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Exploring Middle Weichselian climate variability in NW Europe by applying chironomids as a proxy

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Ice core and marine records covering the Middle Weichselian (or Oxygen Isotope Stage (OIS) -3) are characterized by numerous abrupt short-term climate oscillations, the so-called Dansgaard/Oeschger (D/O) events. High-resolution investigations on terrestrial sites from NW Europe revealed several distinct interstadials in this region, but quantitative data on climate variability during this time interval is still scarce. Chironomids (or non-biting midges) are a relatively new proxy in palaeoclimatology, and offer the opportunity to quantitatively infer past changes in summer temperatures from lake sediment records. Here we present the first results of the application of chironomid-analysis on sediments dated to the earlier part of OIS-3. Two fragmentary records, covering only part of OIS-3, were retrieved from Sokli (northeast Finland) and Reichwalde (eastern Germany) and dated using both radiocarbon and optically stimulated luminescence techniques. The chironomid remains encountered in both sediment records indicate that a shallow lake was present during the time of deposition, and the chironomid-based inferences of past July air temperatures show surprisingly high temperatures reaching present-day values for Sokli, and temperatures just below the current temperature for the Reichwalde record. In addition to these quantitative temperature reconstructions a continuous lake sediment record was obtained from a dry maar lake from the Eifel region (Germany), and analyzed for chironomids and macro-remains. The results clearly illustrate the dynamic response of the aquatic fauna to climate change, and show that although there consistently is a re-

sponse of the chironomid fauna to changes in the climate system, that these responses are not uniform. However, due to low numbers of fossil chironomids in the samples quantitative chironomid-based temperature reconstruction was not possible for this latter record. Our combined results provide independent evidence for the impact of D/O-climate variability on the European continent and offers quantitative palaeotemperature estimates for a time-interval where such data is still scarce.