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61st ANNUAL**

# **EASTERN SNOW CONFERENCE**

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## FOREWORD

This proceedings volume contains papers presented at the 61st Eastern Snow Conference (ESC) held 9–11 June 2004 in Portland, Maine, USA. Sessions covering snow measurement, remote sensing, basin-scale studies, glacial processes, lake ice, and winter storms were convened.

The ESC is a joint United States and Canadian forum for discussing recent work on operational, applied, and scientific issues related to snow and ice. It also retains an increasing interest as a symposium where novel approaches to cryospheric science of international significance are presented. The ESC has published an annual series of proceedings since 1952. Typical topics include studies of snow and ice as materials, snow removal, meteorological forecasting, river ice control, snow hydrology, snow chemistry, glaciology, remote sensing of snow and ice, and snow ecology. 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. More information about the Eastern Snow Conference may be found at <http://www.easternsnow.org/>.

We continue with an optional review process and authors may submit extended abstracts or full papers to the Proceedings. This year's Western Snow Conference (WSC) (<http://www.westernsnowconference.org/>) participants were invited to join the ESC participants in the option of submitting papers relevant to winter hydrology to the international journal *Hydrological Processes*. These papers went through a formal journal review, revision, and referee process, and many appear both in these proceedings and in the December 2004 issue of the journal. John Pomeroy (University of Saskatchewan), Kelly Elder (USDA Forest Service), and Andrew Klein (Texas A&M University) edited this special issue of *Hydrological Processes* dedicated to ESC/WSC papers.

We thank the editors at ERDC–CRREL. Over the years this group has contributed considerable time to this publication and has enhanced the quality of these proceedings.

The 2004 meeting of the Eastern Snow Conference and these proceedings were made possible by sponsorship and corporate memberships by the following:

Campbell Scientific (Canada) Corporation  
Edmonton, Alberta, CANADA  
<http://www.campbellsci.com/offices/csc.html>

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New Brunswick Department of the Environment  
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<http://www.gnb.ca/elg-egl/>

We look forward to seeing many of you at the 62nd Eastern Snow Conference meeting in Waterloo, Ontario, Canada, 8–10 June 2005. This meeting promises an exciting program with anticipated sessions in “The International Polar Year,” “Climate Change,” and “Hydrological and Hydro-Chemical Impacts of Snow and Ice.”

Robert Hellström and Susan Frankenstein  
ESC Proceedings Co-Editors  
Bridgewater State College and ERDC–CRREL

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## STATEMENT OF PURPOSE

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, the United Kingdom, Japan, and Germany. There is a western counterpart to the ESC, the Western Snow Conference (WSC), which also is 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. Most 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 américain-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, et 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 américain-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 États 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 États Unis et son équivalent au Canada, le CISTI.

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## THE PRESIDENT'S PAGE

The 61st annual meeting of the Eastern Snow Conference (ESC) was held 9–11 June 2004 in Portland, Maine, USA, and was by all measures another well-organized and successful meeting. There were 47 people registered, including 12 students, presenting 21 oral and 11 poster papers. The presentations were exceptional and I thank everyone who presented—the success of any meeting is a function of the quality of the people and their work. The meeting maintained its traditional focus on a range of themes, including lake ice, measuring snow and ice processes, remote sensing of snow and ice, glaciers, and basic scale snow estimates. The last session explored winter storms (read Nor'easters) that often prevail along the eastern seaboard, and 2004 was no exception. The Holiday Inn by the Bay provided excellent conference and accommodation facilities and the banquet at DeMillo's floating restaurant was a unique setting that I think all enjoyed.

The ESC operates remarkably smoothly considering that its membership is so diverse and far-flung; this is due largely to those individuals who make up the ESC Executive. I thank the 2004 Executive for their hard work this past year. I would be remiss if I did not single out Derrill Cowing, Tom Hawley (local arrangements), and Susan Taylor (VP and Program Chair) for their time and efforts in making the 61st meeting a success. Since the Executive remains largely intact for 2005, I can only conclude the official duties are not too onerous, and in fact from time to time might even be fun. I also thank our Corporate members (listed in the Foreword) for their continued support of the ESC.

The Wiesnet Medal, which is awarded to the best student paper, was won by J. Farzaneh—I congratulate him on a very fine piece of work. The ESC will continue its efforts to attract students at all levels and I will climb on the soapbox for a moment to ask all ESC members to go out of their way to encourage students to submit papers to the ESC. The feedback I have received over the years convinces me that our meeting is an ideal forum for introducing students to the rigors of conference presentation.

The flagship of the ESC is our Proceedings and I acknowledge here the high quality and professionalism of our Editors, Robert and Susan, and I thank them for their continuous hard work. Also, a number of the papers presented at the Conference have been submitted to *Hydrological Processes* for publication, and I am grateful to John and Andrew for working with *HP*. This link certainly raises our profile and I hope it continues. Andrew is also our Webmaster and I note here his ongoing service to the ESC. I am sure he's glad I won't be e-mailing him quite as frequently as I did this past year!

In closing, I invite you to attend the 62nd meeting of the Eastern Snow Conference to be held at Wilfred Laurier University, Waterloo, Ontario, Canada, in early June 2005. The meeting promises to be an exciting and potentially larger get-together since we are planning sessions focusing on the work of members of CliC (Climate in Cryosphere). As well, with the upcoming International Polar Year (IPY) fast approaching, Dr. Barry Goodison and Dr. Mary Albert (both past ESC presidents), who are directing the Canadian and U.S. efforts for the IPY, respectively, will be giving keynote addresses. As you read this, remember to check out our Web site at [www.easternsnow.org](http://www.easternsnow.org) for up-to-date details of this meeting.

Best Regards,

Miles Ecclestone  
61st President  
Eastern Snow Conference