Gorner jökulhlaups:
Hydraulic model explaining temporary englacial storage of water and flood delay

Mauro Werder, ETH Zürich, Switzerland

werder@vaw.baug.ethz.ch

Gornergletscher is a large valley glacier located in the Swiss Alps. Gornersee, an ice marginal lake, fills every year with melt water and often drains catastrophically during summer. This lake is particularly suited to study jökulhlaups as hydrographs of the outlet river exist back to 1970 and its easy accessibility. The lake is relatively small with a volume of 1-4x10^6 m^3 and a peak outflow of about 40 m^3/s, this is only about three times the maximal ordinary discharge.

In the years 2004 and 2005 detailed measurements were conducted during the drainage of Gornersee. This poster presents a simple hydraulic model — based on lumped elements— and compares this with some of the field data. The lumped element model captures many of the features of the jökulhlaup semi-quantitatively; mainly these are the incorporation of ordinary discharge, the englacial storage of water and the superimposed diurnal variations of the lake outflow hydrograph.