

PAGES2K Trans-regional project: Water Isotope Database

Description:

Stable water isotopes detect regional-scale circulation patterns, making them excellent tracers of the water cycle's response to climate change. This PAGES2K Trans-Regional Project will create a global database of stable oxygen and hydrogen isotope records that researchers can use to assess regional- and global-scale changes in rainfall and atmospheric/oceanic circulation patterns during the past 2,000 years.

Goals:

1. To compile a global database of proxy records derived from the stable oxygen and hydrogen isotopic composition ($\delta^{18}\text{O}$, δD) of rainfall and surface waters during the past two millennia.

The database will be constructed:

- a. Using uniform data selection and quality control criteria agreed upon by experts in the PAGES2K community
 - b. Incorporating proxies for the $\delta^{18}\text{O}$ and δD of precipitation, lake water, seawater, and groundwater: e.g., speleothems, corals, biomarkers, ice cores, tree ring cellulose, etc.
 - c. Including proxies that reflect both temperature and precipitation patterns (recognizing that most $\delta^{18}\text{O}$, δD records are influenced by both)
2. To provide a comprehensive dataset that researchers can use to:
 - a. Assess regional- and trans-regional patterns in hydroclimate and, where appropriate, temperature
 - b. Compare with isotope-enabled climate model simulations
 - c. Compare with proxies reflecting hydroclimate on a local scale (e.g., sediment geochemistry, paleoecology, snow accumulation rates) and on a regional scale (e.g., drought atlases from tree rings, compilations of varve records)