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Late Glacial climate and palaeoenvironment in the Southern Carpathian Mountains inferred by chironomid and pollen analyses

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The Southern Carpathian Mountains have several glacial lakes with their sediments extending back to the Late Glacial period (ca. 11,500-14,700 calibrated radiocarbon years BP). This area has so far missed quantitative palaeoclimate records that are however much needed in order to obtain a continental-scale picture of ecosystem reorganization in response to rapid climatic changes during the Late Glacial. High-resolution chironomid and pollen analyses can both provide such records. In this study these two methods are applied to the sediment sequence of a small sub-alpine lake, Taul dintre Brazi (Retezat Mts, 1740 m a.s.l., 0.5 ha). The lake is situated on base-poor, granite bedrock, within the Picea abies forest belt. Our aim was (1) to study changes in the chironomid fauna, (2) to obtain summer temperature estimates using a chironomid-mean July air temperature inference model, and finally (3) to compare the chironomid-inferred climate record with a pollen-based quantitative climate record (plant functional type method). Here we provide first results from this multi-proxy study. The Late Glacial and Early Holocene part of this core was analysed at 100-200 yr resolution. During the Oldest Dryas the chironomid fauna was dominated by Pseudodiamesa and Tanytarsini species; the start of the Lateglacial interstadial was marked by the diversification of Tanytarsini (Tanytarsus lugens-type, Tanytarsus pallidicornis-type, Paratanytarsus sp, Micropsectra insignilobus-type) and the disappearance of Pseudodiamesa suggesting a distinct increase in summer temperature. At the same time afforestation by Larix, Pinus cembra, Pinus mugo and Picea abies was signaled by the pollen, stomatal and plant macrofossil records. During the Younger Dryas reversal the chironomid fauna showed increasing abundance of Micropsectra insignilobus-type, a chironomid typical for cool, nutrient poor lakes whereas the pollen, plant macrofossil and stomatal records pointed to a decrease of Picea abies around the lakeshore. The chironomid samples suggest a similar development of Late-glacial temperature at Taul dintre Brazi as reconstructed from other localities in Central, West and North Europe. In the near future the resolution of this record will be increased and a quantitative chironomid-temperature inference model will be used to reconstruct past summer temperatures for the Southern Carpathian region.