The above workshop, sponsored by the Uttarakhand State Council of Science and Technology, Dehradun, Uttarakhand Centre on Climate Change (UCCC) was organized by Kumaun University, Nainital at the Biotechnology Department, Bhimtal Campus on 1st May 2010. More than 50 participants from different Government Research and Development Institutions, Government Departments/Organizations, State and Central Universities, and corporate sector participated in this important event. The workshop was organized in three technical sessions.

In the inaugural session, V.P.S. Arora, Vice-Chancellor, Kumaun University, said that the primary objective of the workshop was to construct a framework to enable a participatory and interactive interface between the community, other stakeholders and the UCCC. It is therefore, essential to analyze and advise on issues pertaining to adaptation and mitigation of consequences arising in the wake of climatic changes. Rajendra Dobhal, Director, Uttarakhand Council of Science and Technology, Dehradun, said that for an endeavor of this magnitude and importance, it is essential that there is sharing of relevant information and research of related nature should not be carried out in water tight compartments and therefore, community involvement should be sought. Vinay Pathak, Vice-Chancellor, Uttaranchal Open University, underlined that there is an urgent need for designing a user-friendly database so that it could deliver utility to the community preferably in the local language. B.S. Bishi, Vice-Chancellor, G.B Pant University of Agriculture and Technology, Pantnagar said that the trends of climate changes are evident and farmers are the major and most affected stakeholders, therefore, their participation and involvement is a prerequisite for the success of such a centre. P.L. Sanjeeva Reddy, former Secretary, Government of India, said that the UCCC should be credited as a trend setting experiment in the ‘oxygen park’. He emphasized the adaptation of green technology and making it mandatory can help in reversing the trend.

At the beginning of the technical session-I, J.S. Rawat, said that the objectives of UCCC are to foster a thriving, interdisciplinary resource and education centre, to identify the best existing practices, research and technologies related to climate change by developing a GIS/RS based data/information repository. K.R. Gupta, former Advisor to DST, Government of India and Secretary, Geological Society of India, suggested that the centre should concentrate on developing a model of climate change database involving representative village panchayats from different physiographic regions of the Uttarakhand State. Alok Mukherjee, Centre on Global Change, New Delhi underlined the need for monitoring of the trajectory flow of pollutants, air-sea interaction, solar earth interaction and behaviour of magnetosphere. P.K. Mehrotra, Ministry of Water Resources, Government of India said that agriculture should be high on the agenda of UCCC. Anand P. Gupta, Economic Management Institute, New Delhi hoped that the UCCC will create a ‘public good’ to meet out the requirements in view of climate change. Further he suggested that hydroelectric resources need to be better utilized to mitigate and adapt to climate change.

In technical session-II, R. Ramesh informed that the instrumentation required for monitoring climatic change is expensive and, therefore, the centre should pool resources and information. Prakash Tiwari, Tata Power, Mumbai gave a brief account of the role of corporate in mitigating the impact of climate change. Amalava Bhattacharya, Birbal Sahni Institute of Palaeobotany, Lucknow informed that the climate change is affecting the vegetation which can lead to an alteration in the micro-weather systems and can accelerate the incidence of forest fires. V.K. Dadwal, National Remote Sensing Centre, Hyderabad said that the centre has a very comprehensive vision document and to meet its objectives, it needs to develop a strategy document. Sudhir K. Sinha, Arcelormittal India, New Delhi defined the role of students and corporations to mitigate the impact of climate change.

In technical session–III, Pooran C. Pande, Times of India Group, New Delhi suggested the governance outlining the methods and process needs to be evolved in priority and end-users linkage through web portals and interactive blogs should be made. P.D. Mathur, Disaster Mitigation and Management Centre, Dehradun, stressed on the need for inducting a cell on disaster and risk and highlighted that Himalayan glaciers require re-assessment of the authenticity about their extent of retreat. Mallikarjun Joshi, Banaras Hindu University, Varanasi, stressed that the centre is capable of addressing water scarcity issues in Himalaya and Indogangetic Plain. There has to be accuracy in recording of information and anthropogenic heat flow effect outside the town should be measured. N.S. Murthy, G.B. Pant University of Agriculture and Technology, Pantnagar, informed that climate change database is very meager and the available meteorological network in Himalaya is not sufficient to monitor micro-weather conditions. Uma Malkani, G.B. Pant University of Agriculture and Technology, Pantnagar suggested that the qualitative aspects of data are important and there should be uniformity in methods to be adopted so that accuracy can be ensured. Nayaal Kishore, Punjab University, Chandigarh stressed on the need to adopt aquifer recharge techniques to regenerate drying springs and rivers of the Himalaya to combat climate change.

