Geophysical Research Abstracts, Vol. 8, 01776, 2006
SRef-ID:

Lake sediments on the Flims rockslide mass - a key record to date the largest mass movement of the Alps

G. Deplazes (1), F.S. Anselmetti (1), I. Hajdas (2)

(1) ETH Zurich, Geological Institute, Zurich, Switzerland, 2) Institute of Particle Physics ETH Zurich, Switzerland, (flavio.anselmetti@erdw.ethz.ch / 0041 44 6321075)

Long piston cores taken from the sedimentary subsurface of two mountain lakes located on top of the Flims rockslide deposits (Eastern Switzerland) provide an early Holocene age (around 9480-9430 cal yr BP) for the largest known rockslide of the Alps. In addition, these cores reveal means to reconstruct the post landslide environmental evolution. Gravity short cores and long piston cores from the deepest parts of the two lakes Lag la Cauma and Lag Grond near the village of Flims in the Vorderrhein Valley have been recovered reaching all the way down to the hard top of the Flims rockslide mass. In Lag la Cauma, a composite section of ˜3.9 m length was recovered, consisting partly of very thinly-laminated sediments rich in organic constituents and authigenic carbonate. The sediment cores from Lag Grond can be combined to a 7.3 m long composite section. The upper 5.7 m consist of dark organic-rich sediments with a variable content of authigenic carbonate, interbedded with light grey flood-derived detrital layers. Below 5.7 m, the section consists almost purely of silt to gravel sized limestone clasts, which originate from the Flims rockslide material. The top of this interval is characterized by several perfectly-graded sequences of limestone grains that were deposited through turbiditic flow events in the young lake. An intercalated laminated section contrasts prominently to the overlying organic-rich deposits, and possibly represents an early lacustrine phase, during which Lag Grond was part of the much larger Ilanz Lake that was dammed by the rockslide masses. In the lowest part of the core, an unsorted limestone breccia suggests the recovery of Flims rockslide debris, as it is known from the Rhine gorge outcrops. Seven 14C-AMS datings of wood and leaf fragments of the lake sediments from Lag la Cauma provide a consistent downcore age trend. The oldest dated leafs, taken 2.5 cm above the bottom of the core, have an age of 8540+/-65 BP (9660-9430 cal. yr BP; two-sigma range). This sediment age

provides a minimal age of the rockslide, reflecting the onset of lacustrine sedimentation after the event. In addition, dating a wood fragment in the recovered rockslide deposits below the lake sediments of Lag Grond is interpreted to show a maximum age (8320+/-65, 9480-9120 cal. yr BP). The overlap of these minimum and maximum ages, 9480 - 9430 cal. yr BP, approximates the age of the Flims rockslide. This early Holocene timing is furthermore supported by the lack of typical Late Glacial organic-poor deposits in both lakes as well as by previous studies, which, based on dated wood in the rockslide masses and the occurrence of flood layers in downstream Lake Constance, provided similar ages. Neither the traditionally assumed Late Glacial rockslide age nor a direct link to deglacial rebound as potential trigger mechanism are thus plausible options. The age window coincides with a period of higher frequency of large mass movement events observed in the Alps such as the rockslides of Köfels and Kandertal. The higher likelihood of large rockslides in this time period could be rather controlled by climatic changes, such as increased precipitation and/or higher temperatures.