

**Proceedings of the
FIFTY-SECOND ANNUAL**

EASTERN SNOW CONFERENCE

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Proceedings of the Eastern Snow Conference

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FOREWORD

This proceedings contains papers presented at the 52nd annual Eastern Snow Conference (ESC) in Toronto, Canada, on June 7 and 8, 1995. The ESC is a forum that brings the research and operations communities together to discuss recent work on scientific, applied, and operational issues related to snow and ice. Typical paper topics at the conference include studies of the physics of snow and ice, snow removal, meteorological forecasting, river ice control, hydrochemical response of snowmelt, remote sensing of snow and ice, and winter ecology. The conference program includes oral and poster presentations, as well as displays of scientific equipment.

The papers are arranged into three topic areas for this proceedings. All of the papers received at least two peer reviews. In addition, the editors read each paper twice, first to ensure that the reviews were thoughtful and constructive, and secondly to check that the authors appropriately considered review comments in the final paper.

This year ESC participants were invited to submit papers relevant to winter hydrology to *Hydrological Processes*. Authors wishing to submit their papers to *Hydrological Processes* identified their intentions when their ESC abstract was submitted, and submitted their papers before the conference to participate in the additional journal review, revision, and referee process. These papers, presented at the ESC in June, appear in these proceedings and will also be published in the December 1995 issue of *Hydrological Processes*.

We thank members of the Technical Communication Branch, Technical Resources Center, U.S. Army Cold Regions Research and Engineering Laboratory. Over the years this group has contributed considerable time to the proceedings and enhanced their quality. The editors especially thank Edmund Wright, Sandra Smith, and Donna Valliere for their efforts in the final production of this document.

Membership in the ESC is open to all interested individuals and corporations. Additional copies of the current proceedings and all back issues can be obtained from the Secretary. The annual meeting of the Eastern Snow Conference is cosponsored by the American Geophysical Union, the American Water Resources Association, and the State University of New York, Oswego Campus. Publication of these proceedings is made possible in part by Corporate Memberships in the Conference held by:

- * Hydro Québec, 75 Boulevard René Lévesque, Montréal, Québec, Canada H2Z 1A4
- * Department of the Environment–Water Resources, Province of New Brunswick, P.O.Box 6000, Fredericton, New Brunswick, Canada E3B 5H1
- * Ontario Hydro, 700 University Avenue, Toronto, Ontario, Canada M5G 1X6
- * Niagara Mohawk Power Corp., 300 Erie Boulevard West, Syracuse, New York 13202, USA

We look forward to the 53rd ESC meeting in Williamsburg, Virginia, in May of 1996.

Mary R. Albert and Susan Taylor
Editors, Eastern Snow Conference

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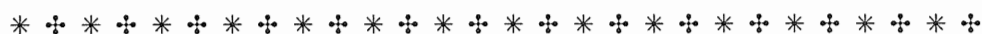
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The Eastern Snow Conference (ESC) is a joint Canadian/U.S. organization founded in the 1940s, originally with members primarily from eastern North America. Our current members are scientists, snow surveyors, engineers, technicians, professors, students, and operational and maintenance professionals from North America, as well as the United Kingdom, Japan, and Germany. There is a western counterpart to the ESC, the Western Snow Conference (WSC), also a joint Canadian/U.S. organization. Every fifth year the ESC and the WSC hold joint meetings.

The Eastern Snow Conference is a forum that brings the research and operations communities together to discuss recent work on scientific, applied, and operational issues related to snow and ice. The location of the conference alternates yearly between the United States and Canada, and attendees present their work by either giving a talk or presenting a poster. All resulting papers are reviewed, edited and published in our yearly *Proceedings of the Eastern Snow Conference*. In recent years, the ESC meetings have included sessions on snow physics, winter survival of animals, snow and ice loads on structures, river ice, remote sensing of snow and ice, and glacier processes. Volumes of the *Proceedings* can be found in libraries throughout North America and Europe, and the papers are also available through the National Technical Information Service (NTIS) in the United States and CISTI in Canada.



