



Dam breaking by catastrophic erosional incision

N. Balmforth (1), J. von Hardenberg (2), A. Provenzale (2)

(1) Departments of Earth & Ocean Science and Mathematics, UBC, (2) ISAC-CNR, Turin

The recession of glaciers in various parts of the world has left a number of moraine-dammed lakes that could act as natural hazards if breached over short times. Indeed, destructive floods from such lakes have been observed and inferred to have occurred as a result of the relatively sudden, catastrophic erosional incision of the moraine dam. With experiments and theoretical modelling, we explore whether catastrophic erosional incision can break a dam if initiated by a wave overtopping the structure or by gradual overfilling. We find that wave-induced dam breaks can occur, but only when the wave is repeatedly reflected back and forth across the lake and washes over the dam several times. Gradual overfilling, by contrast, immediately initiates the breach.