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Millennial-scale changes in hydroclimate during the last glacial period in central Europe reconstructed from leaf wax δD

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Millennial-scale climate events during the last glacial period, such as Dansgaard-Oeschger cycles and Heinrich events, are well-documented in ice cores and marine sediments. During Dansgaard-Oeschger cycles of the last glacial period, repeated rapid warming events of a similar magnitude to modern-day warming occurred over the North Atlantic region. However, the impacts of these fluctuations on hydroclimate in Europe remain poorly constrained, mainly due to a lack of high-resolution, well-dated paleoclimate records. Here, we use D/H ratios (δD) measured on n-alkanes derived from leaf waxes preserved in lacustrine sediments from Eifel maar crater basins to reconstruct changes in hydroclimate. Our record spans the past 60,000 years and is tied to the Greenland NGRIP ice core chronology using a high-resolution index of lake productivity. Initial results show that δD_{wax} was more depleted during interstadial phases of the last glacial period. Multiple factors may influence δD_{wax}; however, if an isotope "temperature effect" played a dominant role, the warmer interstadials would have been associated with more positive δD_{wax} values, in contrast to the observations here. Thus, we interpret low δD during interstadials as a signal of wetter, more humid conditions, possibly related to a shift towards more winter precipitation due to changes in the position of the westerlies. We compare our proxy measurements with an isotope-enabled transient climate simulation of the last deglaciation (iTRACE) to constrain the dynamical factors associated with changes in precipitation δD over stadial/interstadial changes. These results provide important constraints on past millennial-scale hydrological changes in Europe in response to changes in North Atlantic circulation.