

The Eastern Snow Conference and the Atlantic Provinces, especially the Province of Newfoundland and Labrador

MILES ECCLESTONE¹ AND PETER ADAMS¹

ABSTRACT

This is the first time the Eastern Snow Conference (ESC) has met in the Province of Newfoundland and Labrador. However the ESC founded in 1939, first Proceedings published in 1952, has a long association with all the Atlantic Provinces of Canada, Prince Edward Island, Nova Scotia, New Brunswick and Newfoundland and Labrador. This association includes members, Presidents and sponsors of the ESC drawn from those Provinces and published papers using data from them, often by researchers from there. This paper is a short history of the ESC with a focus on Newfoundland and Labrador.

INTRODUCTION

These meetings, of 2007, represent the first time in its almost 70 year history that the Eastern Snow Conference (ESC) has met in Newfoundland. We thought that it might be useful to revisit the history of the ESC to look at its apparent neglect of our host Province. Also, as the meetings in St. John's will be held jointly with those of the American Meteorological Society, the Canadian Meteorological and Oceanic Society and the Canadian Geophysical Union, we thought that members of those organizations might have some interest in the evolution of the ESC.

WHAT IS THE EASTERN SNOW CONFERENCE (ESC)?

The ESC was founded in 1939, and held meetings during and after WW II and published its first Proceedings (of the 9th official meeting) in 1952. The Proceedings for these 2007 meetings will be volume # 64. The ESC was formed in part, in reaction to the creation of the Western Snow Conference (WSC) in 1932 (Henderson, 1982). For a while there was also a Central Snow Conference but it was consumed by the other two organizations. Our founders envisaged North America divided up into eastern and western territories for snow and ice purposes (Adams, 1986a, Adams and McArthur, 1985). Official greetings between the Eastern & Western Snow Conferences are a regular feature of their respective Proceedings and there have been three joint, East-West meetings, the 50th anniversary of the WSC in 1982 (Reno, NA), the 50th anniversary of the ESC in 1993 (Québec City) and in 1997 (Banff, AB).

The ESC is devoted to the study of ice, including snow, in all its forms. Mission statements (which have evolved over the years) appear at the beginning of many Proceedings. Topics covered in the Proceedings range widely from subterranean through terrestrial ice to upper atmosphere ice (with occasional mentions of ice in space) and from ice in freshwater bodies,

¹ Department of Geography, Trent University, Peterborough, ON K9J 7B8, Canada
(<http://www.trentu.ca/academic/geography>), mecclestone@trentu.ca
peter.adams1@sympatico.ca

flowing or still, to ice in seas and oceans. There are laboratory - and field – based studies, theoretically- based papers and papers focusing on the most practical aspects of snow and ice science and technology. The ESC, throughout its history, has tried to be a meeting place for scientists and engineers, technologists and technicians, academics and students. Student papers and prizes are features of the meetings. The Proceedings, through papers published and committee and working group reports show a steady thread of interest in instrumentation and techniques, in both science and technology.

In early years, the ESC had a strong focus on matters associated with the production of hydro electricity – snow survey, discharge prediction, ice control etc. ESC executives of those days included senior representatives of the great utilities of eastern North America.

Those utilities were often corporate members of the ESC. For example, volumes # 2 and #3 of the Proceedings were sponsored by Ontario Hydro and the Shawinigan Power Corp., Québec. This sort of sponsorship, from both sides of the border, has continued through the years, from private and public organizations such as Hydro Québec, Water Resources, New Brunswick, Geonor Inc, Pennsylvania and Campbell Scientific Canada. Beginning in WW II, the US Corps of Engineers was a very important player in the organization, with the Cold Regions Research and Engineering Laboratory, Hanover, NH as a major influence for decades. The Corps of Engineers' interests included snow and ice and the Great Lakes, including lake effect snowfall. Indeed, the Lakes have formed one of the focuses of the ESC as they were for the old Central Snow Conference. The US Weather Bureau and its Canadian equivalent, the Meteorological Service of Canada, Environment Canada, the National Research Council, Canada and the United States Geological Survey are examples of organizations with long-term interests in the ESC. Universities and colleges on both sides of the border became increasingly active over the years and as they did so, topics covered at ESC meetings became more diverse.

