Title: Hydrographic Services in Mauritius
Presenter: Lt Commander Pradeep Singh, Officer in Charge, Hydrographic Unit, Ministry of Housing and Lands

Almost every human activity that takes place in, on or under the sea requires some knowledge of the hydrography of the area—in other words, knowledge of the shape and nature of the seafloor, its characteristics and its hazards. However, there is concern in the maritime community that too few coastal states are supporting hydrography at national level, despite the fact that there are many areas of the world that still lack adequate nautical charts and supporting services. This poses a real and continuing threat to safety of life at sea and to the well-being of marine environment. Furthermore, the awareness about hydrographic services amongst governments and public at large is at best limited. Through this presentation, audience will be introduced to hydrography, resultant nautical products and marine cartography. It would further stress upon the need for evolved hydrographic services in Mauritius. The presentation would give an insight into the applied science of ocean mapping and the critical role it plays in management of activities in maritime domain. After setting up of Hydrographic Unit at MHL in 2013, significant progress has been made in this field. It is essential for the students of tertiary education and especially those who may pursue a career in ocean related professions to understand the hydrographic capabilities in Mauritius and how they can utilise these services in their respective fields in future. The audience would therefore be apprised of the important milestones achieved so far, future plans and possible career options.

Title: Safety at sea and services provided by the Mauritius Meteorological Services
Presenter: Mr. R. Virasami, Divisional Meteorologist, Mauritius Meteorological Services

The Mauritius Meteorological Services (MMS) is an ISO certified agency whose main function is to provide accurate and timely weather information and meteorological products for the general welfare of the citizens of the Republic. The MMS issues weather forecast for fishermen in Mauritius, Rodrigues, St Brandon and Agalega. Moreover as part of the requirement of the GMDSS, it provides the necessary meteorological parameters which are broadcast to the maritime community within the South Indian Ocean which forms part of METAREA VIIIS.
Title: Business opportunities in the Ocean Economy

Presenter: Associate Professor Manta Nowbuth, Dean, Faculty of Ocean Studies, University of Mauritius

The contribution of the ocean as a significant source of food and energy, and as a setting for global trade and commerce has always been part of the lives of all communities. With the development to the blue ocean economy worldwide, the economic importance of oceans is evolving and will likely become a strong economic force in the future. The drivers behind this new economic pillar vary between countries, from the ocean related developmental sector promoted at national level, the international trade agreements in the region, demands for food security, demands for renewable energy and emerging seaborne trade opportunities. Developing ocean resources while promoting a healthy ocean is indeed the challenge that countries will be facing. For countries with an emerging ocean economy the additional challenge will be competitiveness at global level. Economic activities are either ocean-based (fisheries and aquaculture, offshore oil and gas, mining, ocean energy, desalination, shipping/marine transportation, marine tourism, marine construction etc.) or ocean-related (seafood processing, marine biotechnology, chemicals, salt, ship building and repair, ports, tourist resorts, communication, maritime insurance and law, maritime technical services, invasive species management, coastal protection, ocean monitoring and surveillance, blue carbon etc.). Technology, the knowledge sector, and research and development are the enablers that will strengthen the linkage between the blue ocean economy, sustainable development and economic development of ocean resources. With these potential opportunities and challenges, more than ever the need to develop a culture of entrepreneurship at national level is being felt. Business opportunities are around, but the success will rest on the innovation and creativity skills as well as on the know-how in entrepreneurship and marketing.

Title: Coastal Ecosystems: Mangroves, Seagrass and Coral Reef

Presenter: Mr S.P.Luchmun, Scientific Officer, Albion Fisheries Research Centre

The tropical coastal ecosystems consist of mangroves, seagrass and coral reefs. The Mangroves and the Seagrass provide ecosystem services for coastal areas and have high productivity. Their function as nursery grounds support the coastal as well as offshore fisheries. These ecosystems are connected through influx of materials and organisms. Mangroves and seagrass meadows have been found to play a key role in carbon sequestration and thus help combat climate change. Coral reefs have important economic and biological values and they generate about USD 30 billion per year in fishing, tourism and coastal protection from storms. These ecosystems are subjected to pressure from human settlements and natural events. The roles of these ecosystems in productivity,
services and protection are widely recognised and the need to protect these ecosystems is clear. Moreover, the connectivity between these ecosystems is now being considered when managing these ecosystems to optimise their functioning. Mauritius as a tropical island faces the challenges of coastal erosion, sea level rise and climate change. Protecting and managing the coastal ecosystems efficiently can help to offset the effect of climate change.

