

Energy balance of Brúarjökull and circumstances leading to the August 2004 floods in the river Jökla, N-Vatnajökull

Sverrir Guðmundsson¹, Helgi Björnsson¹, Finnur Pálsson¹ and Hannes H. Haraldsson²

¹Institute of Earth Sciences, University of Iceland; ²National Power Company of Iceland

We describe the energy balance and melting of the Brúarjökull outlet glacier of the Vatnajökull ice cap and the exceptional circumstances leading to two extreme floods in August 2004 in the main river Jökla draining the glacier. The energy balance was estimated using observations from three automatic weather stations and energy balance maps produced for the entire outlet glacier. Runoff calculated from the energy balance data satisfactorily agreed with measured river discharge. The flood that occurred during the period August 3-6 was related to exceptionally intensive rain, but glacial melting caused the flood that occurred from August 9-14. Circumstances leading to the second flood were i) five days with high turbulent heat fluxes driven by strong southerly winds (July 28 to August 1) and heat supplied by rain (August 1-6), all speeding up the removal of snow in the ablation area and lowering the albedo, and ii) exceptionally high air temperatures and solar radiation along with abruptly reduced albedo (August 9-14).