In the Valedictory session, Dr. Gajendra Singh, ICAR and Former Vice-Chancellor, Doon University said that the establishment of UCCC is indicative of the level of dedication and commitment of the scientists.
of the Kumaun University. Ranjan Dutta, Office of the Principal Scientific Adviser to the Government of India, New Delhi suggested that UCCC has to be intellectually independent and it should stand for the cause of science and the cause of the people; create capability to carry out environmental impact analysis without any fear.

Presenting Compendium Report of the launching workshop of UCCC, L.M.S. Palni, G.B. Pant Institute of Himalayan Environment and Development, Katarmal said that along with autonomy, the Centre should have a regular monitoring and periodic review system. Palni further suggested that demand driven research, data mining within and outside the University, development of bibliography of climate change studies and restructuring of UCCC is needed.

**Bearing of Last Glacial Maxima (LGM) on Sediment Accumulation in Parts of Arabian Sea – Ashish Sarkar (School of Petroleum Technology, Pandit Deendayal Petroleum University Gandhinagar 382 007; Email: ashish29s@yahoo.co.in)**

The west coast of India witnesses a wide range of monsoonal precipitation from the north to the south. While, the annual precipitation in the Kachchh, Gujarat area is around 300 mm, it is nearly 2500 mm in the coastal areas of Kerala. Along with the spatial variation of monsoonal precipitation, there was change in the southwest monsoonal intensity through the Late Quaternary (Sarkar et al. 2000), which must have resulted in a change in sediment accumulation rate along the west coast of India. Continental margins including shelf and slope are very active oceanic regions. In addition to the varying monsoonal precipitation along the west coast of India as mentioned above, seasonally changing monsoon driven-coastal circulation, upwelling, river discharges make the ‘system’ interesting (Somayajulu et al. 1999). Attempts were made to look at the sediment accumulation rate in off the west coast of India.

In order to understand the climate induced changes in sediment accumulation rate, quite a few offshore cores were raised from the locations with different water depths and from different latitude as well along the western coast of India. Ten ~150 cm long offshore sediment cores from water depths ranging from ~280 m to ~2800 m (between 08°00’07’ N and 21°51’59’ N) in the Eastern Arabian Sea have been retrieved for the present study. The grain size of the terrigenous input in the basin is < 63 μm. The sediment is rich in planktonic foraminifera.

In order to determine the sediment accumulation rates, commonly employed radionuclides viz. naturally occurring 206Pb (half-life = 22.3 years) and 14C (= 5730 years), and man-made 137Cs (= 30 years) have been used for dating the sediments in the cores. While 206Pb and 137Cs isotopes could be used to date and hence to determine the sediment accumulation rate during last ~100 years only, 14C dates could go back to the entire core length equivalent to ~45 ka. In an attempt to establish the 14C based chronology in the cores, handpicked foraminiferal separates (250-400 μm) belonging to only “upper water plankton” in the sediment core at an interval of 10-20 cm have been dated using accelerator mass spectrometry (AMS). 14C ages thus obtained have been corrected for reservoir age and calibrated to calendar ages. These age data in the cores when plotted against the depth below sea floor, it was observed that sediment accumulation rates in between all the sampling intervals are not same resulting in non-linear sedimentation rate. In the northern core (3104G - 12°49.9’N, 71°45.6’E), barring LGM period, the sediment accumulation rate varies between ~2 cm and ~6 cm/ka. Sedimentation rate during LGM in this core increased to ~13 cm/ka. Similar phenomenon has also been observed in the southern core (3101G -08°00’07’N, 74°01’.3E), where the sediment accumulation rate barring the LGM period varies between ~3 cm to ~8 cm/ka, and the same during LGM has been ~13 cm/ka.

The point to be noted here is that in both the locations sediment accumulation rates increased by a few fold during the last glacial maxima. Normally the sedimentation rate should increase during enhanced monsoon induced increase in precipitation. In contrary to this, LGM being the period of enhanced aridity, the sediment accumulation rate should have decreased. In reality, in spite of enhanced aridity the sediment accumulation rate in the eastern Arabian Sea increased by few folds. It has been reported that during LGM the southwest (SW) monsoon in the areas of Indian west coast decreased to about two-third of its present strength, which means, with the depletion in precipitation there was an increase in sediment accumulation rate.

In spite of absence of any ‘systematic’ trend in the ratios of Ti/Al, Fe/Al, and Mg/Al in cores 3101G and 3104G Agnihotri et al. (2003) proposed a model in order to address this increment in sediment accumulation in the eastern Arabian Sea. According to their model, ‘wind induced erosion of exposed shelf sediments and its lateral transport during low sea-level stands’ at the time of LGM led to the enhancement of sediment supply in the marine environment. If this model holds good then the sediment accumulated in the marine realm during the low-stand are reworked from the exposed shelf and hence should give rise to older dates. In reality, the sediment deposited during LGM does not show such inversion of dates.

Through an alternative model this enhancement in sediment accumulation...