Le Colloque sur la neige-région est (ESC) est une organisation américano-canadienne fondée dans les années '40 et dont les membres provenaient à l'origine surtout de l'est de l'Amérique-du-Nord. Actuellement, les membres, qu'ils soient chercheurs, techniciens en enneigement, ingénieurs, techniciens, professeurs, étudiants, ou spécialistes des services d'exploitation et d'entretien, viennent non seulement d'Amérique du nord, mais aussi du Royaume Uni, du Japon, et d'Allemagne. Le Colloque sur la neige-région ouest (WSC), aussi une organisation américano-canadienne, est l'homologue de l'ESC pour l'ouest nord-américain. Tous les cinq ans, l'ESC et la WSC organisent des réunions en commun.

Le Colloque sur la neige-région est un forum qui rassemble chercheurs et responsables des services d'exploitation pour discuter des travaux récents sur les problèmes scientifiques, opérationnels ou autres dus à la neige et à la glace. Le site de cette réunion annuelle alterne entre les Etats Unis et le Canada. Les participants y présentent les résultats de leurs travaux par des communications orales ou au moyen d'affiches. Ces communications, une fois revues et éditées, sont publiées dans les Annales de l'ESC. Dans les années récentes, les réunions de l'ESC ont inclus des sessions sur la physique de la neige, la survie hivernale de la faune, les forces exercées par la neige et la glace sur les structures et les bâtiments, la glace de rivière, la télédétection de la neige et de la glace, et les processus glaciaires. Les annales de l'ESC sont accessibles dans la plupart des bibliothèques scientifiques d'Amérique-du-Nord et d'Europe. Des copies d'articles peuvent être obtenues du National Technical Information Service (NTIS) aux Etats Unis et son équivalent au Canada, le CISTI.

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THE PRESIDENT'S PAGE

The 52nd Eastern Snow Conference was held at the Westin Harbour Castle Hotel in downtown Toronto. By all measures it was a very successful meeting, attended by a total of 60 persons.

There were 20 oral papers organized around three themes: Snow Mapping and Remote Sensing; Snow and Ice Engineering and Operations; and Hydrology and Hydrochemistry of Snow and Ice. The poster session was also highly successful, with a total of 12 papers. I thank Mike Ferrick for the excellent job he did in putting the program together. The standard of presentation was very high, and the content conveyed a great deal of information about current issues and approaches in snow and ice research. There were also two displays by equipment manufacturers, which added greatly to the impact of the event.

The Research Committee did an excellent job in attracting a large number of student papers for the conference. This year's student paper competition was won by Paul Wolfe and Michael English of Wilfrid Laurier University for their paper, "Hydrometeorological Relationships in a Glacierized Catchment in the Canadian High Arctic." The paper entitled "Dissolution Kinetics, Transit Times Through Subglacial Hydrological Pathways and Diurnal Variations of Solute Content of Meltwaters Draining From an Alpine Glacier," delivered by David Collins of the University of Manchester, was selected as best overall oral presentation, and the best poster award was given to the paper, "SSM/I Time Series Observations of Great Lakes Ice and Snow," by Drew Pilant of Michigan Technical University. I congratulate Paul, Michael, David and Drew for their success.

Six papers from the conference have been submitted for publication in *Hydrological Processes*. I thank our co-editors, Mary Albert and Susan Taylor, for their work and initiative in handling all the arrangements for this new venture, which offers exciting potential for raising the profile of the ESC. I also thank Mary and Susan for the excellent job they have done in bringing out these Proceedings. Their hard work has again resulted in a publication of very high quality. Thanks are also due to all the authors and many reviewers who cooperated in the process.

On behalf of all participants, I also thank John Metcalfe and Max Perchanok for the excellent job they did on local arrangements. A real highlight was the banquet held at the Royal Canadian Yacht Club on Toronto Island, including the ferry ride back and forth. Our after-dinner speaker, David Phillips, Chief Climatologist with Environment Canada, gave a very interesting and entertaining talk on Canadian climate, with an emphasis on winter.

In recognition of their many years of outstanding contributions to the ESC, Don Wiesnet and Hilda Snelling have been made Life Members. This is a well-deserved honour in both cases.

The 1996 meeting of the ESC will be held in Williamsburg, Virginia, in early May (to avoid the hottest weather). Plans are also progressing for the 1997 meeting to be a joint one with the WSC and the Hydrology Section of the Canadian Geophysical Union at Banff, Alberta.

Finally, I thank all members of the 1995 ESC Executive Committee for their individual contributions and support during the last year. I wish the 1996 Executive Committee the best of luck in their preparations for Williamsburg.

Colin Taylor
52nd President