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Hydrology of glaciers and ice sheets

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Cover illustration Four glacier rivers, Hverfisfljót, Brunná, Djúpá, and Núpsvötn, southern Iceland, combine in a narrow area, confined by a recent lava flow on one side and a very large sandur plain on the other, to make this weft of braided streams. Photograph by Oddur Sigurðsson.

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PREFACE

This thematic issue of the *Annals of Glaciology* concerns the hydrology of glaciers and ice sheets. The ice masses act as vast reservoirs of fresh water, and their hydrology has wide-ranging importance. Many mountain glaciers act as a direct resource of water for habitation, for irrigation, and for hydro-power generation. Hydrological processes are fundamental agents of glacial erosion and landform development, and they provide catastrophic flood risks that demand attention from both regional and national planners. The hydrological systems of glaciers and ice-sheets play a major role in the dynamics of the ice itself, providing strong controls on basal sliding, crevassing, and the mass and thermal balances at the ice surface. Meltwater runoff from ice sheets has potentially profound effects on ocean circulation and marine ecology, as well as its obvious effect on sea level.

Many of these themes are covered by the diverse range of studies in this issue. There are several papers concerning the near surface hydrology of snow, firn, and supraglacial lakes. Subglacial hydrology features heavily, with new measurements of water pressure beneath the Greenland ice sheet, of hyrologically controlled sliding, and estimates of water flow and subglacial lake locations in Antarctica. Suspended sediments in glacial outflows are used both to investigate lithological controls on surging, and to infer the subglacial hydrology of a marine-terminating margin in Greenland. In all, this issue of the Annals attracted 26 submissions, of which 15 were accepted for publication. We thank the scientific editors and reviewers for their work in selecting and improving the final papers.

This issue of the Annals is loosely associated with an international symposium on Hydrology of Glaciers and Ice Sheets that was convened by the International Glaciological Society (IGS) in June 2015 in Höfn, Hornafjörður, Iceland. The meeting covered a wide range of aspects of glacier and ice-sheet hydrology, including some, but not all, of the studies documented in this issue. The topics at the symposium included supraglacial and firn hydrology, englacial and subglacial hydrology, basal sliding and influence on ice dynamics, erosion and landforms, as well as glacial outburst floods and associated hazards.

The symposium attracted an international audience, with 117 participants as well as eight accompanying persons attending the isolated conference venue at Hótel Vatnajökull, at Lindarbakki, Hornafjörður. Many of the participants stayed at the hotel; others stayed in cabins or camped at nearby Höfn. The program for the week included 68 oral presentations and 35 poster presentations, and included time for fruitful scientific discussion amid the dramatic backdrop of the Vatnajökull ice cap. A midweek afternoon excursion to two nearby outlet glaciers offered the chance to stretch legs and see a newly formed terminus lake. Some participants were also treated to a pre-symposium snowmobile tour of the Vatnajökull ice-cap, and a post-symposium tour of the south coast of Iceland doubled as transport back to Reykjavík for many.

The Höfn symposium was co-sponsored by the University of Iceland, the Institute of Earth Sciences, University of Iceland, the Icelandic Meteorological Office, Landsvirkjun – the National Power Company of Iceland, the Icelandic Road and Coastal Administration, the Iceland Glaciological Society, and the Geoscience Society of Iceland.

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