The geocryological bibliography of J. Ross Mackay (1915-2014)

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ABSTRACT
For more than four decades Professor J. Ross Mackay was the Canadian authority in permafrost science, and was internationally recognized for his contributions to geocryology. This paper presents the research bibliography of J.R. Mackay with respect to the permafrost environment, and also his contributions on the hydrology of Mackenzie River and his studies of needle ice and snow in southern British Columbia.

RÉSUMÉ
Durant plus de quatre décennies le Professeur J. Ross Mackay était l'autorité canadienne en matière de science du pergélisol, et était reconnu internationalement pour ses contributions en géocryologie. Cet article présente la bibliographie scientifique de J.R. Mackay en lien avec les environnements de pergélisol, ainsi que ses travaux sur l'hydrologie de la rivière Mackenzie et ses études relatives aux aiguilles de glace et de neige dans le sud de la Colombie Britannique.

1 INTRODUCTION

J. Ross Mackay, Canada's leading permafrost scientist, died on 28 October 2014. He was nearly 99 years old. Professor Mackay's Arctic field research began in the Paulatuk area, N.W.T., in summer 1951 and continued without interruption from 1954 to 2011. He focussed his work on the western Canadian Arctic, especially the Tuktoyaktuk Coastlands. His Arctic research was wholly conducted from the Department of Geography at the University of British Columbia. The permafrost community knows him best for his work on pingos and ice wedges, but his expertise on terrain conditions in the western Arctic was wide ranging. He began his field research taking a physiographic approach to the landscape, and during the 1950s developed a mechanistic view, working closely with W.H. Mathews on the structural geology of permafrost sediments. In the 1960s he revolutionized Canadian geocryology with his physically based approach to the study of landforms.

Mackay's first major contribution to geocryology concerned glacier ice-thrusting of permafrost sediments to account for the deformed beds of Nicholson Peninsula (1956) and Herschel Island (1959). He based most of his geocryological publications in the 1950s on field observations, but in 1962 he presented an assessment of talik geometry as part of a seminal paper on pingos. This paper and the Mackenzie Delta memoir (1963) were magisterial quantitative statements on the form and function of the landscape. From 1959 onwards he had used computers to assist his statistical examinations of freeze-up and break-up of Mackenzie River, which accompanied his transition into fundamental studies of geomorphic processes. His work developed along with federal and industrial interest in the western Arctic, so that 1970-1980 provided a series of key papers, e.g., the classical treatment of disturbance to permafrost terrain (1970); segregation as the origin of massive ice (1971); the origin of offshore permafrost (1972); the development of pingos from pore-water expulsion (1973); the characteristics of thermal contraction cracking (1974); experimental demonstration of pingo growth (1977); and the origin of hummocks (1980).

After his formal retirement in 1981 he published 52 papers concentrating on tundra lakes, ice wedges, and pingos. Two of these papers, reporting long-term studies of pingo growth (1998) and the development of ice-wedge polygons (2000), are of monograph length. They were published in *Géographie physique et Quaternaire*, the successor name for the *Revue Canadienne de Géographie*, in which he had published his first papers (on the Ottawa River valley in 1947 and 1949). In 2005, he published observations on wind-abraded rocks at Paulatuk, including data he had collected in 1951, and in 2011 his last paper discussed a pingo near Paulatuk originally photographed by Stefansson in 1911.

In total, Dr Mackay published 201 research papers and two memoirs. About 150 of the papers focus on the permafrost environment. He also published extensively on cartography. He was the sole or senior author of all but 9 of the papers concerning permafrost. Here I present Professor Mackay's full geocryological bibliography, with the exception of contributions published as abstracts. The bibliography is divided into several categories, which are presented in chronologic order of the first paper. The list also includes 13 papers regarding freeze-up, break-up, and mixing of Mackenzie River, and eight papers reporting research on snow and needle ice, conducted in collaboration with W.H. Mathews in southern BC.

Throughout his career, Dr Mackay was loyal to the Canadian research presses. His initial work on the North was published in particular in the *Geographical Bulletin*. After this stopped publishing, the *Canadian Journal of Earth Sciences* became his principal journal. During the 1970s and 1980s, he presented many short papers in the Geological Survey of Canada's *Report of Activities*, after 1978 called *Current Research*. A detailed obituary for Dr Mackay was published earlier this year (Burn 2015).

2 MONOGRAPHS

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ACKNOWLEDGEMENTS

I would like to thank Michael Church and Ian McKendry, both of the Department of Geography, University of British Columbia, for helpful discussions and assistance in checking some of the citations in this bibliography, and Timothy Oke, Olav Slaymaker, John Stager, and Graeme Wynn of the same department, for many points of information. Fabrice Calmels kindly translated the abstract.

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