



## **High-resolution study of Late Glacial and Early Holocene vegetation and tree line changes in the Southern Carpathian Mountains**

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The Retezat Massif of the S Carpathian Mountains abounds in glacial lakes, mainly above 1900 m a.s.l., just above the present day tree limit formed by *Picea abies* and *Pinus cembra* in the northern slopes. For the reconstruction of Late Glacial and Early Holocene vegetation and tree line changes in this mountain, two lakes were selected: Taul dintre Brazi (1740 m a.s.l.) and Lake Gales (1990 m a.s.l.). Sediments obtained from these lakes extend back to the Late Glacial, and so provide us an exceptional opportunity to study 1) when trees were first established locally around the lower lake following glacial retreat and 2) what tree and shrub species were present and replaced each other in the Late Glacial and early postglacial forests in response to the high-amplitude climatic fluctuation, and in case of the Early Holocene, the high-amplitude climatic amelioration. Pollen, conifer stomata and plant macrofossils were studied from both lake sediments at approximately 100 years resolution. Sediment chronologies were based on multiple AMS radiocarbon dates. Preliminary results from this study show that *Pinus mugo*, *Pinus cembra*, *Picea abies* and *Betula nana* appeared very early during the lateglacial interstadial, ca. 14,500 cal yr BP followed by *Larix decidua* around 14,200 cal yr BP. *Pinus cembra* gained dominance in the Lateglacial interstadial forest and survived locally during the Younger Dryas reversal unlike *Picea abies*. Another important result was the reconstruction of the Early Holocene forest composition around the lower lake that proved much more species rich than the present-day forest; *Picea abies* grew together with *Larix decidua*, *Pinus mugo*, *Pinus cembra*, *Alnus viridis*, *Juniperus*, *Betula nana* and *Betula pubescens* during the Early Holocene, furthermore the stomatal record suggested that conifer species were evenly distributed around the lake.

In light of our data, the position of the Early Holocene tree line reached 1990 m a.s.l. by ca. 10,700 cal yr BP (i.e. above the present day tree line!), when macrofossils of *Pinus cembra* appeared in the sediment of Lake Gales.