



Palaeoenvironments, climate and human impact during the Late-Glacial and Holocene in mountainous ecosystems: the high-resolution multi-proxy record of the Lauza peat bog (Champsaur, French Alps)

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The multi-proxy record (pollen, NPP, organic matter, magnetic susceptibility, granulometry, sedimentology) of the sediments collected from the Lauza peat bog (1.140 m asl, Champsaur, Hautes-Alpes) allow us to describe the Late-Glacial and Holocene history of palaeoenvironments in a mountainous area which represents a junction point between several biogeographic zones, between the Southern, Northern, Outer and Inner French Alps. The sediment profile extracted from the deepest part of the former lake basin is more than 7 m long, 3.5 m of these belonging to the Late-Glacial. This sequence thus provides an exceptional sedimentation rate considering the mountainous environment, especially for the Late-Glacial and early Holocene periods, very often badly represented in the Alps because of altitude. The high-resolution analyses of this core offer a great opportunity to reconstruct precisely the vegetation history, climate changes and the environment/societies interrelationship evolution since the last glaciation.

The main vegetation changes in the past are recorded at the site by the pollen analysis, especially by distinguishing differences between the local, extra-local and regional vegetation covers. The Late-Glacial and early Holocene vegetation changes are well established, clearly characterized by several cyclic transitions from open vegetation with steppe elements to more or less forested landscapes. These major abrupt changes, associated with the Oldest Dryas/Bölling, Alleröd/Younger Dryas, and the Younger Dryas/Preboreal transitions, are also clearly identified by the magnetic susceptibility, as well as other minor fluctuations related to cold events for which high values of magnetic susceptibility are recorded (IBCP, Older Dryas, Gerzensee and PBO), characteristic of brief intensifications of soil surface erosive processes from the supplying zone. The other significant elevations of magnetic susceptibility values, associated to low organic matter content, occurring since the beginning of Atlantic are linked with clayey deposits within the peaty Holocene sedimentation of the depression. These episodes are perfectly correlated with the three phases of strong human impact on vegetation around the site described by pollen and NPP records from the Neolithic up to the present times. Reconstructed rhythms of landscape evolution and exploitation systems related to the Holocene climate variable, show that periods of climatic deterioration have not discouraged human activity in this alpine valley. These first conclusions lead to the idea that more than real decline of human occupation of the valley due to climatic deterioration between the major phases of anthropogenic activities, other reasons have to be put forward, such as social, cultural, economic reasons.