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European climate change at the end of the last glaciation: chironomid–based temperature reconstruction on a continental scale

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In Europe climatic conditions at the end of the last ice age were affected by a number of abrupt temperatures shifts, including the rapid transitions to warmer climate at the beginning of the Lateglacial Interstadial and the Holocene, and the cooling at the start of the Younger Dryas cold period. The amplitude and spatial pattern of Lateglacial changes in temperature can provide information about the forcing factors of these climate shifts and about processes affecting the European climate system during a transition to warmer climate. However, spatially resolved datasets describing temperature change across the European continent during the Lateglacial period at centennial or higher time resolution and based on the same standardized approach are presently not available. We aim to develop such a standardized dataset based on records of past summer temperature reconstructed from fossil chironomid assemblages in lake sediments. A combination of regional calibration datasets provided the basis for a chironomid-based inference model for July air temperature that covers the range of temperatures and chironomid assemblages expected for Europe during the Lateglacial. This model, which is based on modern chironomid assemblages from 274 lakes in Norway and Switzerland and associated observed values of mean July air temperature, was then used to produce temperature records from Estonia, Denmark, Ireland, the UK, Norway, the Netherlands, southeastern France, Western Spain, Northern Italy, Switzerland, and southern Romania. Preliminary results indicate distinct variations in the amplitude of temperature changes across Europe during the Lateglacial, with stronger shifts in July air temperature reconstructed in northern parts than at localities more to the south of the continent. Future work will expand this dataset to include additional sites in the British Isles, Italy, Bulgaria and Scandinavia in order to confirm the observed spatial pattern of Lateglacial temperature changes.