**Title: Marine Renewable Energy**

**Presenter: Mr. F. Shamutally, Research Assistant, Mauritius Research Council**

Increasing energy demand, due to the rapid economic growth, has made energy a priority in the governmental agenda in Mauritius. The energy supply in Mauritius relies heavily on fossil fuels, especially heavy petroleum oil. However, due to issues of pollution, sustainability and climate change related to the consumption of fossil fuels, the Mauritian government is trying its best to divert its energy supply from conventional energy resources to new renewable energy resources such as wind and solar energy. However, land availability being limited on an island like Mauritius, renewable ocean energy provide huge potentials. Prefeasibility studies show that Mauritius is suitably located in terms of marine resource potential and that a huge amount energy from diverse sources can be harnessed out at sea such as ocean wave, ocean current, ocean thermal, salinity gradient and offshore wind. In order to do so, a detailed resource assessment is necessary. This would help boost interests and attract investors in the field.

**Title: Submarine groundwater discharge**

**Presenter: Dr. Yashvin Neehaul, Associate Research Scientist, Chemical Oceanography, MOI**

Submarine groundwater discharge (SGD) refers to the flow of water from the seabed to the coastal ocean, regardless of fluid composition. Very often though, SGD is the flux of fresh groundwater from the seabed to the ocean. In this investigation, we used a novel multi-disciplinary approach to identify the major SGD sites around Mauritius. Initially, multi-temporal sea surface temperature satellite imagery was used to detect any SGD associated temperature anomalies. Each of these thermal anomalies or potential SGD sites was studied and measurements of $^{222}$Radon, a naturally occurring radio-isotope, were performed. A total of 28 major SGD sites were identified around Mauritius. With increasing coastal population and activities, coupled with the recent episodes of drought and vulnerability of the islands of the Republic of Mauritius to climate change, there is an urgent need to explore and exploit new
sources of potable water. The results obtained in this investigation would be useful for the formulation of integrated coastal zone management policies.

Title: MESA project: Observing the ocean from space

Presenters: V. Ramchandur & B.A. Motah, Research Scientists, Physical Oceanography, MOI

AMESD (African Monitoring of Environment for Sustainable Development) was the first thematic programme where five Regional Implementing Centres (RICs) spread out over the African continent, dealt with a specific thematic domain. The Mauritius Oceanography Institute (MOI), as the RIC for the Indian Ocean Commission (IOC) region, supervised the installation of 10 AMESD Environment Stations in eight partner countries and Mauritius, thus providing an improved access to basic Earth Observation data in the region. Regional partners can now access monthly bulletins on biological and physical oceanography parameters e.g. chlorophyll, sea surface temperature, wave, wind and current, and a tool for detection of potential fishing zones. A Wave Data Buoy measuring wave height and direction in near real-time, is being used for climatology and monitoring of weather conditions in the Mauritian EEZ.

Under the Monitoring for Environment and Security in Africa (MESA) programme, a continuation of AMESD, the MOI is further developing the operational services in place and a new service for Coastal Area Management. The products developed by the MOI in the framework of the MESA programme for the IOC region is dedicated to using Earth Observation and in-situ data to support the information requirements and decision-making processes for marine and coastal resources management in the South West Indian Ocean (SWIO) region. Coastal Area Management is also looking into the impact from ocean hazards with the deployment of wave data buoys and also developing a Coastal Vulnerability Index (CVI). The CVI will serve to identify areas potentially at risk and aid in decision-making to implement mitigative measures. Observation of the ocean’s physical properties from space coupled with in-situ data help to better understand and describe these oceanographic parameters. Monthly Oceanography bulletin are released to highlight the main events occurring in the SWIO region.
Title: Geophysical mapping of the deep sea floor

Presenter: Dr. Dass Bissessur, Associate Research Scientist, Geophysics, MOI

Many oceanographic expeditions have been carried out in the Central and South-West Indian Ocean. These expeditions have not only enabled the understanding of the geodynamics of these regions: their age, structure and evolution, but have also contributed to the identification of potential areas of resources (living and non-living) and to the delimitation of maritime boundaries. To understand the Earth’s structure, b) extend the limits of the legal continental shelf, and c) explore the seabed for potential non-living resources, implies carrying-out geophysical surveys of the deep seafloor where huge amount of data on the seabed and sub-seafloor are collected for onward processing, analysis and interpretation. The main data that need to be acquired in any geophysical explorations are: multi-beam bathymetry, gravity, magnetic and seismic data. These surveys are carried-out using specific instruments that are operated by oceanographic research vessels, specific ships that are designed and/or equipped to carry out research at sea (shallow, mid or deep waters). We present the main and most relevant geophysical expeditions, in Mauritius waters, that have acquired multi-beam bathymetry data to map areas of the deep seafloor, thus enabling the identification of various structures of the seafloor and the characterisation of its geological history amongst other results.