From the first, the ESC has been a bi-national organization with officers from both Canada and the US (Table 1 and Ecclestone, 2000). One of the ways this shows up is in the spelling used in the Proceedings! Since the early 1960s, the annual meetings have alternated between Canada and the US. One only has to think of the environmental and economic and political significance of the Great Lakes and the St. Lawrence Sea Way in eastern North America to appreciate how important this bi-national character of the ESC has been over the decades.

In closing this section, we must, for honesty's sake, mention that the evolution of the ESC has not always been straightforward and easy. Indeed, all of the words in its title, and the timing of its remarkably civilized meetings, have been challenged and debated. For example, it has been argued that "Eastern" does not reflect either the membership or the regional coverage of topics. Members have been drawn from all over the world and papers presented have been based on work undertaken in more than 35 countries around the globe, and Antarctica. Even the location of meetings has not always been "Eastern" as we have had meetings in Michigan, Nevada and Alberta. The second word in our title, "Snow", has been said to reflect the obsession of early ESC members with the Western Snow Conference's obsession with snow survey, theory and practice. (What types of wax do you use when snow surveying?). We are interested in ice in all its forms, including snow. And, "Conference" is confusing in that in our title it actually means "Association", as in "football conference" (Adams, 1986b). Thus, this paper will be presented at the conference of the Eastern Snow Conference and that conference is not the only activity of the Eastern Snow Conference! We will leave the matter of the timing of meetings for another day as this is a topic which almost tore the ESC apart. For decades the annual meeting was held in winter generating great stories of heroic travels to and from meetings and of members snowed-in at meetings. In the event, comfort and sunbathing won out and we now meet in summer.

Each of the ESC Proceedings is a mine of information about the organization as successive executives and committees have gone to great lengths to describe activities and concerns of their day. For a quick sense of this, insomniacs might wish to consult, Adams, 1986a., b., Adams and McArthur 1985, Ecclestone, 2000, Lansing, 1982 and Wiesnet, 1993.

THE EASTERN SNOW CONFERENCE AND THE ATLANTIC PROVINCES

The four Atlantic Provinces of Canada, New Brunswick, Nova Scotia, Prince Edward Island (PEI) and Newfoundland and Labrador all appear in the history of the ESC but the degree of involvement varies greatly between them.

Much of the work of the ESC is not regional. For example, theoretical studies, studies of instrumentation and techniques (e.g. snow or ice gauges and measuring regimes) or studies of over snow roads or snow-ploughing or of the icing of cables, ships or planes or of snow fences or laboratory studies are not region-specific. The same point can be made for modeling studies. We like to think that such work is of interest and value for all regions in which snow and ice occur, including the Atlantic Provinces. However, as the ESC is visiting Newfoundland and Labrador for the first time, we thought we would look back through the Proceeding (soon to be available digitally) for ties between the Atlantic Provinces and the ESC, especially ties with the Province of Newfoundland and Labrador.

In the case of **PEI**, we could find only one directly relevant paper in the Proceedings, on sea ice conditions in the Northumberland Strait (Cowley, 1968). Today of course the famous Causeway spans the Strait. No meetings have been held in PEI and there have been no members of the Executive from that province. As we do not have records of attendance over the years, we cannot tell whether we have had members from PEI.

Nor have there been ESC meetings in **Nova Scotia** but that province has provided members of the Executive, including a President (Table 1). People from Nova Scotia have made presentations at our conferences and the Proceedings include papers on a variety of studies undertaken there.

