

NUCLEAR HYDROLOGY LABORATORY

The Nuclear Hydrology Laboratory was established in the year 1993 at National Institute of Hydrology, Roorkee during the strengthening of the Institute under UNDP assisted project. Presently, the Isotope Laboratory is a part of Hydrological Investigations division at NIH, Roorkee.



NUCLEAR HYDROLOGY LABORATORY
(HYDROLOGICAL INVESTIGATIONS DIVISION)
NATIONAL INSTITUTE OF HYDROLOGY
(AN ISO-9001:2015 CERTIFIED ORGANISATION)
ROORKEE - 247667 (UTTARAKHAND), INDIA

Major Equipment available in the Laboratory

PRECISE ISOTOPIC MEASUREMENTS

- Performance of Isotope Laboratory was found excellent amongst 102 laboratories who participated in an international comparison exercise organized by International Atomic Energy Agency, Vienna during the year 2000 for measurement of Environmental Tritium.
- Performance of Isotope Laboratory was again found excellent amongst 183 laboratories participated in "Fourth inter laboratory comparison exercise for $\delta^2\text{H}$ and $\delta^{18}\text{O}$ analysis of water samples" (WICO2011), an international comparison exercise organized by International Atomic Energy Agency, Vienna during the year 2011.

MAJOR ACHIEVEMENTS

- Established a network in the country for isotopes characterization of precipitation, rivers and groundwater.
- Established Indian Meteoric Water Line.
- Estimated sedimentation rates and useful life of various lakes.
- Integrated hydrological studies of lakes.
- Identified marine transgression effect on groundwater salinity and zones of modern groundwater recharge in coastal areas.
- Identified groundwater recharge zones, recharge sources and flow regimes in different parts of the country.
- Investigated the effectiveness of artificial recharge measures in two watersheds of Maharashtra.
- River and groundwater interaction studies
- Estimation of snow & glacier melt contribution in various rivers of Western Himalayas.
- Identification of sources & locations of leakage in dams mines, etc.
- Evapo-transpiration partitioning using isotopes



Dual inlet stable isotope ratio mass spectrometer



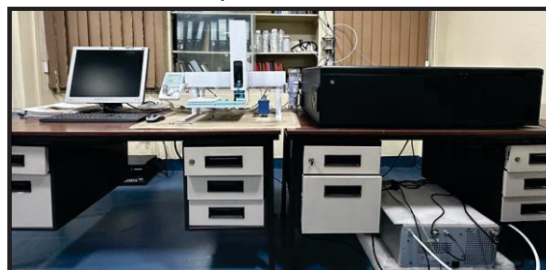
Multi-channel gamma-ray spectrometer



Continuous flow stable isotope ratio mass spectrometer



Ion chromatograph



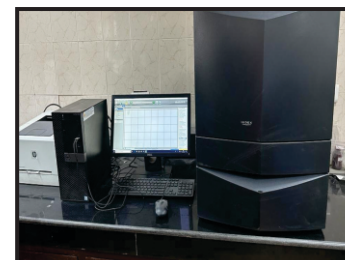
Isotopic water analyzer (liquid water and water vapour)



Multi-channel alpha spectrometer



Ultra low level liquid scintillation counter



Normal liquid scintillation counter



Liquid nitrogen plant



Electronic radon detector

Training Programmes



ONE WEEK TRAINING WORKSHOP
On
Application of Isotopes in Water Resources Investigations and Management
(15-20 January, 2024) at NIH, Roorkee
Organized by
National Institute of Hydrology, Roorkee - 247 667 (Uttarakhand)



**ENVIRONMENTAL TRACERS IN WATER
RESOURCES MANAGEMENT**
24-26 JULY 2024



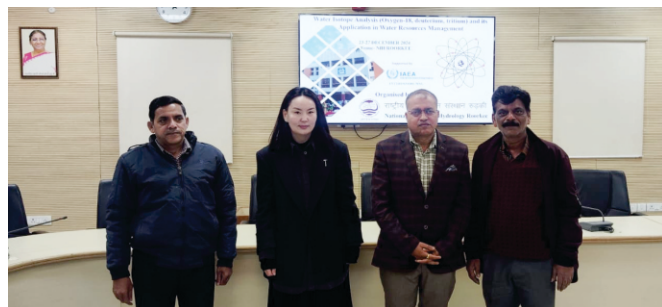
Prof. Daren Goody



Dr. Daniel Lapworth



Prof. Alan MacDonald

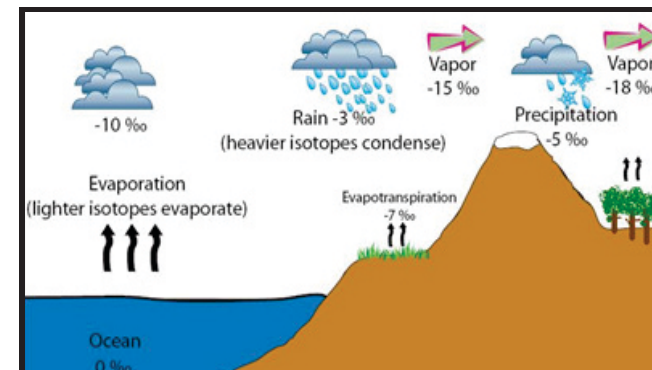


Application of Isotopes in Water Resources Management

- Water Balance and Dynamics of Lakes and Reservoirs
- Seepage and Leakage from Water Bodies
- Discharge of Mountainous Rivers
- Soil Erosion from Watersheds/catchment
- Snowmelt Runoff and Hydrograph Separation
- Suspended and Bed Sediment Transport
- Sources and Tracing of Pollutants
- Paleo-hydrological Investigations
- Soil moisture movement and variation
- Groundwater source/Recharge Zone identification
- Groundwater recharge & residence time
- Salinization (inland and coastal)
- Surface water-groundwater interaction
- Sub-marine groundwater discharge
- Sources of Precipitation and onset of Monsoon
- Contribution of Local Evapotranspiration in Precipitation
- ET partitioning
- Altitude, Latitude, and Continental Effects on the Precipitation Regime
- Environmental Pollutants Tracing

Isotopic Measurement Capabilities

- Radioactive Isotopes
- Environmental Tritium (^3H)
- Artificial Tritium (^3H)
- Carbon-14 (^{14}C)
- Caesium-137 (^{137}Cs)
- Lead-210 (^{210}Pb)
- Polonium-210 (^{210}Po)
- Bismuth-210 (^{210}Bi)
- Radium-226 (^{226}Ra)
- Radon-222 (^{222}Rn)
- Uranium-238 (^{238}U)
- Hydrogen-2 (^2H)
- Carbon-13 (^{13}C)
- Oxygen-18 (^{18}O)
- Nitrogen-15 (^{15}N)
- Sulphur-34 (^{34}S)
- Chlorine-37 (^{37}Cl)



For further information, please contact

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