

High resolution lake-level history of Lake Nojiri, Japan, during the last 40,000 years

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As evidence for global warming accumulates, concern grows about future water balance. A database providing lake-level history, together with a quantitative simulation, could provide powerful tools to estimate future water balance. In early studies, lake levels were discussed in terms of a shift of boundary conditions, such as ice volume, sea surface temperature, aerosols, and carbon dioxide. Recent studies have revealed that lake levels respond to abrupt cooling events. In addition, abrupt cooling events have occurred during the Holocene as well as in the last glacial period, which have been confirmed in North America and Asia as well as in lower latitudes of the Atlantic Ocean. However, the extent and effects of such cooling in the easternmost area of Asia is not well understood. Here, we show that lake levels underwent dramatic changes in Japan during those cooling events. The reduction in the lake level exceeded 15 meters during some periods. Also, the timing correlated with the abrupt cooling events, suggesting that those events affected even the eastern area of Asia.