

Isotope hydrology: a tool for understanding water



DRAWING THE MEASURE OF FRESH WATER

Nearly all the renewable fresh water on Earth is carried in rivers and lakes – and is becoming increasingly susceptible to misuse by human activity.

Fresh water is vital to life and a prudent balance between its use and assessment of its availability is imperative to protect limited reserves and avoid costly development of new resources.

A critical component in assessing fresh water is knowledge of Earth's water cycle - how water supplies are renewed - and the birth and life expectancy of groundwater resources.

During its evaporation and condensation, the concentration of oxygen and hydrogen isotopes, in a water molecule, undergo small changes.

Water fingerprints

As a result, in different parts of the hydrologic cycle, water is naturally tagged with isotopic "fingerprints", which vary according to the history of a particular body of water and its pathway through the hydrologic cycle.

Isotope techniques in water management provide important and sometimes unique tools for obtaining critical information.

If it is present, they can identify the source of renewal to groundwater; determine the age of groundwater; its rate of movement; the relationship between rainfall, run-off in streams and rivers, flooding and sedimentation.

Cost savings

Fully integrated into hydrology, isotope techniques provide significant cost savings.

Each year the IAEA allocates nearly US\$3 million to its water resources program, and the agency has invested about US\$30 million in 150 projects in 60 countries to improve water management using isotopes. In the process, hundreds of young scientists have been trained in isotope hydrology.



CONTACT

Pradeep Aggarwal

Institution:
International Atomic Energy Agency

Box 100, Wagramer Strasse 5
A-1400 Vienna

Country:
Austria

Email:
p.aggarwal@iaea.org

Telephone:
+ 43 (1) 2600-21735

Fax:
+ 43 (1) 2600-21737

Website:
www.iaea.org

