The Global Network of Isotopes in Precipitation

Since 1961, the IAEA and the World Meteorological Organization (WMO) have been jointly conducting a worldwide survey of hydrogen (²H, ³H) and oxygen (¹⁸O) isotopes in precipitation.

This isotope monitoring network is called the Global Network of Isotopes in Precipitation, or GNIP. The initial objective was to systematically collect basic data on the isotope content of precipitation on a global scale to determine temporal and spatial variations of environmental isotopes in precipitation. With this information, scientists could find out the origin, movement and history of water. To support this work, the IAEA established its Isotope Hydrology Laboratory.

With this setup, basic isotope data started becoming available for hydrological investigations. These data were made accessible online to researchers and practitioners all over the world from the 1990s onwards. They are now used to study water resources, but also to interpret past climatic archives and animal migrations. GNIP currently comprises more than 350 active sampling sites in over 90 countries and territories. While the IAEA Isotope Hydrology Laboratory is still a key player in analysing precipitation samples collected through GNIP, more than 60 laboratories — several of which have been established through IAEA technical cooperation projects — are contributing to this analytical challenge.

The IAEA maintains the central database for GNIP, which has more than 130 000 precipitation isotope records from more than a thousand sites. The Agency is also actively involved in research and development to help scientists collect precipitation samples. For example, it developed an evaporation-safe precipitation sampler that is reliable, easy to use and requires less pre-processing in the laboratory.

Historical and current data from the GNIP database are used to validate and further improve climatic prediction models (see page 24), as well as for other applications.

To learn more, try this: h2o.iaea.org





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