The Province of **New Brunswick**, on the other hand, has a very long and strong association with the ESC. We have drawn members to the Executive, including Presidents, from there, and we have held meetings there (Table 1). The ESC has been sponsored by organizations based in New Brunswick, notably in recent years, New Brunswick Department of the Environment, Water Resources, has been a Corporate Member. In addition, papers by researchers from that province and using data collected there have often appeared in the Proceedings over a period of many decades.

THE EASTERN SNOW CONFERENCE AND NEWFOUNDLAND AND LABRADOR

That brings us to **Newfoundland and Labrador**, our host province for 2007. As we have already confessed, this is the first time in the almost 70-year history of the ESC that we have met here. There have been no members of the Executive from this province but numerous members. And, Newfoundland and Labrador has been an important focus of our Proceedings since the first volume appeared in 1952. Table 2 provides examples of this.

As the Québec-Labrador peninsula (Fig. 1, from Finlayson, 1952 (the first Proceedings), is one of the great centres of hydroelectricity in the world, it is not surprising that the mainland part of the province has attracted the interest of members of the Eastern Snow Conference. At first smaller hydro operations around the edge of the peninsula and later the Churchill Falls Power (see Fig.2) and Baie James projects, encouraged research into snow and ice conditions (see Fig. 3) in and around their regions. So did the iron ore operations, partly in permafrost, of Wabush, Labrador City and Schefferville, in the centre of the peninsula, the first two in Labrador. Also, the position of Newfoundland and Labrador, on the eastern edge of North America, on major routes between North America and Europe, including the sea outlet of the St. Lawrence, enhances the value of data and studies of snow and ice in the air, on land and on both fresh and salt water, from this area. And, from the point of view of ESC members, this part of the Atlantic coast, with its large accumulations of ice, including icebergs (in “ice berg alley”), is part of our own backyard for the study of ice at sea. As this is a part of the world where ice is a very prominent feature of the environment at a remarkably low latitude (think sea/river/lake ice, think persistent deep snow, think ice bergs and even think glaciers – in the Torngat of northern Labrador), this is a region

which is very important for Canada-and North America-wide and hemispheric studies of snow and ice.

So, in Table 2, you will find a variety of examples of papers based on studies in Newfoundland and Labrador, using data from the province or involving extrapolations to the province. The list includes papers presented by researchers from Newfoundland.

