

Sediments reveal monsoon precipitation mechanism in central eastern China

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Heavy clouds formed during storm from north-west to south-east, at monsoon, over Salt Lake, Calcutta. Credit: Biswarup Ganguly/Wikipedia

Prof. Zhou Xin from University of Science and Technology of China (USTC) of the Chinese Academy of Sciences (CAS) and collaborators have reconstructed a high-resolution model of monsoon precipitation in the Jiang-Huai region, and proposed the possible driving mechanism behind it by studying the sediments of Lake Nvshan. The results were

published in *Geology*.

Variations in East Asia summer monsoon (EASM) have great impacts on economic development. However, there has been scant research on this subject due to a lack of meteorological observation data.

The researchers cast their eyes on sediments from Lake Nvshan in Jiang-Huai (JH) region, which are less disturbed by human activities. They characterized the samples in terms of the color, chronology, [grain size](#), total organic carbon (TOC), and other features.

The researchers found that when there is abundant [precipitation](#), which leads to higher lake levels, sediments are apt to possess more reduced conditions and display blue-gray color, and deficient precipitation leads to lower lake levels with sediments more oxidized and thus redder.

Through the analysis, researchers realized the 1,800-year multiproxy reconstruction of monsoon precipitation. They detected large fluctuations of [sediment](#) redness during the past 1,800 years, during which redness value is higher during Little Ice Age (LIA, 1000 to 1300 CE), while during the Medieval Warm Period (MWP, 1400 to 1850 CE), indicating a wetter LIA compared to a dryer MWP.

However, these results contradicted previous studies, which showed that changes in the Intertropical Convergence Zone (ITCZ) should have caused a dryer LIA and a wetter MWP. The researchers believed that this contrast is caused by the fact that the rainfall in the JH region was modulated by the mean state of the tropical Pacific Ocean on centennial time scales.

They explained that the dominating influence factor of precipitation in the JH region is the anomaly of Pacific Ocean sea-surface temperature, similar to the known La Nina and El—Nino phenomena. These

hydroclimate changes of the ocean may have been a response to the effective radiative forcing change during the past 1,800 years.

More information: Shiwei Jiang et al, Central eastern China hydrological changes and ENSO-like variability over the past 1800 yr, *Geology* (2021). [DOI: 10.1130/G48894.1](https://doi.org/10.1130/G48894.1)

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