Post-drainage ice dam response at Merzbacher Lake, Inylchek glacier, Kyrgyzstan

C. Mayer[1], W. Hagg[2], A. Lambrecht[3] and A. Helm[4]

[1]Commission for Glaciology, Bavarian Academy of Sciences and Humanities, Munich, Germany
[2]Institute of Geography, Ludwig Maximilians University, Munich, Germany
[3]Institute of Meteorology and Geophysics, University of Innsbruck, Austria
[4]GFZ, Potsdam, Germany

Glacier lake outburst floods (GLOF) are one of the major hazards related to the existence of alpine-type glaciers. In most cases moraine-dammed lakes or intra-glacially stored water form the source of such floods after failure of the respective dam. Merzbacher Lake is a prominent example of an ice-dammed lake, occupying the lower end of a tributary valley of Southern Inylchek glacier, central Tian Shan. There, GLOFs occur regularly at least once every summer, draining major amounts of the lake water through subglacial channels. The drainage flux can exceed 1000 m^3/s and the floods usually last for several days and up to two weeks, before the lake is empty or the subglacial passages are closed again. Southern Inylchek glacier, which dams Merzbacher Lake, is strongly influenced by the existence of this lake. A large part of the ice flux is diverted towards the lake forming an ice dam, instead of following the main valley to the glacier terminus. The ice dam acts as a calving front, especially during high lake levels, when large amounts of ice detach from the glacier and float in the lake, covering the major part of the lake surface. The influence of the lake on the glacier dynamics are the focus of this resreach. From repeat Aster imagery it can be shown that there exists a strong seasonality in the surface ice velocity which is characterised by increasing ice velocities towards the ice dam and low ice flux towards the glacier terminus. The area closer to the dam shows a characteristic velocity pattern similar to surging glaciers with high ice flux during and immediately after the flood and a subsequent recovery phase.