State of the climate in the Three Gorges Region of the Yangtze River in 2019

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National meteorological station at Yichang Credit: Xianyan Chen

The Three Gorges project, completed in 2009, is one of the world's

largest hydropower projects. It has brought important social and economic benefits in flood control, power generation, shipping and water resource redistribution. But how does such a large-scale water conservancy project affect the local climate, and is the response to climate change a relatively vulnerable one? The Three Gorges Project has been repeatedly questioned, especially whenever rainstorms, floods and drought hit the area around the reservoir area or its neighboring areas, since the Three Gorges Reservoir started to raise its water level to the desired target.

"The Three Gorges Region is located in the middle and lower reaches of the Yangtze River, and its annual climate characteristics are obviously affected by the surrounding climate of the Yangtze River, which means that it is greatly affected by the synergistic influence of large-scale atmospheric circulation, oceanic forcing, and water vapor transport. In order to better understand the climate of the Three Gorges Region, the National Climate Center has carried out continuous climate monitoring since 1996 and released its Annual Climate Report each year. Our report is the latest result based on the observation data in 2019, part of a series of annual climate reports for the Three Gorges area of the Yangtze River, providing information on climate monitoring, meteorological disasters and climate impacts," says Dr. Chen Xianyan, a researcher at the National Climate Center and the first author of this paper recently published in *Atmospheric and Oceanic Science Letters*.

Although against the background of climate warming, significant changes have been found in temperature, precipitation and other meteorological observations, as well as some extreme climate events, in the Three Gorges Region and its surrounding areas in the past several decades. Many studies have shown, based on numerical simulation experiment results and statistical comparative analyses, that the Three Gorges Region has little influence on local climate changes compared with environmental climate changes.

Characterized by a much warmer spring and autumn, and much drier fall, the climate in the year 2019 in the Three Gorges Region showed an upward trend in temperature. The major climate events in the Three Gorges Region in 2019, including heat waves, drought, heavy rain and flooding, were not isolated events in region; they were the responses to weather extremes in the Yangtze River Basin as a whole. The information in the annual report was not a diagnosis of extreme climate events. However, detailed climate information is helpful to understand the climate and its changes in the Three Gorges Region, and is also the basis of research on the climatic effects of the Three Gorges Region.

"We intend to carry out continuous monitoring in this area and analyze the causes and mechanisms of climate extremes to assess the impact of reservoir impoundment," concludes CHEN.

More information: Xianyan Chen et al, Climate observation of the Three Gorges Region of the Yangtze River in 2019, *Atmospheric and Oceanic Science Letters* (2020). DOI: 10.1016/j.aosl.2020.100026

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