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Late Glacial to Holocene climate variability and anthropogenic impact as reflected in a high resolution sedimentary record from Baldeggersee, Central Switzerland

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Proxy data from the sedimentary record of Baldeggersee in the northern Alpine foreland reflect remarkable climate variations during the last 15500 years as well as strong anthropogenic influences starting during the late Holocene (late Roman period). Several sediment cores up to 8 m long were retrieved from the deepest part of Baldeggersee in about 65 m water depth. The sedimentary record was dated using historic climate and earthquake catalogues (MONECKE et al. 2004), varve counting in certain intervals, radiocarbon dating of plant debris, and tephra chronology (Laacher See Tephra and Vasset Killian Tephra). The sediment consists mainly of faintly to well-laminated carbonate-rich mud formed by biogeochemical processes within the lake. Remarkable are up to 70 cm thick varved intervals. A few up to 3 cm thick turbidites occur in the sedimentary record and mark major flood events. Proxy data include median grain sizes reflecting the allochthonous influence, and organic carbon content as an indicator of lake productivity and can be used as excellent indicators of environmental change (STURM et al. 2002).

The sedimentary record of Baldeggersee can be roughly divided into three major sections:

- Section I, up to 7500 cal y BP, is characterized by a high amount of allochthonous material, which is attributed to wind erosion during the Late Glacial and Younger Dryas. From 10200 to 7500 cal y BP flood events occur frequently, indicating cold and wet climate conditions in Central-Europe,

which are related to large freshwater pulses into the North Atlantic during the melting of the northern ice sheets. Furthermore, periods of low productivity in Baldeggersee during the early Holocene correlate with increased ice-rafting events (Bond-cycles) in the North Atlantic.

- Section II, covering the mid-Holocene period after 7500 cal y BP, is characterized by autochthonous sediments with low grain sizes and high content of organic material, representing high primary productivity under rather stable, warm and dry climate conditions. Minor cold episodes at 6000, 5000, 3500 and after 2000 cal y BP have been observed within this period. These cold events correlate well with other Alpine and mid-European climate records, but indicate less influence of North Atlantic climate variations especially between 6000 and 4000 cal y BP.

- Section III, representing the climate period after 1800 cal y BP, is characterized by short-term variations of grain sizes and organic content. This reflects the increasing anthropogenic influence by widespread deforestation of the lake's catchment starting during late Roman times and by large supply of nutrients due to intensive agricultural land use and growth of population around the lake during the last 120 years.

MONECKE K, ANSELMETTI F, BECKER A, STURM M. & GIARDINI D. 2004. The record of historic earthquakes in lake sediments of Central Switzerland. *Tectonophysics*, 394, 21-40.

STURM, M., KULBE, T., OHLENDORF, C. (2002). Archives in the depth of high mountain lakes. *EAWAG News* 55E: 15-17.