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Interglacial variability in Central Asian (Lake Baikal) precipitation

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Uncertainty surrounds the prospects for future changes in the hydroclimate across Central Asia in response to a warmer climate state. Lake Baikal, south-east Siberia, provides a unique opportunity to develop new insights into this issue by providing an uninterrupted sediment record that captures previous interglacials that may represent analogues for future hydrological change. Here, using a calibrated relationship between diatom oxygen isotopes and historical observations of precipitation; rates of regional Central Asian precipitation are reconstructed for Marine Isotope Stages 1, 5e and 11c. Through these interglacials, annual precipitation is closely related to the prevailing Milankovitch orbital parameters and summer solar insolation. On the basis of this relationship, mean rates of precipitation are reconstructed for other interglacials over the last 600 ka with MIS 1 (mean = 570 mm/yr) and MIS 11 (mean = 550 mm/yr) displaying the lowest rates of annual precipitation since the Mid Pleistocene Transition compared to values >600 mm/yr for other interglacials. In contrast, typical rates of regional precipitation have been considerably lower at <500 mm/yr through the 20th and 21st century to date.