Geophysical Research Abstracts,
Vol. 10, EGU2008-A-08605, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-08605
EGU General Assembly 2008


# The sedimentary record of an early Holocene landslide-dammed lake (Baspa Valley, NW Himalaya)

**E. Draganits** (1), S. Gier (2), C.C. Hofmann (2), C. Janda (3), B. Grasemann (2) and C. Hager (4)

(1) Institute for Engineering Geology, Vienna University of Technology, Austria (Erich.Draganits@tuwien.ac.at), (2) Geo-Center, University of Vienna, Austria, (3) Geological Survey of Austria, Vienna, Austria, (4) Department of Geology, University of Kansas, Lawrence, USA

Properties of lake sediments are closely related to geomorphologic processes in their catchment, which are otherwise difficult to trace, especially in high Alpine areas, where high process rates often remove traces of previous periods. In combination with geochronology it is possible to quantify these processes. We have investigated the sediments of a landslide-dammed palaeo-lake in the NW Himalaya (Sangla, Baspa Valley), which covered some 4 km2 at an altitude of c. 2560 m. The Baspa River is a major left side tributary of the Sutlej River; the catchment area of the lake is c. 1000 km2. Most of the catchment comprises metamorphic/magmatic rocks of the Higher Himalayan Crystalline, except its eastern part that consist of sedimentary rocks of the Tethyan Zone. A large part of the lake catchment with altitudes up to 6440 m is covered by glaciers. The exposed lake sediments, close to the dam, comprise more than 94 m of finely laminated pelitic and silty sediments, with minor thin, sandy layers. Radiocarbon ages of organic remains demonstrate an early to middle Holocene age of the lake sediments and some more than 2400 years time for the filling of the lake. The thickness and number of lamination compared to the time of lake filling indicates that the record sedimentary events more frequent than annual. The lake sediments are covered by a thin layer of fluvial gravel, evidencing that the lake was filled completely with sediments before the subsequent incision of the Baspa River by backward erosion. Fine-grained lake sediments were sampled for mineralogical analyses; bulk

samples and separated clay fractions were analyzed by X-ray diffraction. The mineralogy of the 9 samples from the Sangla palaeo-lake remains the same throughout the profile. Semi-quantitative estimates of the top and bottom samples indicate 19% quartz, 5% K-feldspar, 9% plagioclase, 64% muscovite, 3% chlorite (top) and 15% quartz, 3% K-feldspar, 10% plagioclase, 56% muscovite, 16% chlorite (bottom). The virtual lack of mixed-layer or expandable clay minerals indicates relatively cold and dry climate, with dominantly physical weathering. Pollen from clay samples in the lowermost part of the lake, close to the dam, show a relatively diverse flora (65 taxa) indicating considerable warmer and more humid climate (e.g. 25 taxa of ferns and fern allies) close to the time, when the rock-avalanche occurred, than a less diverse flora (23 taxa) in a sample from clays directly above the lake sediments. Abundant deformation structures in the lake sediments are probably related to active faulting of a nearby fault. Thus, it may be suggested, that a more humid climate facilitated the formation of the rock-avalanche, additional to the seismic activity in this area.