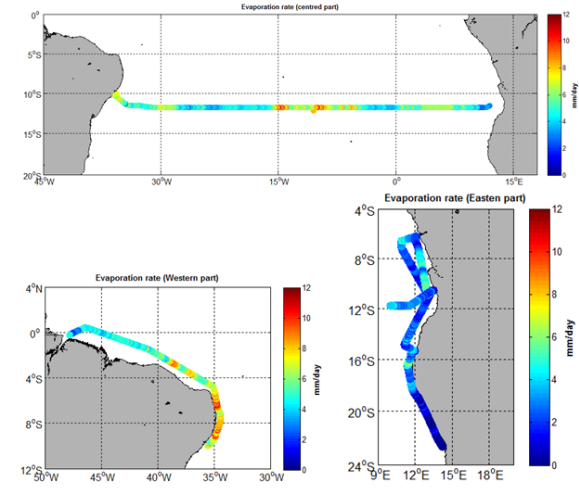

Figure n°2: Evaporation rate along the cruise track in tropical Atlantic.

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

The training I acquired is of great importance for the conduct of my PhD, which begins on October 1, 2018 at UBO - Brest in France. In fact, the TSG salinity data from the calibration will be used to evaluate the accuracy of the SMSS SMOS estimate, which I will use during my PhD. As the topic of my thesis focuses on the horizontal and vertical small-scale thermohaline variability within the superficial layers of the ocean (especially in the plumes of the Gulf of Guinea's rivers), the skills acquired during the calculation of the evaporation rate will be useful in assessing the freshwater balance in my study area.

3) Please provide your comments on the Fellowship Programme.

The POGO program is a real source of support for the development and skills of young scientists, especially those from developing countries. It was a great opportunity for me to benefit from this program. Through POGO, I was able to integrate a large network of great researchers and establish new working relationships that will help me in my career as a scientist researcher. POGO program was also a nice chance for me to meet, engage, discuss, learn with other graduate students from South America and Europe that were partly funded (by POGO).

O. J. Houndegnonto·

Date: 24.07.2018

Section B

(To be completed by host supervisor and returned to the POGO Secretariat)

Please note Q1-Q3 will be passed on to the parent supervisor and trainee and made publicly available on the OTP website; Q4 will be read only by the POGO Secretariat and remain confidential

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

Odilon was very enthusiastic about all aspects of data sampling and eager to learn about the preparation and deployment of instruments to observe the ocean. During his watch period, we thus assigned him to the deployment and preparation of a variety of different observatories such as CTD, uCTD, Argo floats, gliders, and mooring equipment. In the off-watch period, he learned how to calibrate thermosalinograph data using salinity values from the CTD and salinity from water samples measured by salinometers as reference. While visiting GEOMAR, he completed the thermosalinograph calibration and started working on issues related to the fresh water balance of the Congo River inflow using different oceanographic and meteorological parameters collected during the cruise. He performed all tasks entrusted to him with great responsibility and openly interacted with other post-graduate students and staff scientists.

2) Is this exchange likely to lead to future collaboration with the trainee's parent institution? If so please give example(s) of how this collaboration may be pursued.

Odilon will start his PhD program in Brest, France in autumn this year. Some of the data analysis performed during his fellowship program may be useful for his PhD program. We envision that during his PhD program collaboration will continue on aspects of evaluating the accuracy of different products such as satellite salinity data as well as heat and freshwater fluxes from climatology.

3) Please provide your comments on the Fellowship Programme.

The NF-POGO Fellowship for Ship-board Training is an ideal program for students from developing countries and from countries in transition to experience oceanographic data collection at sea and to interact with researchers, technicians and students from developed countries. This experience as such is in many aspects of great benefit for the fellow's career. The targeting of post-graduate students is exemplary due to their high level of receptiveness and professional qualification. Despite some gaps in knowledge of the fellow's that we were happy to address, a prominent outcome of the NF-POGO- GEOMAR Fellowship program was that we learned from each other while advancing our knowledge about ocean science integrated in the cultural and political dimension of the human, country and ocean interactions. Perhaps the last aspect could be foregrounded in the program.

M. Dengler

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Date: 24.07.2018

SECTION C

(To be completed by parent supervisor and returned to the POGO Secretariat)

Please note Q1 will be passed on to the host supervisor and trainee and made publicly available on the OTP website; Q2 will be read only by the POGO Secretariat and remain confidential

1) Do you agree with the above comments and do you have any additional feedback you wish to provide?

I am entirely satisfied with the comments above.
It is a good idea that the home Institution delivers its opinion on the return of the trainees.
This enables us to know what was made by the trainee.

Professor Ezinvi BALOÏTCHA

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Date: 20/08/2018