

Eastern
Snow
Conference

Proceedings of the

1984

Annual Meeting



PROCEEDINGS OF THE
FORTY-FIRST ANNUAL
EASTERN SNOW CONFERENCE

JUNE 7 and 8, 1984
WASHINGTON, D.C.

ISBN 0-920081-06-1

ISSN 0424-1932

Proceedings of the Eastern Snow Conference

Printed and Bound in Canada

Cover Printed in United States of America

FOREWORD

In keeping with the objectives of the Eastern Snow Conference "to collect, disseminate and analyze data relating to snow and ice", the Executive Committee of the Conference is pleased to submit this copy of the Proceedings, Volume 29, in recognition of the 41st meeting of the Conference.

The Eastern Snow Conference is an informal group of businessmen, engineers, foresters, hydrologists, meteorologists, scientists and educators from the Eastern United States and Canada, which meets annually at some pre-selected location in New England, New York or Canada. The purpose of these meetings is the interchange of information related to snow, ice, frost, hail and other phenomena associated with the winter season.

The 1984 meeting of the Conference was held at the Sheraton Hotel, New Carrollton, Maryland. In June 1985, the group will hold the annual meeting in Montreal, Quebec.

Membership in the Conference is open to all interested individuals. Annual dues are only ten dollars (U.S.) and this includes one copy of the Proceedings, plus any other data distributed by the Conference. Additional copies of current Proceedings may be obtained from the Secretary. Copies of all back issues are now available from the Secretary.

Publication of these Proceedings was made possible in part by Corporate Memberships in the Conference held by the following:

1. C.T. Main, Prudential Center, Boston, Massachusetts, 02199
2. Hydro-Québec, Place Dupuis, 855 est, rue Sainte-Catherine, Montréal, Québec, Canada, H2L 4M4
3. Province of New Brunswick, Dept. of the Environment - Water Resources, P.O. Box 6000, Fredericton, New Brunswick, Canada, E3B 5H1
4. Ontario Hydro, 700 University Ave., Toronto, Ontario, Canada, M5G 1X6
5. Niagara Mohawk Power Corporation, 300 Erie Boulevard West Syracuse, New York, U.S.A. 13202.

PROCEEDINGS OF THE EASTERN SNOW CONFERENCE
 Forty-First Annual Meeting, June 7 and 8, 1984

TABLE OF CONTENTS

	Page
FOREWORD	iii
TABLE OF CONTENTS	iv
REPORT OF THE RESEARCH COMMITTEE	vi
EASTERN SNOW CONFERENCE OFFICERS	vii
THEME SESSION ON SNOW AND BUILDINGS	
INTRODUCTION - D. Taylor (Chairman)	1
SNOW LOADS ON TWO-LEVEL FLAT ROOFS	
Donald A. Taylor	3
DRIFT SNOW LOADS ON MULTILEVEL ROOFS	
Michael J. O'Rourke and Robert S. Speck	14
AUTOMATED DATA ACQUISITION FOR STRUCTURAL SNOW LOADS	
Ronald L. Sack, George G. Burke and Kent J. Penningroth	26
A NEW LOOK AT GROUND SNOW LOADS IN CANADA	
M.J. Newark	37
PROBABILISTIC MODELS FOR GROUND SNOW ACCUMULATION	
Bruce Ellingwood	49
GROUND SNOW LOADS FOR IDAHO	
Ronald L. Sack and Azim Sheikh-Taheri	59
THEME SESSION ON REMOTE SENSING OF SNOW AND ICE	
INTRODUCTION - Donald R. Wiesnet (Chairman)	65
REGIONAL DIFFERENCES IN SNOWPACKS IN THE NORTHERN U.S. AS SEEN BY THE NIMBUS-7 SMMR	
D.K. Hall, J.L. Foster and A.T.C. Chang	67
OBSERVATION OF PASSIVE MICROWAVE EMISSION FROM SNOWPACK	
James C. Shiue, R. Shin, A.T.C. Chang, J. Fuchs, F. Lin, and H. Greenan	75
MULTI-YEAR EXPERIENCE OF REMOTE SENSING OF ICE THICKNESS ON THE ST. LAWRENCE RIVER	
Gordon Batson, H.T. Shen and Stephen Hung	86
AIRBORNE SNOW WATER EQUIVALENT MEASUREMENTS OVER A FORESTED ENVIRONMENT USING TERRESTRIAL GAMMA RADIATION	
Thomas R. Carroll and G. Dane Vose	101
INDEPENDENT MEASUREMENT OF SNOW WATER EQUIVALENT AND SOIL MOISTURE USING GAMMA SPECTRAL ATTENUATION	
Kenneth G. Vadnais	116
INFLUENCE OF BOREAL FOREST COVER ON THE CHEMICAL COMPOSITION OF SNOWCOVER	
H. Gérald Jones	126

