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Welcome to the fifth issue of the Ocean Quest Newsletter!

This issue of our quarterly newsletter is a special issue as it focuses on two very important events, the World Oceans Day and the Inauguration of the new building of the Mauritius Oceanography Institute (MOI) at Albion, both celebrated on the same day – the 8th June 2017! We were honoured to have the new research facility inaugurated by the Minister Mentor, Minister of Defence and Rodrigues, Honourable Sir Anerood Jugnauth. The Honourable Minister of Ocean Economy, Marine Resources, Fisheries, and Shipping, Hon. Premdut Koonjoo launched the new website of the Institute on the same occasion. The double celebration, which stretched over two days, was a great success especially with the participation of various stakeholders of the ocean sector.

In addition to the inauguration ceremony, we have had the privilege of welcoming renowned scientists and scholars, who made presentations to the MOI scientific staff as well as participants from other institutions and organisations. This newsletter is especially rich in events such as presentations, visits and workshops that all contribute to the sharing and dissemination of latest scientific information in the field of oceanography.

You will also read about the ongoing research activities at the MOI, an update on which will be presented in the next issue. I hope that you will enjoy the latest issue!

Happy reading!

Dr Ruby Moothien Pillay
Director

The last six months have been very rich and productive with many activities including visits from eminent visitors at our new oceanography research centre in Albion.

You will be pleased to read under the various headings information on the Events, Activities, and talks. However, the milestone event during this period has been the official opening of the new oceanography research centre at Albion by the Honourable Minister Mentor, Minister of Defense and Minister for Rodrigues, the Right Honourable Sir Anerood Jugnauth, in the presence of the Honourable Minister Premdut Koonjoo, Minister of Ocean Economy, Marine Resources, Fisheries and Shipping as well as other eminent members of the government and guests.

The opening ceremony was scheduled on the same day as the World Oceans Day on 8th June 2017. In the margin of the celebrations, many partners including various government agencies had participated in an open exhibition to showcase their contribution in the conservation and protection of the ocean and various ongoing research programmes.

The University of Mauritius and the University of Technology had also participated in the exhibition and their researches were on hand to give explanations on ongoing research programmes. Dignitaries and some 250 science students from various secondary schools were invited to visit the Physical, Biological, Chemical, Biotechnology and Marine Geosciences exhibition booths as well as laboratories to be given explanations on ongoing research programmes and to appreciate the relevance of the ongoing researches and their contribution in the short, medium and long term development of a strong, sustainable and vibrant ocean economy.

I am also pleased that MOI has entered into a new phase of its development as the laboratories are fully equipped to carry a large gamut of research programs.

The MOU between the MOI and the Council of Scientific & Industrial Research (CSIR) – National Institute of Oceanography (NIO) of India was also recently signed and very shortly a joint committee of MOI and NIO would be meeting to elaborate and agree on a joint research programme. There shall be an update on all these in our next Newsletter.

Raj Hemansing PRAYAG
PDSM, FIEM
Chairman
Presentation by scientist from National Centre for Antarctic and Ocean Research (NCAOR) – 9th Southern Indian Ocean Expedition

A group of scientists from the National Centre for Antarctic and Ocean Research (NCAOR, Goa), headed by Dr. Sarat C. Tripathy (chief scientist) visited MOI on February 28th, 2017. NCAOR is India’s premier R&D institution responsible for the country’s research activities in the Polar and Southern Ocean realms. The SO research programme is mainly focused on the “Role and response of Southern Ocean to the regional and global climate variability”. The SO is a very challenging region compared to other oceans for accomplishing any scientific investigation due to its harsh climate inaccessibility and remoteness. Detailed studies on air-sea interaction, hydrodynamics, food web dynamics and biogeochemistry were carried out in the regions of the Indian Ocean sector of SO. The results obtained from these expeditions provided baseline data/information on various physical, biological and biogeochemical processes that are responsible in modulating the global warming and climate variability. During the SO expedition 2017, detailed observations were made in the Prydz Bay (PB) region during austral summer, however in the SO expedition 2017-18 the scientists are planning to deploy an under-ice mooring for a period of one year. The 10th SOE to the Indian Ocean sector of the SO will be launched in early December 2017. The samplings during this expedition will be made for physical, chemical, biological and geological studies. MOI scientists have been invited to join the next expedition.

