



Post-Little Ice Age (1891-2011 AD) volume loss of Kotárjökull glacier, southeastern Iceland, as established from historical photography

Snaevarr Gudmundsson, Hrafnhildur Hannesdóttir, and Helgi Björnsson
Institute of Earth Sciences, University of Iceland, Sturlugata 7, 101 Reykjavík, Iceland

Kotárjökull is one of several outlet glaciers draining the ice-covered central volcano Öräfajökull in SE-Iceland. We estimate the average annual specific mass loss of the glacier, to be 0.22 m (water equivalent) over the post Little Ice Age period 1891–2011. The glacial recession corresponds to an areal decrease of 2.7 km² (20%) and a volume loss of 0.4 km³ (30%). A surface lowering of 180 m is observed near the snout decreasing to negligible amounts above 1700 m elevation. This minimal surface lowering at high altitudes is supported by a comparison of the elevation of trigonometrical points on Öräfajökull's plateau from the Danish General Staff map of 1904 and a recent LiDAR-based digital elevation model. Our estimates are derived from a) three pairs of photographs from 1891 and 2011, b) geomorphological field evidence delineating the maximum glacier extent at the end of the Little Ice Age, and c) the high-resolution digital elevation model from 2010–2011. The historical photographs of Frederick W.W. Howell from 1891 were taken at the end of the Little Ice Age in Iceland, thus providing a reference of the maximum glacier extent.