



Alaskan Glaciers and Glacier-Outburst Floods (Jökulhlaups)

B.F. Molnia

United States Geological Survey, Eastern Earth Surface Process Team, Reston, VA 20192, USA (bmolnia@usgs.gov)

Alaska has more than 50,000 glaciers, including about 2,000 valley glaciers. Nearly all Alaskan glaciers are temperate. Many Alaskan valley glaciers end in ice-marginal lakes formed by terminal or recessional moraines. Some Alaskan valley glaciers act as ice dams, forming lakes by blocking side valleys or by extending into adjacent valleys. Many Alaskan glaciers store large quantities of water in thermokarst lakes, crevasses, conduits, and cavities.

Annually, all of these situations result in jökulhlaups. Draining of ice-dammed lakes or ice-marginal lakes causes most. Some jökulhlaups are produced by the release of water stored subglacially, englacially, or supraglacially, sometimes through surge-related processes. Less frequently, jökulhlaups result from the melting of glaciers located around the summit craters of many of Alaska's erupting volcanoes. Recently, all of these mechanisms have produced jökulhlaups that have effected resource development, fisheries, and infrastructure. In spite of Alaska's small population and large geographic area, annually Alaskan jökulhlaups cause millions of dollars of damage.

In the last three decades, jökulhlaup events at Hubbard Glacier have produced two of the largest floods that have occurred anywhere on Earth in post-Pleistocene time. Two recent Bering Glacier jökulhlaups resulted in a flood lasting nearly a year and in the rapid lowering of an ice-dammed lake by more than 50 m. This presentation characterizes the scope of jökulhlaups that have recently occurred in Alaska, focusing on recent jökulhlaup events at Hubbard and Bering Glaciers and Mount Redoubt.