Independence Day Celebration at the MOI

To mark the celebration of the 49th Independence Day of the Republic of Mauritius, the MOI organised a flag raising ceremony in the presence of all its staff and the Chairman on the 10th March 2017. The Chairman seized this opportunity to emphasise on the role of the MOI towards the sustainable development of the ocean economy in line with the Government Vision 2030 and highlighted on team work for the achievement of this common goal.

Talk on “Marine Biodiscovery in Southern Africa: Finding Drugs from the Sea” by Dr. Suthananda Sunassee

A presentation by Dr. Suthananda Sunassee, researcher from University of Cape Town on “Marine Biodiscovery in South Africa: Finding Drugs from the Sea” was held on Thursday 30th March 2017 in the MOI Conference Room with MOI Scientific Staff.

Dr. Sunassee presented an overview of the contribution of marine natural products, particularly from Southern Africa, in drug discovery. He highlighted the inherent challenges as well as the opportunities in the complex pharmaceutical drug discovery process. He also described selected research projects of the natural products research group (NPRG) at the University of Cape Town, directed towards exploring the unique biomolecular diversity of Southern Africa’s marine invertebrate populations, with special emphasis given to the discovery of natural products that show promising activity against infectious diseases, pathogenic bacteria and non-communicable diseases such as cancer.

Visit of Quartier Militaire SSS Students

On 3rd May 2017, the MOI received the industrial visit of some 25 students from the Quartier Militaire State Secondary School. In an effort to apprise the students of the importance of oceanography and the research activities undertaken at the MOI, a PowerPoint presentation was made by Mr. Kamlesh Ramdhony, Associate Research Scientist on the above as well as the career prospects in oceanography.
On 29th May 2017, Professor Andrew Baird from the Australian Research Council (ARC) Centre of Excellence for Coral Reef Studies at James Cook University (JCU), Australia, delivered a talk on “The molecular revolution in coral systematics and the implications for coral reef ecology” in the MOI Conference Room at Albion. This interactive talk which was organised by the MOI in collaboration with the High Commission of Australia, focussed on coral reef ecology, coral systematics, coral reef research programmes undertaken by the JCU and past experience/research from Prof. Baird. Invitees to this talk included representatives from the Ministry of Ocean Economy, Marine Resources, Fisheries and Shipping; Albion Fisheries Research Centre (AFRC), Ministry of Social Security, National Solidarity, and Environment and Sustainable Development, University of Mauritius. The High Commissioner of Australia, her excellency, Susan Coles graced the event by her presence.

Talk by Professor Andrew Baird

Visit of scientists from Stanford University

Scientists from Stanford University visited the MOI on 15th June 2017 in view of collaboration with the MOI with regards to Marine Archaeology in the region around Mauritius. They have carried archaeology works in other parts of the world, and they are already carrying some studies in the region of Flat Island regarding land archaeology. During this visit, a diving expedition was effected near the Sirius wreck. An agreement would soon be signed between both institutions for kick starting collaboration in common areas of interest.
Inauguration of new MOI Research Facility and Celebrations of World Oceans Day 2017

To mark the celebrations of World Oceans Day 2017, the MOI in collaboration with the Ministry of Ocean Economy, Marine Resources, Fisheries and Shipping organized the Inauguration Ceremony of the new MOI research facilities at Albion on Thursday 8th June 2017.

The unveiling of the inaugural plate was done by the Right Honourable Sir Anerood Jugnauth, GCSK, KCMG, QC, Minister Mentor, Minister of Defence and Minister for Rodrigues in the presence of the Honourable Ivan Leslie Collendavelloo, GCSK, SC, Deputy Prime Minister and Minister of Energy and Public Utilities as well as Honourable Premdut Koonjoo, Minister of Ocean Economy, Marine Resources, Fisheries and Shipping.

