Hydrological Investigations Division

National Institute of Hydrology

(Ministry of Water Resources, Govt. of India)
Roorkee- 247 667 (India)

VISION OF THE DIVISION

The Hydrological Investigations division is actively engaged in conducting field and laboratory based research using conventional, isotopic and modelling techniques. The main focus of the division is application of isotopes in hydrology, lake hydrology, mining hydrology, and hydrological instrumentation. The division is involved in a number of internal, sponsored (national and international) and consultancy projects related to the above aspects.

THRUST AREAS

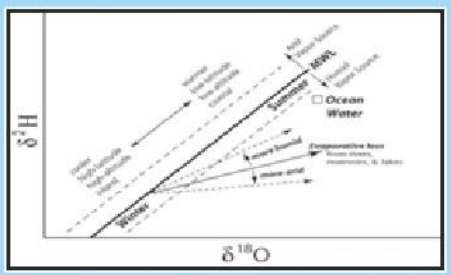
Major thrust areas of Hydrological Investigations division are:

- Hydrology of Mountainous Areas
- Surface Water and Groundwater Interaction
- Groundwater Management
- Integrated Hydrological Studies of Lakes
- Hydrological Instrumentation

STUDY AREAS

The division has been working on the following hydrological aspects.

- Separation of snow melt, glacial melt, base flow and rainfall-runoff
- Identification of recharge zones of springs & streams in mountainous areas
- Movement of soil moisture in unsaturated zone
- Interaction between surface water and groundwater
- Base flow contribution in rivers during lean flow period
- Salinity ingress in coastal aquifers
- Seepage from water bodies
- Identification of recharge zones
- Estimation of groundwater recharge
- Groundwater age using Tritium, Carbon-14 and other dating techniques
- Groundwater modelling in mining and other specialized areas
- Source and migration of contaminants in groundwater
- Water balance of lakes
- Sedimentation in water bodies using Cs-137 and Pb-210 dating techniques
- Identification of different sources of air moisture, arrival and withdrawal of monsoon vapours
- Impact of climate change



APPLICATION OF ISOTOPES IN HYDROLOGY

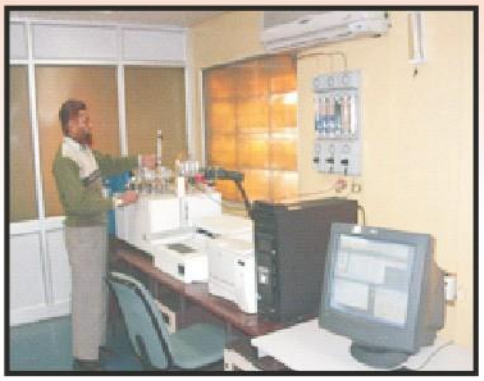
The various sources/sinks in the hydrologic cycle have distinct isotope ratios. As water moves into different processes in the hydrologic cycle (e.g., evaporation or infiltration etc.), it undergoes small but important and measurable changes in its relative abundance of different isotopes through a process called fractionation (isotope ratio is modified e.g. lighter isotopes are enriched). Thus, distinct isotopic signatures or fingerprints of water develop in various components/processes which provide valuable information to understand the hydrological processes. In this way, isotopes provide information in tracing the origin and movement of water in the hydrologic cycle.

In India, the potential of isotope techniques is not being fully utilized due to inadequate laboratory facilities for isotopic measurements and less awareness about the techniques and potential for solving water related problems. Use of isotope technology in hydrology and water resources needs to be popularized through some examples of successful studies. The division has taken stride in this direction.

ISOTOPE LABORATORY

The Isotope Laboratory has various equipment to measure stable and radioactive isotopes.

- Isotopic Water Analyzer (Liquid & Vapor)
- Dual Inlet Stable Isotope Ratio Mass Spectrometer
- Continuous Flow Stable Isotope Ratio Mass Spectrometer
- Ultra Low Level Liquid Scintillation Counter
- Multi-channel Alpha Spectrometer
- Multi-channel Gamma Spectrometer
- Radon Detector
- Ion Chromatograph
- Neutron Probe



HYDROLOGICAL INSTRUMENTATION LABORATORY

The Hydrological Instrumentation Laboratory has state-of-art hydro-meteorological instruments for measuring various hydro-meteorological parameters.

- Automatic Weather Station
- Rain Gauges & Snow Gauges
- Current Meters
- Terrameter
- Resistivity Meter
- Depth Water and Sediment Samplers
- Digital Surface Water and Ground Water Level Recorders
- Guelph Permeameter
- Infiltrometer
- Soil Moisture Meter & Tensiometers
- Hydrographic Survey Grade Echo Sounder

TRAINING COURSES

The division regularly organizes training courses on the following topics for Central/ State Government officers, academicians and research scholars.

- Advanced Techniques for Hydrological Investigations
- Application of Isotopes in Hydrology
- Groundwater Investigations and Management
- Hydrological Investigations for Conservation and Management of Lakes

Courses on other relevant topics are organized, as per demand.

SCIENTIFIC MANPOWER

Currently, the division has 7 scientists with expertise in application of isotopes in hydrology, groundwater modelling, seawater intrusion, lake hydrology, watershed hydrology, remote sensing and GIS.

LOOKING INTO FUTURE

- Further Development of Isotope Techniques in Hydrology
- International Collaboration
- Sponsored and Consultancy Projects
- Publication of Technical Papers
- Organization of Training Courses
- Capacity Building of Scientists & Staff Members

SPONSORED AND CONSULTANCY PROJECTS

Scientists of the division are coordinating with central and state government departments for solving specific hydrological problems. Sponsored and consultancy research projects have been completed / taken-up on the following topics.

- Isotope Fingerprinting of Waters of India
- Hydrograph Separation using Isotopic Techniques
- Groundwater Dynamics using Isotopes
- Surface Water and Groundwater Interaction
- Hydrogeological Studies of Mines
- Impact of Mining on Groundwater Regime
- Integrated Hydrological Investigations of Lakes
- Bathymetric Survey of Lakes

The division has also undertaken few projects with International collaboration including International Atomic Energy Agency (IAEA), British Geological Survey, and Natural Environment Research Council, UK.

For further information, please contact:

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