H12: Glacier Hydrology: On, In and Under the Ice

Conveners: Anna Grau Galofre[1], Leonora King[2], and Gwenn Flowers[3]

Co-chairs: Anna Grau Galofre[1], and Leonora King[2] , and Gwenn Flowers[3]

[1] Department of Earth, Ocean and Atmospheric Sciences, University of British Columbia, Vancouver, BC, V6T 1Z4
Phone: (604)-700-8421, E-mail: agraugal@eos.ubc.ca
[2] Department of Geography, University of British Columbia, Vancouver, BC, V6T 1Z2
Phone: (778)-378-6009, E-mail: leonora.king@geog.ubc.ca
[3] Department of Earth Sciences, Simon Fraser University, Burnaby, BC, V5A 1S6
Phone: (778) 782-6638, E-mail: gflowers@sfu.ca

Session Description

Rising temperatures are extending glacier and ice-sheet ablation zones, increasing surface melt and inducing higher diurnal and seasonal variability in meltwater supply. This meltwater can be stored at the surface of the ice in supraglacial lakes or transported in channels, and can be delivered down to the ice-bedrock interface, opening en- and sub-glacial waterways. Drainage pathways developed by meltwater at the ice-bed interface influence ice flow mechanisms. Meltwater input and variability can result in an increase or decrease in ice velocities, including the development or termination of glacier surges, and the onset of catastrophic floods. Advances in remote sensing techniques, modelling, and field studies are key to characterizing the spatial and temporal dynamics of these supra-, en-, and sub-glacial drainage structures as well as their formative mechanisms. The morphology of these waterways reflects the cumulative effects of their discharge rates and meltwater supply, the dynamics and characteristics of their glacial substrates, and the role of mechanical and thermal erosion. The goal of this session is to bring together insights from glacier hydrology modelling, field observations and remote sensing to improve our understanding of the role of meltwater in ice dynamics, the formation and morphological characteristics of drainage systems, and the onset of catastrophic floods. In particular, we welcome contributions addressing the formative mechanisms of subglacial and englacial channels, the role of thermal and mechanical erosion, and the morphologic characteristics of the drainage pathways. Advancing our understanding of the role of meltwater in ice-flow dynamics is key to improving predictions regarding the rate of ice loss and rise of eustatic sea level, as well as assessing the risk of glacier outburst floods.

Primary Affiliation: Specific / CGU / Glaciology / Hydrology / Earth Surface Processes/ Quaternary Sciences.