Other ministers, namely Honourable Anil Kumarasingh Gayan, SC, Minister of Tourism; the Honourable Marie Roland Alain Wong Yen Cheong, MSK, Minister of Social Integration and Economic Empowerment; and the Honourable Dharmendar Sesungkur, Minister of Financial Services, Good Governance and Institutional Reforms, also attended the inauguration ceremony.

Concurrently, to celebrate World Oceans Day 2017, the MOI organized a series of multi-stakeholders’ exhibits and displays, short film projection and presentations in collaboration of different ocean related stakeholders for secondary school students on Friday 9th June 2017 under the theme “Our Oceans, Our Future”. Around 200 to 250 students from various state secondary schools participated in the above event.

Collaborating partners included the Ministry of Ocean Economy, Marine Resources, Fisheries and Shipping, the Ministry of Social Security, National Solidarity, and Environment and Sustainable Development (Environment and Sustainable Development Division), the National Coast Guard, the Mauritius Meteorological Services, the Outer Islands Development Corporation, the Hydrography Unit, the Shipping Division, the Fisheries Protection Service, the University of Technology, the Rajiv Gandhi Science Centre as well as NGOs such as the Reef Conservation and Lagon Bleu Project – ECO-SUD.
Ms. Vidoushi Chinta, also our STM intern, built a model based on the theme of the Evolution of Marine Pollution for the World Ocean Day 2017 celebration at the Mauritius Oceanography Institute. The aim was to raise awareness among the population of the changes on the state of our ocean over time. The model consisted of three main parts representing the past, the present, and the future conditions of our ocean. Its objectives were to:

1. show how our ocean was before the interference of human activities.
2. illustrate how land development through industrialization has caused marine pollution for the past 50 years; and finally
3. demonstrate how the ocean will become in the eventuality that proper attention is not drawn to the problem of marine pollution and remedial actions taken.

The overall model was presented to the audience and the students on the 8th and 9th of June 2017 with interactive questions to draw their attention on this important issue.
Focus

WORLD OCEANS DAY AT MOI
Achievements of the different units of the MOI

**Biological Oceanography**
The biological oceanography unit has produced both, short-term and long term, biological and physico-chemical data from permanent monitoring sites/stations around the island. In the past few months, 38 sea cucumber specimens have been sequenced and analysed using bioinformatics tools while microscopic spicule examinations have been undertaken for 26 sea cucumber samples. Following validation of sea cucumber samples, the online marine diversity and genetic database has been populated with both taxonomic and genetic data. The team has also carried out optimization of protocols for DNA extraction and amplification of DNA barcoding gene in marine sponges. In its pursuit to assess the biological resources in the EEZ of Mauritius, the team is now focusing on the collection and identification of marine molluscs in the nearshore waters. In this context, the team is planning field activities and is preparing to host a regional training workshop on the taxonomy of marine molluscs in the nearshore waters of Mauritius in October 2017. The biological oceanography unit continues to provide its services to the Seafood industry and has successfully identified four frozen fish filet samples. The unit has recently welcomed and trained two interns, namely Ms. C. Diaz and Ms. H. Tegally.

**Physical Oceanography**
The physical oceanography team has completed the survey of 13 sites at GRSE and has produced 3 reports. The simulation scenario for Rodrigues based on numerical modelling on Sumatra 2004 has also been completed and submitted to the NDRMC. The unit has also developed algorithm for processing satellite data with regard to Sea Surface Temperature (SST) and Chlorophyll-a (Chl-a) concentration 4km resolution and to generate climatological charts for SST and Chl-a for the Indian Ocean. A wave energy assessment has been made using data available for Flic en Flac and Belle Mare and the non-directional wave energy data for these sites have been interpreted and report produced.

