Precipitation variability in Northeast, Southwest linked in 1,000-year analysis

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An analysis of precipitation data collected from a lakebed in New York and a Rhode Island estuary has provided a link between the variability of precipitation in the Northeast with that of the Southwest. The results validate climate models that predict an increasing number of extreme weather events.

The research was published in the online edition of the Proceedings of the National Academy of Sciences on Oct. 19.

Former URI graduate student J. Bradford Hubeny, currently an assistant professor of geological sciences at Salem State University, and John King, a professor in the University of Rhode Island's Graduate School of Oceanography, reconstructed the precipitation record from Green Lake in Fayetteville, N.Y., and the Pettaquamscutt River estuary in Narragansett, R.I. They found that the moisture patterns at these sites were similar and correlated with the Pacific/North American pattern, a large-scale weather pattern that circulates from the North Pacific Ocean across North America.

"Really long droughts and extended wet periods appear to occur at a continental scale," said King. "We can see that the records of droughts in the Southwest extend all the way to eastern North America."

Added Hubeny, "The same phase of the Pacific/North American pattern that would bring us dry conditions in the Northeast would also bring dry conditions to the Southwest."

The scientists noted that while their research found a strong connection between the climate in the Northeast and Southwest, that doesn't necessarily mean that both regions will experience the same conditions.

Hubeny and King reconstructed the precipitation record by examining the thickness of annual sediment layers called varves, somewhat like tree rings, which relate to the amount of precipitation in a given year.

"The strength of going back 1,000 years is that we can look at the natural variability in the precipitation record," Hubeny said. "What we can see from the last 150 to 200 years are changes in the natural pattern that could represent human impact on climate.

"At first glance, precipitation variability might seem random, and to some extent it is. But there are also global patterns that are predictable," he explained. "The more we can understand these patterns, the more we can help to quantify climate models and cycles."

According to the scientists, the objective of studies such as this is to provide improved predictive capabilities of future climate. The strong relationship this study provides between the meteorological record and the geological record will help make climate forecasts more accurate.

"We've confirmed the recent trend toward a more meridional circulation pattern, which increases the frequency of flooding and decreases the frequency of droughts in the Northeast," King said. "The unusual weather is going to become more usual. The good news is that we probably won't have mega-droughts like they're experiencing in other parts of the country, but we will be in for more extreme weather events."

Provided by University of Rhode Island