

Publication

14,500 years of vegetation and land use history in the upper continental montane zone at Lac de Champex (Valais, Switzerland)

JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)**ID** 4634937**Author(s)** Rey, Fabian; Brugger, Sandra O.; Gobet, Erika; Andenmatten, Romain; Bonini, Andrea; In-niger, Hannah; Maurer, Corina; Perret-Gentil-dit-Maillard, Nina; Riederer, Julian C.; Heiri, Oliver; Tinner, Willy; Schwörer, Christoph**Author(s) at UniBasel** [Heiri, Oliver](#) ;**Year** 2022**Title** 14,500 years of vegetation and land use history in the upper continental montane zone at Lac de Champex (Valais, Switzerland)**Journal** Vegetation History and Archaeobotany**Volume** 31**Number** 4**Pages / Article-Number** 377-393**Keywords** Afforestation, Alpine farming, Central Alps, Human impact, Palaeoecology, Tree line

Forests in the upper continental montane zone are important ecotones between lowland and subalpine forest ecosystems. A thorough understanding of the past vegetation dynamics at mid elevation is crucial to assess past and future altitudinal range shifts of tree species in response to climate change. Lake sediments from Lac de Champex (1,467 m a.s.l.), a small lake in the Canton Valais in the Central Swiss Alps were analysed to reconstruct the vegetation, land use and fire history for the last 14,500 years, using pollen, macrofossils, non-pollen palynomorphs and charcoal. The record indicates that the tree line had already reached the Champex area during the Allerød (14,000 cal bp) but dropped below the lake's catchment during the Younger Dryas cooling (12,750-11,550 cal bp). Reforestation started again with *Betula* and *Pinus sylvestris* in the Early Holocene at 11,500 cal bp in response to rapid climate warming. Temperate tree species (*Ulmus* , *Tilia* , *Quercus* , *Acer*) may have reached the altitude of the lake during the Holocene Thermal Maximum (ca. 10,000-5,000 cal bp). Mixed forests with mesophilous *Abies alba* were dominant between 7,500 and 5,000 cal bp . The mass expansions of *Picea abies* after 5,000 cal bp and *Alnus viridis* thickets after 4,500 cal bp were directly linked to increasing human disturbance. High values of coprophilous *Sporormiella* fungal spores and cereal pollen suggest pastoral and arable farming at the site from the Late Neolithic/Early Bronze Age onwards (5,000 cal bp). Our data imply that vegetation at intermediate elevation was less affected by human activities than at higher or lower elevations but that these areas served as important stations between the permanent settlements in the valleys and the seasonally occupied alpine huts at higher elevations. We argue that future climate warming will lead to drastic reorganizations of mountain ecosystems.

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