



Report



Training NCAOR PhD students and post-docs on diatom taxonomy.



Lecture at NCAOR.

### **Name of Visiting Professor**

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### **Host Institution**

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Host Country: India

### **Dates of Visit**

03 March 2018 to 24 March 2018

## Summary of Visit

The main goal of the visit was to train PhD students and post-doctoral fellows on diatom taxonomy and diatom-based transfer function along with developing collaboration with colleagues from NCAOR.

The two first weeks of my stay were mainly dedicated to training on diatom slide preparation, diatom taxonomy and diatom transfer function. For the diatom taxonomy part that took most of the first two weeks I explained to the trainees the specific characteristics separating genera, then what were the characteristics separating species with a given genus (via drawings, taxonomic keys, etc...). For each genus or group of genus, after theoretical explanations, we spent few hours at the microscope to identify the species' specific characteristics that led to identification of the species. This mode of training is very efficient in that it goes much beyond the simple "look at photos" training they usually got. We worked on modern and fossil samples covering different time slices and different regions of the Southern Ocean and the trainees can now identify more than 100 diatom species from the Subtropical zone to the sea ice zone. With this training, and this method, the trainees have the basics to efficiently seek into the abundant literature on diatom taxonomy to identify unknown (though rare) diatom specimens. The training of transfer function followed the same protocol with a theoretical explanation of the transfer functions, how they work, their limits, etc... and a practical course on how to use my diatom transfer function. In agreement with Dr. Mohan Rahul it was decided that I will share my modern database (the reference dataset that allows to estimate past sea-surface temperatures and sea-ice cover; not published) with NCAOR colleagues when they will participate to the development of this modern database by the addition of new surface sediment samples. For the time being, I will provide the SST reconstitutions based on their diatom counts. During the two first weeks, I also shared my experience of science with the trainees on many aspects: oral presentation, writing papers, interpreting the data, etc... I also discussed with them about their own results.

The trainees were:

- Miss CHOUDHARI Pallavi; PhD student
- Miss GHADI Pooja, PhD student
- Mr NAIR Abilash; PhD student
- Dr PATIL Shramik; Post doctoral fellow
- Miss VAZ Vailancy; student

The last week was mainly dedicated to discussions with Indian colleagues at NCAOR. Firstly, with Dr. Mohan Rahul both on the interpretations of the data they have already generated that will soon end up in a co-signed paper and on future collaborations (see "future plans"). Secondly, with many scientists from very different expertise such as geochemistry, glaciology, remote sensing, etc... Most of them were seeking a different view on their results and interpretations. I believe these discussions proved useful for them as well as for me as they provide me with new information on ocean and atmospheric circulations and new proxies of ocean circulation. Further collaborations may sprout from these discussions. Additionally, I shared my scientific network with Indian colleagues to find the expertise they were lacking. For example, I contacted a French colleague who agreed to help NCAOR scientists to estimate sea-surface temperatures based on foraminifera census counts.

Finally, I visited the NCAOR facilities and got ideas for new technological developments at EPOC.

## **Capacity Building, Education and Outreach Activities**

The numerous discussions I had with the PhD students helped some of them to refine the objectives of their PhD and to better select the sediment material they should work on. For example Ghadi Pooja, who was supposed to work on diatoms from coastal Antarctic lakes, will finally investigate three deep-sea cores from the Indian sector of the Southern Ocean covering several climatic cycles (two Indian cores and one French cores) during her PhD.

Over the three weeks I delivered three public lectures, which titles can be found below. The three lectures were attended by young and senior scientists from very different expertise and background. The lectures information was shared on NCAOR Facebook and Tweeter accounts.

- Antarctic sea ice in a changing world.
- Late Holocene sea ice dynamics in the Indian sector of the Southern Ocean and potential forcing mechanisms.
- Environmental conditions off Kerguelen Islands over the last 40,000 years.

A short interview of Dr. Crosta was video recorded by Mr. Rao Rakesh. The Interview will be stitched into a short video discussing the importance of diatoms and Southern Ocean paleoceanography to be used for Education/Outreach in schools and colleges. The video will also be uploaded online to spray a larger audience.

An interview of Dr. Crosta on the importance of Southern Ocean paleoceanography was taken by Dr. Nagar Swati and has submitted for publication in Hindi and English in local newspapers/magazines.

## **Future Plans**

The SCAR Professorship visit has served as the backbone of future collaborations.

The short-term collaboration implies a joint scientific paper authored by Nair Abilash and the co-coordination of Ghadi Pooja's PhD at NCAOR who will be working on Indian and French sediment cores. We will apply to several calls to fund Miss Gadhi Pooja's visits at EPOC. After PhD completion Mr. Nair Abilash will probably apply with me to Bordeaux University post-doctoral fellowship scheme.

The long-term collaboration implies larger scale projects such as an application to the CEFIPRA call this year of next year and joint sea-going expeditions. The CEFIPRA is a Franco-Indian bilateral program in which co-coordinated students have to spend half of their PhD in each country. This program covers networking, consumables and manpower and, as such, ensures the success and durability of bilateral collaborations. For the sea-going expeditions, one NCAOR PhD student may sail in January-February on the expedition I will be directing around the Crozet Islands, SW Indian sector of the Southern Ocean.

I would also like to participate to one of the yearly cruise the NCAOR colleagues are conducting in the Indian sector of the Southern Ocean.

We will be trying to have more international collaborations with scientists working in this sector, namely Prof. Ikehara Minoru and Dr. Cortese Giuseppe. To shape this international framework, we will rely on the IODP proposal PePSI-SO (pre-proposal accepted; PIs: M. Ikehara and X. Crosta). We have invited Dr. Mohan Rahul to be a co-proponent on this project.

### **What were the highlights of your visit?**

The entire visit was a fantastic experience both scientifically and personally. The three weeks visit allowed to get more in-depth information on the large range of activities conducted at NCAOR and more in-depth discussions with Indian colleagues, which that is usually not possible in conferences. These kind of “long-term” visits are a unique opportunity to build strong bounds between people and institutions.

On a personal aspect, one highlight is certainly the discovery of the Indian culture and gastronomy.

### **How did the SCAR Visiting Professor Award impact your research? your career objectives? you personally?**

The award enabled me to get an extended visit to the NCAOR, which would not have been possible otherwise. Immediate outcomes of this visit are joint papers and the co-coordination of a PhD on Southern Ocean Paleoceanography to start in the next months. Another rapid outcome will be the improvement of my modern diatom database by the addition of surface sediment samples retrieved by my NCAOR colleagues over the last years.

I would say that these kind of extended visits, enabling daily interactions with local colleagues, are pivotal to help developing collaborative networks. In my case, it helped me developing my network towards Asia.

### **We often like to use quotes from these reports in advertising the programme. Do you have a specific quote you would like us to use?**

A fantastic experience both scientifically and personally.

### **We are always looking to improve SCAR’s activities. Are there suggestions you have that we could do to help make this programme more effective?**

The program is an excellent opportunity to nurture short- and long-term collaborations between different institutions. I would however suggest to modulate the fellowship according to the living costs in the host country and to be flexible on the housing cost that currently falls on the host institution. In some cases, the grant is large enough to cover both the flight and daily fees, including housing fees. I am sure that some host institutions may not be able to cover the housing fees, thus preventing potential applications.