Late Quaternary climate in southern China deduced from Sr-Nd isotopes of Huguangyan Maar sediments

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Chemical composition and Sr-Nd isotope ratios of sediments from lake Huguangyan Maar and its vicinity are used to infer the hydro-climatic conditions that prevailed during the last Glacial and early- to mid-Holocene periods in South China. Variations in $^{87}Sr/^{86}Sr$ ratios in the lake sediments indirectly indicate two modes of climate conditions: wet intervals during which the lake sediments are mainly derived from the volcanic-lake rim materials, expressed in low $^{87}Sr/^{86}Sr$, and dry intervals during which fine particles from the nearby granitic soils are windblown to the lake and supply local dust with high $^{87}Sr/^{86}Sr$ ratios to the sediments. These wet and dry intervals generally correspond to regional climate records (e.g., speleothem $\delta^{18}O$ profiles in southeast China) and correlate with global climate events, (e.g., Heinrich events). While $\delta^{18}O$ records of speleothems from southeast China caves are dominated by the precession signal, the Huguangyan Maar Sr record mainly correlates with obliquity. This most likely reflects masking of the precession signal due to regional climate variability, accentuating the obliquity signal. These local effects may also account for some of the differences that have been observed between the various East Asian monsoon records in the region. More importantly, the masking of the precession signal reveals the influence of obliquity on the hydro-climate regime in South China.