Earth System Science Organisation (ESSO)
Ministry of Earth Sciences

India deploys its first Sub-surface Ocean Moored Observatory in the Arctic

A major milestone in India's scientific endeavors in the Arctic region was achieved on the 23rd July, 2014 when a team of scientists from the ESSO-National Centre for Antarctic and Ocean Research (NCAOR) and the ESSO-National Institute of Ocean Technology (NIOT) successfully deployed IndARC, the country's first multi-sensor moored observatory in the Kongsfjorden fjord of the Arctic, roughly half way between Norway and the North Pole. This moored observatory, designed and developed by ESSO-NIOT and ESSO-NCAOR with ESSO-Indian National Centre for Ocean Information Services (INCOIS) was deployed from the Norwegian Polar Institute's research vessel R.V. Lance during its annual MOSJ-ICE cruise to the Kongsfjorden area. The observatory is presently anchored (78°57´ N 12°01´E), about 1100 km away from the North Pole at a depth of 192 m and has an array of ten state-of-the-art oceanographic sensors strategically positioned at discrete depths in the water column. These sensors are programmed to collect real-time data on seawater temperature, salinity, current and other vital parameters of the fjord.

The Kongsfjorden is an established reference site for the Arctic marine studies. The Kongsfjorden has been considered as a natural laboratory for studying the Arctic climate variability, as it receives varying climatic signals from the Arcitc/Atlantic in the course of an annual seasonal cycle. ESSO-NCAOR has been continuously monitoring the Kongsfjorden since 2010 for understanding response of the fjord to climate variability at different time scales. The temperature and salinity profiles of the fjord, water column nutrients and diversity of biota are being monitored at close spatio-temporal scales throughout the spring-summer-fall seasons. There exists a great need to know on how the fjord system is influenced by, or responds to exchanges with the water on the shelf and in the deep sea outside during an entire annual seasonal cycle. In particular, there is a need for continuous observations of the water transport into the interior part of the fjord. One of the major constraints in such a study has been the difficulty in reaching the location during the harsh Arctic winter and obtaining near-surface data. The IndARC observatory is an attempt to overcome this lacuna and collect continuous data from depths very close to the water surface as well as at different discrete depths. The data acquired would be of vital importance to the Indian climate researchers as well as to the international fraternity. In addition to providing for an increased understanding of the response of the Arctic to climatic variabilities, the data would also provide a good handle in our understanding of the Arctic processes and their influence on the Indian monsoon system through climate modelling studies.

The deployment of the country's first polar mooring is a testimony to the capabilities of the ESSO in designing, developing and installing underwater observatories. The technical and logistics support extended by the Norwegian Polar Institute, is a good example of the increasing scientific and technical co-operation between India and Norway in addressing the global climate change.