Geophysical Research Abstracts
Vol. 19, EGU2017-7448, 2017
EGU General Assembly 2017

Assessing glacial lake outburst flood risk

Ioannis Kougkoulos (1), Simon Cook (1), Vincent Jomelli (2), Leon Clarke (1), and Elias Symeonakis (1)

(1) Manchester Metropolitan University, Science and The Environment, Manchester, United Kingdom (ioannis.kougkoulos@gmail.com), (2) Laboratoire de Géographie Physique, CNRS, place Aristide Briand, FR-92195 Meudon, France

Glaciers across the world are thinning and receding in response to atmospheric warming. Glaciers tend to erode subglacial basins and deposit eroded materials around their margins as lateral-frontal terminal moraines. Recession into these basins and behind impounding moraines causes meltwater to pond as proglacial and supraglacial lakes. Consequently, there has been a general trend of increasing number and size of these lakes associated with glacier melting in many mountainous regions around the globe, in the last 30 years. Glacial lake outburst floods (GLOFs) then may occur where the glacial lake dam (ice, rock, moraine, or combination thereof) is breached, or overtopped, and thousands of people have lost their lives to such events in the last few decades, especially in the Andes and in the Himalaya. Given the ongoing and arguably increasing risk posed to downstream communities, and infrastructure, there has been a proliferation of GLOF studies, with many seeking to estimate GLOF hazard or risk in specific regions, or to identify 'potentially dangerous glacial lakes'. Given the increased scientific interest in GLOFs, it is timely to evaluate critically the ways in which GLOF risk has been assessed previously, and whether there are improvements that can be made to the ways in which risk assessment is achieved. We argue that, whilst existing GLOF hazard and risk assessments have been extremely valuable they often suffer from a number of key shortcomings that can be addressed by using different techniques as multi-criteria decision analysis and hydraulic modelling borrowed from disciplines like engineering, remote sensing and operations research.