

## NOTES

### A NOTE ON THE SERC SCHOOL ON ISOTOPE TRACER TECHNIQUES FOR WATER RESOURCES DEVELOPMENT AND MANAGEMENT

A three week school on Isotope Tracer Techniques for Water Resources Development and Management was organized by the Centre for Water Resources Development and Management (CWRDM), Kozhikode in collaboration with the Bhabha Atomic Research Centre (BARC), Mumbai during 15 April to 4 May 2002 in two parts. The first part of two weeks duration was held at CWRDM, Kozhikode and the second part of one week's duration at BARC, Mumbai. The course was sponsored by the Department of Science and Technology (DST), Government of India under its Science and Engineering Research Council (SERC) scheme. Eighteen participants (including the author of this note) from Research/Academic Institutions and officers of State and Central Government Departments participated in the course.

The course was inaugurated by Dr. A.V. Rao, Advisor, DST, Government of India. Dr. S.M. Rao, former Associate Director, Isotope Group of BARC, Mumbai and Member, Governing body of CWRDM, Kozhikode presided over the inaugural function. In his presidential remarks Dr. S.M. Rao stressed the importance of isotope hydrology and its need to be included in the syllabi of Civil Engineering and Earth Science courses. Drs. K.R.S. Krishnan, Director, DST, Government of India and S.V. Navada, Head, Isotope Hydrology Section of BARC, Mumbai were the chief guests at the inaugural function. Dr. Krishnan highlighted the activities of DST and purpose with which various training courses, workshops, seminars/symposia etc. are sponsored. Dr. Navada, who was also one of the coordinators of the course, briefed the applications and advantages of using isotopes in water resources development programmes. Dr. E.J. James, Executive Director, CWRDM, Kozhikode welcomed the gathering and explained the background in organizing this school. Dr. K. Vasu, Head in Charge of Nuclear Hydrology Division, CWRDM, Kozhikode and course coordinator proposed a vote of thanks.

The various aspects covered in the course included: (1) basic concepts and uses of isotopes, (2) interaction between water bodies and water balance, (3) sedimentation in lakes and reservoirs, sediment/pollutant transport in harbours and estuaries, (4) groundwater dating for identification of recharge resources, (5) estimation of natural/artificial recharge to groundwater, (6) isotope

techniques in mine hydrology, stream flow measurement, seepage in dams, pollution due to urban and industrial effluents, (7) isotopes in precipitation and GNIP programme, (8) isotope application in groundwater salinisation/pollution studies, (9) computer modelling for groundwater flow, and (10) production of radio-isotopes and radiological safety.

At the end of the first week, field experiments on collection of water samples (from various depths) and sediment cores using water bottle and gravity corer respectively were demonstrated by Mr. A.R. Nair, Drs. Nachiappan, Unnikrishnan Warriar and Shahul Hameed at Sasthamkotta lake. Preparation of water samples for  $^{14}\text{C}$  dating and sub-sampling the sediment cores for radio-tracer studies were also shown experimentally at this natural, biggest lake of Kerala. This lake situated in the mid-lands at ~25 km NE of Kollam town is the main source of drinking water for the whole of Kollam district.

An experiment on rate of groundwater recharge was demonstrated by  $^3\text{H}$  injection at CWRDM campus. The participants were taken to Pookot lake where groundwater flow velocity was demonstrated by the scientists of CWRDM using single cell well dilution technique. Pookot lake is located in the Western Ghats about 70 km from Kozhikode on the way to Mysore (NH No.212). On the last day of the first part of the course, the participants were taken to the Nuclear Hydrology Laboratory (where quantulus ultra low level liquid scintillation spectrometer is installed), Radio-tracer and other laboratories of CWRDM and were introduced to the research facilities available and the various activities of the Centre. Discussion on formulation of projects was also held on the same day by the Course Coordinator. Most of the participants took part in the discussion and came out with the specific problems where isotope techniques could be used as an effective tool.

