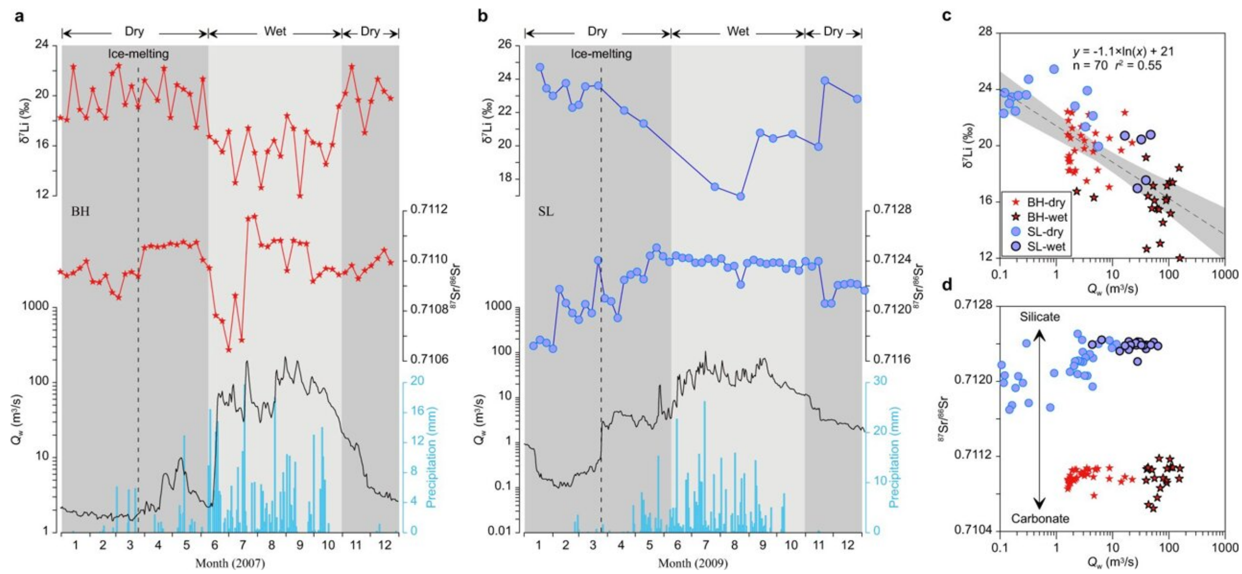
PHYS.ORG

Hydrology controls lithium isotopes in rivers and seawater

June 23 2022, by LI Yuan



High-resolution river water δ^7Li, ^{87}Sr/^{86}Sr, and hydrometeorological data from the NE Tibetan Plateau. Weekly variations of δ^7Li and ^{87}Sr/^{86}Sr in the carbonate-dominated BH (a) and silicate-dominated SL (b) catchments (Supplementary Fig. 2) along with daily Q_w and precipitation, showing inverse trends between δ^7Li and Q_w in each river. When plotting up weekly data from the two rivers together (c), there is still an overall negative relationship, highlighting a strong hydrology control on riverine δ^7Li. (d) ^{87}Sr/^{86}Sr versus Q_w, showing large differences between the two rivers, reflecting their distinct lithology (Supplementary Fig. 3). The dashed lines in a and b represent ice-melting times. Errors for δ^7Li are 10^6 years) and found that the dataset can be explained by a similar mechanism—shifts in the fluid residence time linked to changes in continental hydrology and the water cycle.

The researchers showed, for the first time, that a hydrological control mechanism can explain all δ^7Li records across various climatic transitions during the last ~445 million years, and led to a provocative conclusion: the Cenozoic seawater δ^7Li record reflected overall drying of the continental climate over millions of years, rather than control by tectonic uplift.

More information: Fei Zhang et al, Hydrological control of river and seawater lithium isotopes, *Nature Communications* (2022). DOI: 10.1038/s41467-022-31076-y

Provided by Chinese Academy of Sciences