

The Impact of Prehistoric and Historic Mining Activities on the Vegetation of the Kitzbühel Region

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Introduction & Study Area



Fig. 1: Study area Kitzbühel in Tyrol.



Fig. 2: Study site „Kelchalm“.

Prehistoric and historic mining activities had a sustainable impact on the natural environment. Thereby the development and progress in montane techniques is linked to changes in the entire montane landscape. Furthermore early mining activities next to exploitation of natural resources are leading to changes in unspoilt landscapes and advancements in social systems as well as in the regional economy. These conditions apply also for the Kitzbühel area in the Eastern Alps (Fig. 1). This region was an important and prominent mining district during the Bronze Age as well as in the Middle Ages and the early Modern Times.

This poster presents first results of the pollen diagram from the mire „Rauber“, located in the vicinity of the ore exploitation site on the „Kelchalm“ (Fig. 2).

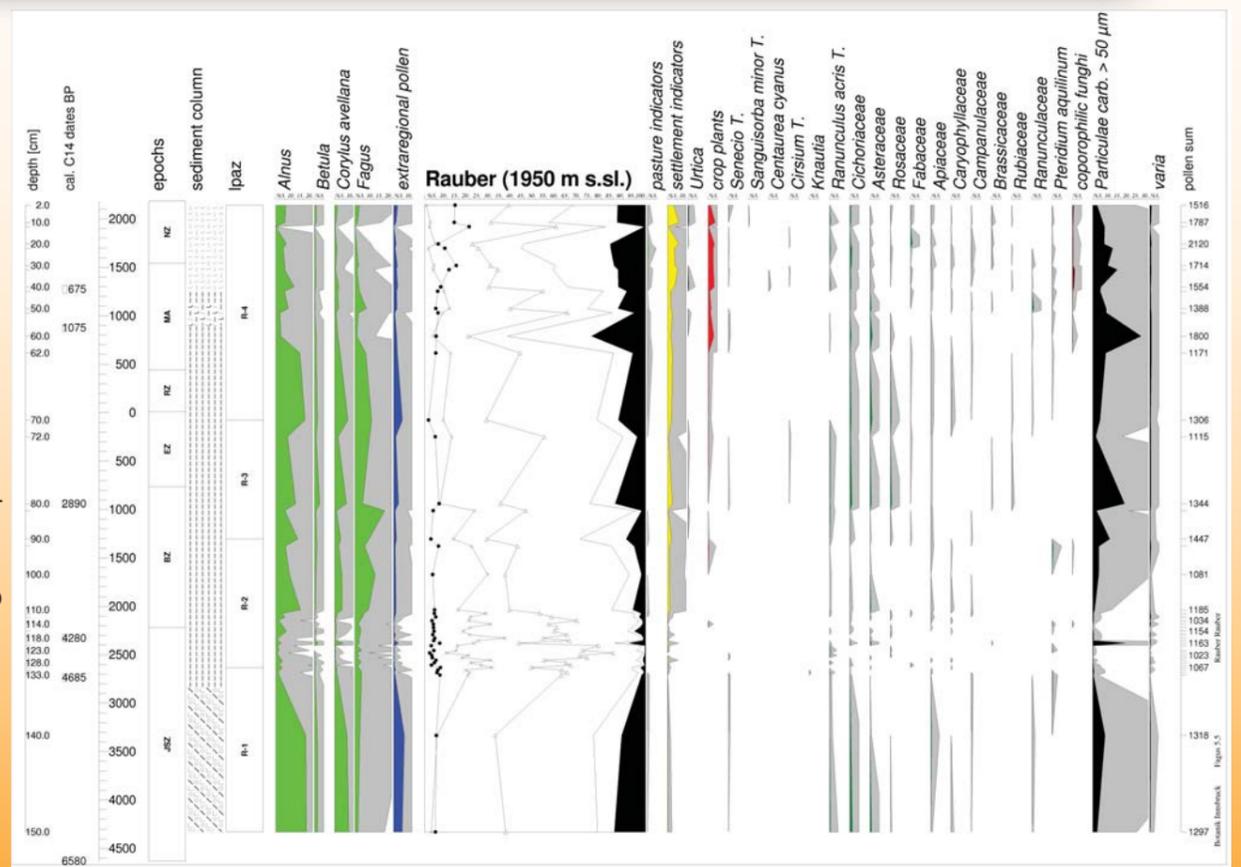
Aim of the study is to determine the onset, duration and impact of copper mining on the vegetation in the region of Kitzbühel by a combination of pollen and heavy metal analysis.

Results

The pollen diagram (Fig. 3) below shows the vegetation changes since the Atlantic Chronozone (last 7.000 years).

The **picea-alnus-zone (Ipaz R-1)** is characterized by an open spruce forest (*Picea*) in which fir (*Abies*) immigrates. Alder (*Alnus*) is sporadic dispersed in the surrounding forests of the mire. In the **picea-abies-zone (Ipaz R-2)** a spruce-fir forest (Abieti-Piceion) intermixed with beech (*Fagus*) is developing. First traces of human interference are recorded by settlement indicators, e.g. *Rumex*, *Plantago*, *Chenopodium* and *Artemisia*. In the **picea-alnus-poaceae-zone (Ipaz R-3)** fir (*Abies*) decreases and the grasses (Poaceae) expand. Contemporaneous charcoal particles (Particulae carbonae > 50µm) occur and reflect an anthropogenic opening of the forest. In the **picea-poaceae-cyperaceae-zone (Ipaz R-4)** also pollen of cereals (*Cerealia*), rye (*Secale*), and hop (*Humulus lupulus*) occur and display the intensification of the human impact especially during the Middle Ages but as well as in Modern Times.

Fig. 3: Simplified relative pollen diagram of the mire „Rauber“ (only selected species shown). Main diagram: ● pine (*Pinus*), X fir (*Abies*), Δ spruce (*Picea*).



Outlook

For a comprehensive view on a mining district all working parts as mining, smelting and settlement have to be examined. Therefore two additional pollen diagrams are planned, one in the mire „Untermoosberg“ (Fig. 1) near the prehistoric smelting

sites and a second one near Kitzbühel for detecting the settlement activities. The results, together with geochemical analysis shall allow detailed conclusions to mining activities and shall be validated additionally by archaeological excavations. In order to

scrutinize the causes for the vegetation changes at the end of the Neolithic, the Middle Ages, and the early Modern Times and to correlate them with mining activities, supplemental geochemical analyses are necessary and will be done.