The second part of the school was conducted at BARC, Mumbai. Apart from 12 lectures held here, the participants were taken to various laboratories and reactors. They include: (1) Mass Spectrometers at Chemistry Laboratory, (2) Low Level Laboratory at BARC Hospital where  $^3\text{H}$  and  $^{18}\text{O}$  dating measurements are done, (3) Reactors Apsara (the first reactor of the country) and Dhruva (the latest

and biggest reactor) and (4) Radiology Laboratory where various uses of isotopes were explained by the scientists of Board of Radiations and Isotopes Technology (BRIT). Activities of BRIT/BARC and various uses of isotopes were also shown through a video-programme.

Participants were given an opportunity to interact with the expert faculty in formulating collaborative research programmes of individual interest. At the valedictory function held on 3 May, Dr. Navada welcomed the participants and other invitees. Dr. Ramamurthy, Associate Director, Isotope Group and Chief Executive, BRIT, BARC spoke about the activities of Isotope Division and advantages of isotope techniques. He distributed certificates

to all the participants. Dr. E.J. James, Executive Director, CWRDM, Kozhikode gave the valedictory address. Sri A.R. Nair proposed vote of thanks.

On the last day of the training programme, a visit was arranged to IIT, Mumbai to visit the Geotechnical Centrifuge facility in the Civil Engineering Department. The application of the facility in different fields of science and technology was explained to the participants in detail by Prof. V.S. Chandrasekaran and his colleagues.

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## INTERNATIONAL CONFERENCE ON 'DRYLAND CHANGE 2001', UPINGTON, SOUTH AFRICA

A major three day interdisciplinary international conference, 'Dryland Change 2001', was held at Upington, South Africa during 30th August - 7th September, 2001. It was sponsored by UNESCO - IGCP Project 413 - 'Understanding future dryland from past dynamics' and the IGU Land Degradation Commission (COMLAND) and Third World Academy of Sciences. The Conference was co-organised by the University of Cape Town, South Africa and the Sheffield Centre for International Drylands Research, University of Sheffield, United Kingdom. It was attended by 68 delegates from 15 countries. It explored the nature of environmental changes in drylands and offered opportunities for an improved understanding of future dryland changes and their impact on dryland societies.

Deserts and drylands cover almost 50% of the global land area and pose grave challenges for their human populations. Desertification has been recognised as a globally important environmental issue. Problems of water resource availability and food production are bound to increase under the dual impacts of enhanced population pressure and the green-house warming - induced climatic changes. This IGCP-Project commenced in 1998. Despite their great extent and growing population, deserts and drylands are marked by their relative scientific neglect. It is imperative to improve understanding of spatial complexity of dryland systems and change causing linkages to allow better, region specific predictions of future changes and their remedial measures for sustainable utilisation of the available resources. Understanding the nature, magnitude, causes and timing of past environmental changes in

drylands provides critical data inputs into models and predictions of the future changes that will significantly affect societies.

This conference provided an excellent opportunity for researchers interested in long term environmental change in drylands to interface with practitioners and researchers interested in the causes and nature of contemporary land degradation. The themes covered included: Records of long-term environmental change in drylands; Using records of the past to better understand future dynamics; Role of high magnitude events (rapid and massive sedimentation and erosion) in dryland systems and landscape evolution; modern environmental change and land degradation in drylands and drylands in 21st century - predicting the roles of climate change and human actions.

Multi-disciplinary research from various desertic terrain over the past decade has demonstrated that the desert margins have fluctuated significantly during the Pleistocene and Holocene. Besides broad conformities in Quaternary climato-stratigraphic and geologic evolution, operative geomorphic processes in different deserts within the given hemispheric domains have had different response times to climatic perturbations. Different desert surfaces and climatic zones within the desert show marked differences in ecosystems characteristics and offer varying potential for human activities. Scenarios for the future impact of green-house gas induced global warming predicted that most drylands would experience increased mean temperatures and enhanced aridity. This is likely to affect operation of hydrological and geomorphological process domains or