

# New technique measures evaporation globally

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Researchers at Columbia Engineering and Boston University have developed the first method to map evaporation globally using weather stations, which will help scientists evaluate water resource management, assess recent trends of evaporation throughout the globe, and validate surface hydrologic models in various conditions. The study was published in the April 1 online Early Edition of *Proceedings of the National Academy of Sciences (PNAS)*.

"This is the first time we've been able to map evaporation in a consistent way, using concrete measurements that are available around the world," says Pierre Gentine, assistant professor of earth and environmental engineering at Columbia. "This is a big step forward in our understanding of how the water cycle impacts life on Earth."

The Earth's surface hydrologic cycle comprises precipitation, runoff, and evaporation fluctuations. Scientists can measure precipitation across the globe using rain gauges or microwave remote sensing devices. In places where streamflow measurements are available, they can also measure the runoff. But measuring evaporation has always been difficult.

"[Global measurements](#) of evaporation have been a longstanding and frustrating challenge for the hydrologic community," says Gentine. "And now, for the first time, we show that simple weather station measurements of air temperature and humidity can be used across the globe to obtain the daily evaporation."

Evaporation is a key component of the [hydrological cycle](#): it tells us how

much water leaves the soil and therefore how much should be left there for a broad range of applications such as agriculture, [water resource management](#), and weather forecasting.

Gentine, who studies the relationship between hydrology and atmospheric science and its impact on climate change, collaborated on this research with Guido D. Salvucci, professor and chair of the Department of Earth and Environmental Sciences at Boston University and the paper's lead author. Using data from [weather stations](#), widely available across the globe, they focused on evaporation and discovered an emergent relationship between evaporation and relative humidity that gave them the evaporation rates.

Gentine and Salvucci plan to provide daily maps of evaporation around the world that will enable scientists to evaluate changes in water table, calculate water requirements for agriculture, and measure more accurate evaporation fluctuations into the atmosphere.

"Sharing our data with researchers around the world will help us learn more about the Earth's [hydrologic cycle](#) and assess recent trends such as whether it is accelerating," adds Gentine. "Acceleration could greatly impact our climate, locally, nationally, and globally."

**More information:** Paper: [www.pnas.org/content/early/2013/04/11/1215844110.abstract](http://www.pnas.org/content/early/2013/04/11/1215844110.abstract)

Provided by Columbia University

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