



## **Field, experimental and numerical model developments in outburst flood understanding and opportunities for future work**

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Local-scale risks to society from a rapidly changing cryosphere include a range of mass flows and floods. Most of these slides, slumps, falls and flow events have been attributed to climatically-induced permafrost degradation, to glaciological mass loss and consequent meltwater production and sudden drainage of glacier lakes, or to volcano-ice interactions.

This presentation will firstly overview outburst flood research and knowledge to date and it will do this from a field, experimental and numerical modeling perspective. Fieldwork examples from around the world and including Iceland, New Zealand, Greenland, and the European Alps will be argued to underpin all understanding but to be severely limited in spatiotemporal coverage. Laboratory experiments will be argued to be overly generalised and narrowly-focussed. Numerical models will be argued to be omitting or over-generalising major processes; particularly sediment transport and morphodynamics.

This presentation will then look forwards, by placing an emphasis on several recent and major technological advances that should be enabling much improved monitoring and measurement in both the field and the laboratory. The opportunity for new numerical modelling approaches will be discussed from two viewpoints; that of the researcher interested in process mechanisms, and that of the natural hazard manager wishing for real-time information.