CHEMISTRY OF A TEMPERATE POND'S DECAYING WINTER COVER C.M. Kingsbury, D.C. Pierson and W.P. Adams	139
EFFECTS OF SNOW AND ICE ON WETLAND WATER CHEMISTRY Jeanette Campbell and W.P. Adams	143
OBSERVATIONS OF CHLOROPHYLLS IN HIGH ARCTIC SEA ICE IN WINTER Anne T. Roberts and Peter Adams	148
THERMAL INDEX AND THERMAL CONDUCTIVITY OF SNOW AND THEIR RELATIONSHIP TO WINTER SURVIVAL OF THE MEADOW VOLE, MICROTUS PENNSYLVANICUS N.M. Kalliomaki, G.M. Courtin and F.V. Clulow	153
THE EFFECT OF THE WINTER ICE COVER ON ODANATA LARVAE IN A POND NEAR PETERBOROUGH, ONTARIO David Beresford	165
BERGY-BIT MOTION DUE TO WIND, WAVE, CURRENT AND CORIOLIS FORCES R. Doyle and M. Arockiasamy	182
SPATIAL AND TEMPORAL SNOWCOVER DISTRIBUTION IN NEW YORK STATE Ronald V. Allen and Charles R. Barnes	199
ENERGY BALANCE MODELLING OF SNOWMELT IN A SUBURBAN ENVIRONMENT: A PROGRESS REPORT J.M. Buttle and P. Lafleur	204
A SNOWMELT LYSIMETER FOR RESEARCH APPLICATIONS Hugh J. Greenan and Eric A. Anderson	209
DESIGN, INSTRUMENTATION AND OPERATION OF A SNOWMELT RUNOFF PLOT Barry E. Goodison and J.R. Metcalfe	219
TESTS OF NEW SNOW DENSITY SAMPLES H.B. Granburg and C.M. Kingsbury	224
USACRREL'S SNOW, ICE, AND FROZEN GROUND RESEARCH AT THE SLEEPERS RIVER RESEARCH WATERSHED T. Pangburn and H.L. McKim	229
SNO-FOO AWARD	241
EXHIBITORS SECTION	245

Report of the Research Committee
1984 Eastern Snow Conference

Since the research questionnaire was sent to all Eastern Snow Conference members last year covering the period 1980 to 1983, the only business on hand this year was the annual competition for the Student Prize. The prize is given for the best student paper on research related to snow. The award consists of a cash prize of \$100 and up to \$350 towards the cost of coming to the Conference and presenting the paper. The winner and two runners up also receive a one-year free membership to the ESC.

Approximately 150 posters announcing the competition were sent to American and Canadian universities and six papers were submitted for the 1984 competition:

Thermal Index & Conductivity of Snow and their Effect on Winter Nest Temperatures & Winter Survival of the Meadow Vole, <i>Microtus Pennsylvanicus</i>	N.M. Kalliomaki, (G.M. Courtin and F.V. Clulow), Dept. of Biology, Laurentian University, Sudbury, Ontario
Comparison of Linear and Log-Linear Extrapolation Techniques for Snow Surface Temperature Prediction at Schefferville, Quebec	Julia Bartoshesky, Dept. of Geography, McGill University, Montreal, Quebec
Winter Cover Formation and its Effect on Water Chemistry	Jeanette Campbell, Geography-Biology, Trent University, Peterborough, Ontario
Observations on the Relationship between Hemispherical Surface Reflectance and Zenith Path Reflectance over Snow at Schefferville, Quebec	Robert Van Wyngaarden, Dept. of Geography, McGill University Montreal, Quebec
Alternative Method of Snow Making via Artificially Induced Nuclei	Anthony Urbano and Chris Moran, Dept. of Civil Engineering, University of Vermont, Burlington, Vermont
Physical Properties of Natural and Man-Made Snow and their Relationship to Skiing	Samuel Jung and Chris Cushing, Dept. of Civil Engineering, University of Vermont, Burlington, Vermont.

These papers were judged by Nabil Elhadi, Tim Pangburn and Don Taylor.

The 1984 prize was awarded to Ms N.M. Kalliomaki and the runners up were Julia Bartoshesky and Jeanette Campbell.

1984 06 05

Don Taylor
Chairman, Research Committee.

EASTERN SNOW CONFERENCE OFFICERS

1983-84

1984-85

President

Donald R. Wiesnet
Satellite Hydrology Assoc.
6606 Midhill Place
Fallschurch, Virginia
U.S.A. 22043

Peter Adams
Watershed Ecosystems Program
Trent University
Peterborough, Ontario
K9J 7B8

Vice President

Peter Adams
Watershed Ecosystem Program
Trent University
Peterborough, Ontario
K9J 7B8

Hilda J. Snelling
Meteorology Section
USAF/ETAC
Building 859
Scott AFB, Illinois
U.S.A. 62225

Executive Committee

Hilda J. Snelling
Meteorology Section
USAF/ETAC
Building 859
Scott AFB, Illinois
U.S.A. 62225

Jean-Louis Bisson
Hydro Quebec
2, Complexe Desjardins
Montreal, Quebec
H2Z 1A4

Jean-Louis Bisson
Hydro Quebec
2, Complexe Desjardins
Montreal, Quebec
H2Z 1A4

James Foster
Code 924
NASA Goddard Space Flight
Center
Greenbelt, Maryland
U.S.A. 20771

James Foster
Code 924
NASA Goddard Space Flight Center
Greenbelt, Maryland
U.S.A. 20771

Nabil Elhadi
New Brunswick Environment
P.O. Box 6000
Fredericton, N.B.
E3B 5H1

Secretary-Treasurer

Donald V. Dunlap
335 George Street
Room 201
New Brunswick, New Jersey
U.S.A. 08901

Proceedings Editor

Barry E. Goodison
Atmospheric Environment Service
4905 Dufferin Street
Downsview, Ontario
M3H 5T4

