



A predicted and controlled jökulhlaup (GLOF) from Harbardsbreen, Norway.

Miriam Jackson, Rune Engeset, and Hallgeir Elvehøy

Norwegian Water Resources & Energy Directorate, Hydrology Department; Glacier, Snow and Ice Section, Oslo, Norway

A jökulhlaup (GLOF) from Harbardsbreen, Norway in 2015 was predicted and the runoff of over five million cubic metres of water was released in a controlled manner through a hydropower reservoir. The glacier-dammed lake was investigated in early August and showed evidence (change in water-level, radial crevasses) of movement of water from the lake to subglacial storage. The water level in the glacier-dammed lake was over overburden pressure but the event didn't occur until two weeks later.

There have been previous events from this glacier, with annual events between 1996 and 2001 due to glacier thinning. The glacier continued to thin substantially (20m) over the next decade but the next event didn't occur until 2010 when over five million cubic metres of water was released as well as additional runoff due to heavy precipitation and melting. At this time the reservoir couldn't accommodate the extra water and there was flow over the dam.

Several glaciers in Norway have had one or several jökulhlaups in the last fifteen years due to glacier thinning, and at several others, glacier-dammed lakes have appeared for the first time. Hydropower reservoirs are situated downstream from some of these glaciers, so such an event can have a beneficial effect. However, negative glacier mass balance and subsequent glacier thinning is increasing the magnitude and frequency of events.