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# **Annals of Glaciology 58(75)**

The cryosphere in a changing climate. Part 1

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**Cover illustration** Haupapa/Tasman Glacier, with its rapidly-expanding proglacial lake, is fed ice and debris from the highest mountains in Kā Tiritiri o te Moana/the Southern Alps of Aotearoa/New Zealand. Photo credit: Huw Horgan.

# Annals of Glaciology

The cryosphere in a changing climate. Part 1



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## PREFACE

This issue of *Annals of Glaciology* contains 19 papers addressing the theme of the responses of ice and snow to changes in Earth's climate. The papers here have a focus on physical processes within the cryosphere and interactions between the cryosphere and the climate system. The decrease in the extent of ice and snow on land, and on the ocean, is one of the more profound and visible changes resulting from climate warming. The last two Assessment Reports from Working Group I (the physical science basis) of the Intergovernmental Panel on Climate Change have included dedicated chapters reviewing and summarizing observed changes to the cryosphere, and projections of future changes and their impact (IPCC WGI AR4, 2007; IPCC WG1 AR5, 2013). This issue of *Annals of Glaciology* presents additional studies since those assessments, progressing and improving knowledge of how seasonally snow-covered and glacierized land regions, and the oceanic sea ice zone, are affected by climate change.

*Annals of Glaciology* is a peer-reviewed, thematic journal published by Cambridge University Press on behalf of the International Glaciological Society. A team of 12 Scientific Editors (listed above), with expertise across the broad range of topics covered by the theme, were responsible for assessing the papers in this issue. They acknowledge and are grateful for the work of a large number of peer-reviewers who contributed to improving the quality of many of the papers.

The papers published here are presented in two separately bound parts, split firstly by cryospheric component. Part 1 covers the shorter time-scale components of snow, hydrology of ice- and snow-covered regions and sea ice on the ocean. It additionally includes papers on perennial ice shelves, also on the ocean. Part 2 covers the perennial ice masses originating on the land surface: glaciers, ice caps and ice sheets. Within each of these categories the papers are ordered by the subjects of basic processes and modelling, cryospheric change, and impacts and feedbacks. Finally, they are sorted by geographical scale, from local through regional to global.

The cryosphere in a changing climate was also the topic of a recent international symposium attended by 228 delegates in Wellington, New Zealand (22-28 February 2016). This important theme, which is global in scope, brought together for the first time three of the leading international organizations in the field of cryospheric research: the International Glaciological Society (IGS), the International Association of Cryospheric Sciences (IACS), and Climate and Cryosphere (CliC), a core project of the World Climate Research Programme.

**Ian Allison**

# CONTENTS

Waqar Younas, Rachel W. Hay, Matt K. MacDonald, Siraj ul Islam, Stephen J. Déry	A strategy to represent impacts of subgrid-scale topography on snow evolution in the Canadian Land Surface Scheme	1
Marzena Osuch, Tomasz Wawrzyniak	Variations and changes in snow depth at meteorological stations Barentsburg and Hornsund (Spitsbergen)	11
Michael I. Allchin, Stephen J. Déry	A spatio-temporal analysis of trends in Northern Hemisphere snow-dominated area and duration, 1971–2014	21
Tomasz Wawrzyniak, Marzena Osuch, Adam Nawrot, Jaroslaw Jan Napiorkowski	Run-off modelling in an Arctic unglaciated catchment (Fuglebekken, Spitsbergen)	36
Markus Engelhardt, Paul Leclercq, Trude Eidhammer, Pankaj Kumar, Oskar Landgren, Roy Rasmussen	Meltwater runoff in a changing climate (1951–2009) at Chhota Shigri Glacier, Western Himalaya, Northern India	47
Jiechen Zhao, Bin Cheng, Qinghua Yang, Timo Vihma, Lin Zhang	Observations and modelling of first-year ice growth and simultaneous second-year ice ablation in the Prydz Bay, East Antarctica	59
Emiliano Cimoli, Arko Lucieer, Klaus M. Meiners, Lars Chresten Lund-Hansen, Fraser Kennedy, Andrew Martin, Andrew McMinn, Vanessa Lucieer	Towards improved estimates of sea-ice algal biomass: experimental assessment of hyperspectral imaging cameras for under-ice studies	68
Alison F. Banwell, Ian C. Willis, Grant J. MacDonald, Becky Goodsell, David P. Mayer, Anthony Powell, Douglas R. Macayeal	Calving and rifting on the McMurdo Ice Shelf, Antarctica	78
Christine M. Ledoux, Christina L. Hulbe, Martin P. Forbes, Ted A. Scambos, Karen Alley	Structural provinces of the Ross Ice Shelf, Antarctica	88