Partnership for Observation of the Global Oceans

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REPORT ON POGO PROFESSIONAL TRAINING INITIATIVES - 2015

Contractor's Report

Subject of Training: Emerging Trends in Ocean Observations and Ocean Data Analysis

Name of Contractor: B. Madhusudan Rao, Consultant, ITCOocean

Host Institution that provided the Training: International Training Centre for Operational Oceanography (ITCOocean), Indian National Centre for Ocean Information Services (INCOIS), Hyderabad, India

Dates of Training: July 04 -15, 2016

Names/s of Trainee/s: Please see **Annexure-I**

Name of the Parent Institution/s of Trainee/s (and country of origin): Please refer **Annexure-I**

Total expenditure to be reimbursed (please attach a financial report with copies of receipts):

EURO 5000/- **Annexure - II**, the scanned copy of the statement. **The original and copy of receipts are being sent separately by our Accounts Officer.**

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

The Training course was attended by 55 trainees, including 7 foreign trainees from six countries (Egypt, Iran, Morocco, Mozambique, Saudi Arabia and Sri Lanka). 18 trainees attended the course through video conferencing from Chennai.

The training schedule consisted of morning theory classes and afternoon practical/hands on exercise sessions. A computer lab with 17 desktops with the required software was set up for this purpose. All the trainees were divided in groups, each of three for practical sessions. Morning lecture session contained two talks (each of 90 minutes). A total of 23 lectures were delivered and 12 practical sessions were conducted. The theory classes focussed on recent advances in ocean observations, real time communication system, analysis techniques-Fourier analysis, filters in time and space, Confidence level tests, Hypothesis testing, EOF analysis, real time oceanographic data sets, satellite remote sensing of oceans, data assimilation, Indian Ocean Expeditions-past and present, marine ecosystems observations, bio-geo-chemical observations etc.

The practical sessions involved study of variability of ocean parameters (Current, temperature, sea level etc) at different time scales. Various techniques such as Fast Fourier Transform (FFT),

Morlet Wavelet transform, Time series filter analysis, EOF (Empirical Orthogonal Function) analysis were used to analyze the data. Trainees used only open source software (e.g. FFT code, Morlet Wavelet code, Timer series filter (Lanczos Filter) and EOF analysis code). The freely available data sets (RAMA current observation, OSCAR current data, Altimeter sea level data, TMI sea surface data) were provided. A few guest lectures were also organized during the course. The detailed two weeks programme schedule of the training course is attached as **Annexure-III** for the reference. **Two faculty members (Prof. Eric D'Asaro, University of Washington and Dr. Thomas Farrar, Woods Hole Oceanographic Institution) from USA visited and delivered a number of lectures.**
A group photo of the participants of the training course is attached. **(Annexure IV)**

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

The performance of the trainees was assessed through the tutorial assignments. One set of RAMA observed current data and one set of satellite observed data was provided to each group. The aim was to analyze the data using FFT, Wavelet, Time series filter of same data and EOF analysis of satellite data to know the variabilities present in the data, when it is strong, how magnitude of the ocean parameters vary at different periods and what are the spatial modes strongly present in the data. On the final day of the course, each group presented their results in the presence of all faculty members.

It was felt by the faculty members that the trainees have shown remarkable understanding of the various advanced topics covered in the course and a good skill in applying these techniques in the analysis of ocean data sets. Most of the trainees were quite comfortable in using advanced software and various platforms and many of them tried to go through software programs to understand more details.

The feed back received from all the trainees suggests that the course was conducted in a highly professional manner, with top scientists in these fields delivering the lectures. They were quite confident that they would use the new skills acquired during the training course more meaningfully in their Ph D/research work.

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

All the trainees were adequately briefed about various activities and facilities of INCOIS. The successful conduct of this course would encourage more participation from the trainee's parent institution in future. The possibilities of more scientific and technical collaborations (like participation in International cruises etc.) will be explored in future. The centre has plans to host young sponsored researchers for a period of 6-12 months to work with eminent scientists on a mutually agreed project.

4) Please provide your comments on the POGO-funded Training Initiative.

The objectives of ITCOocean (in addition to many) are to provide advanced training in Operational Oceanography for young researchers and scientists and decision makers/officials from the IOR countries on a regular basis, to enable to create a large pool of skilled manpower. Thus such training initiatives by POGO compliment the objectives of ITCOocean. The POGO

funds helped in bringing the international trainees to attend the course. Five trainees were provided the international air fare enabling them to visit India to attend the course. The accommodation and food was provided by INCOIS to all the foreign participants. This certainly helped in giving opportunities to the trainees from less developed countries to undergo training and a exposure to the advanced topics/themes in operational oceanography, all delivered by the best experts in the field from best institutions in the world. In fact, looking at such joint initiatives by POGO and ITCOocean, the US experts lauded our efforts and managed their travel from other sources.

However, it may be worth mentioning that in view of the increasing air fares across the world, there is a need to look into the funds allotted to each course. The present amount needs to be considerably enhanced to accommodate more trainees in each course. Similarly, provision should be made to reimburse visa fees, as requested by some participants.

I am sure such POGO funded training initiatives would bring the two institutions collaborate more closely in future and help ITCOocean to emerge as a nodal institution in the Indian Ocean region to address the regional requirements of ocean community and extend the most recent and relevant scientific/technological information services for the benefit of the society.

Please return completed form by e-mail to: pogoadmin@pml.ac.uk