**Chemical Oceanography**
Under the Bioprospecting of Mauritius Waters (Biological activities of marine natural substances from the Mauritius Waters) project 54 marine sponges have been taxonomically identified and extracts from 54 sponges have been tested for their anti-cancer, anti-Alzheimer, anti-diabetic and anti-oxidant activities. Preliminary findings have been disseminated via 13 publications to date. Writing up of material transfer agreement (MTA) and project specific agreement (PSA) for conducting research work at UCT are underway.

**Marine Biotechnology**
Under the Biological Survey of Port Mathurin Harbour to detect Introduced Species, the TOR write up for the project coordinator has been completed and a project consultant has been recruited. Trainings have been delivered to MOI scientific staff on the recently acquired inverted fluorescence microscope by Leica expert.
The MOI organised a regional training workshop on “Coastline Mapping using Satellite Imagery” from 17th to 21st April 2017 at the MOI, Mauritius. A total of twelve participants from Comoros, Seychelles and Mauritius attended the workshop. The workshop was officially opened by Honourable Mr. Premdut Koonjoo, Minister for Ocean Economy, Marine Resources, Fisheries and Shipping in the presence of His Excellency Mr. Hamada Madi, Secretary General of the Indian Ocean Commission.

The objectives of the workshop were to provide participants training on the following:

1. shoreline definition and indicators,
2. pre-processing techniques for satellite images, shoreline mapping methodologies,
3. shoreline extraction from satellite images; and
4. calculation of rate of change of shoreline.

The training was conducted by Mr. Jean-Pierre Gerard from TTI Production, France.
Currently following a Master’s Degree in Environmental and Marine Ecological Sciences, Ms. Clara Diaz from the University Pierre and Marie Curie, France, followed an internship at the MOI from 18th April to 16th June 2017. During the two months' internship at the institute, Ms. Diaz worked on a pilot study entitled “Macrofaunal abundance and community in soft-bottom sediments from shallow waters of Mauritius”.

This multidisciplinary study which involved the Biological Oceanography, Chemical Oceanography and Marine Geoscience units of the MOI had main objectives of:

1. morphologically characterising macrofaunal communities inhabiting soft-bottom sub-tidal sediments from shallow waters of Mauritius, and
2. understanding what factors drove the structure of macrofaunal communities in coastal waters of the island.

The main deliverables from the project included:

1. a report/review on macrofaunal diversity/identification from soft bottom sediments, and
2. the development of appropriate protocols for field sample collection, preservation and identification of macrofaunal communities. Main results from this study was presented as a poster during the World Oceans Day 2017. Baseline data (incl. protocols) generated through this study will help the MOI in establishment of in-depth studies for macrofaunal diversity assessment in sediments.
The MOI has provided training to Ms. Houriiyah Tegally who holds a Bachelor Degree in Molecular, Cellular & Developmental Biology from Yale University. From January 2017 to July 2017 Ms. Houriiyah has been trained to work both in the molecular biology and natural product chemistry laboratories. Following her traineeships, she worked on the “Optimization of protocols for the identification of sponges using DNA-based techniques.” The aim of the study was to identify marine sponges collected from the Bioprospecting of Mauritius Waters project with the aid of DNA-based tools.

The main objectives were:

(i) To optimize the DNA extraction strategy for marine sponge (Porifera) by:
   a) Evaluating sponge sampling and storage procedures for best preservation of DNA;
   b) Testing and adapting existing DNA extraction protocols to sponge samples;
(ii) To undertake amplification using various protocols and primers
(iii) To sequence amplicons and identify sponges using DNA techniques

The main deliverables were:

(i) a report depicting the different methods utilized to extract as well as increasing the DNA yield from marine sponges.
(ii) techniques to amplify DNA barcoding gene from marine sponges.
(iii) identification of marine sponge using DNA.

The techniques developed will help MOI to identify marine sponges collected during the bioprospecting project and hence aid in the characterization of bioactive compounds.