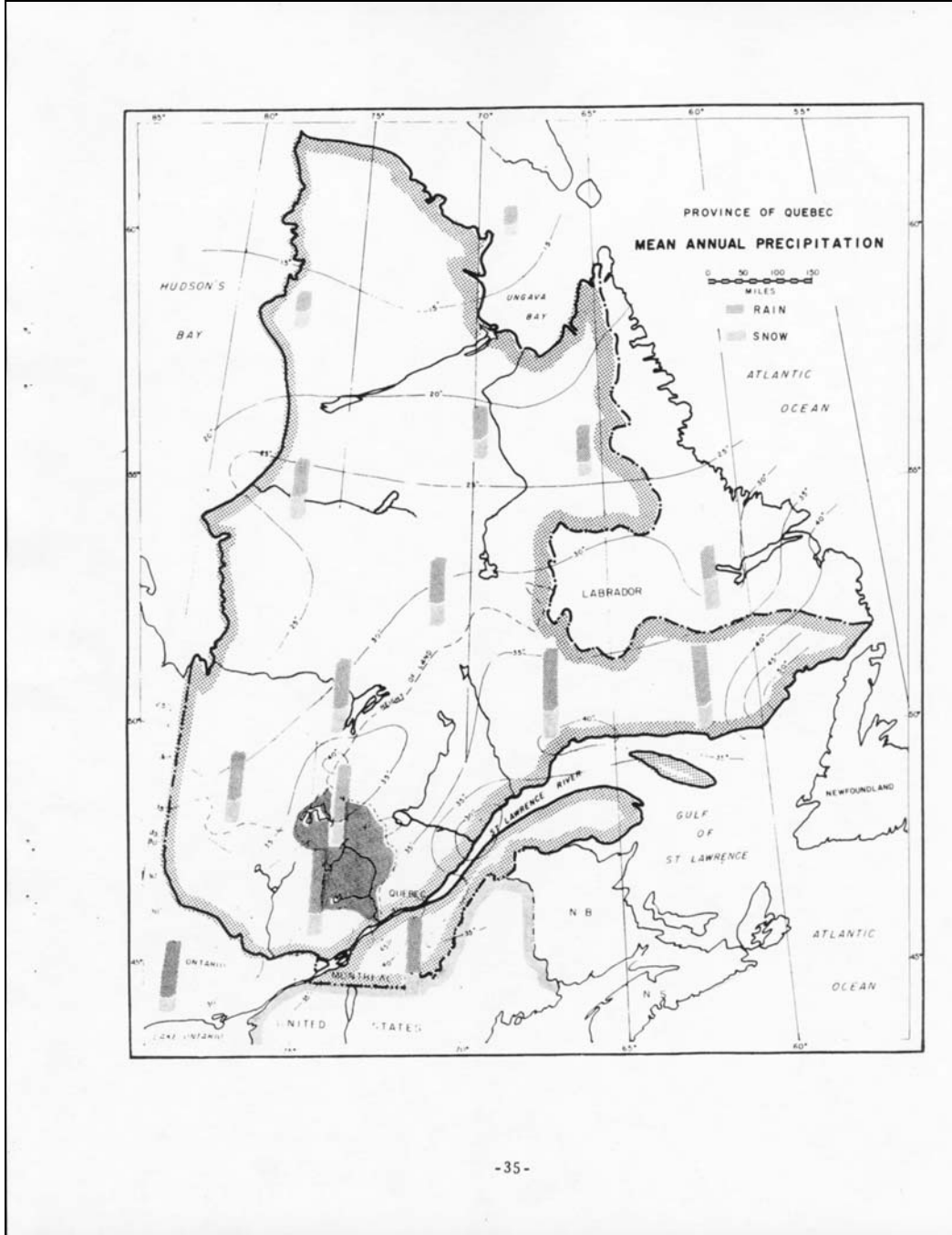


Figure 1. The Québec- Labrador Peninsula, a world centre for hydro power, a diagram from H.M. Finlayson's paper in the first ESC Proceedings (Finlayson, 1952). At that time, smaller catchments along the peninsula's southern rim, were being developed. Churchill Falls and Baie James came later. In its original form, this was an early example of the use of colour in a scientific journal.



Fig.2 (top). Trent U. researchers near the Churchill Falls, Labrador in 1970, before diversion of the flow for the hydro operation. Note the spray ice vegetation zone, now gone.
(bottom) The Grand Falls in winter, same year.



Fig.3. McGill and Trent snow surveyors in the Elizabeth Lake, Labrador, watershed in the 1980s, collecting data for one of the papers listed in Table 2.

CONCLUDING REMARKS

Although this is the first time that the Eastern Snow Conference has held its meetings in this province, there is a long association between the Atlantic Provinces, including Newfoundland and Labrador and the ESC. We hope that this relationship will continue and strengthen – to the benefit of both parties.

ACKNOWLEDGEMENTS

The authors are most grateful to Steve Gardiner, Trent University for his contribution to the design and layout of the poster version of this manuscript.

REFERENCES

- Adams, W.P., 1986a. Towards more formal links between the North American Snow Conferences with an index of the Proceedings of the ESC, 1951-84, *Proc. Western Snow Conference*, 54, 176-198
- Adams, W.P., 1986b. Eastern Snow Conference conference, *Bulletin American Meteorological Society*, 67, 4, 429
- Adams, W.P. and B. McArthur, 1985. Evolution and roles of the Eastern Snow Conference, with an index and classification of the Proceedings 1952-1983, *Proc. ESC*, 42, 1-24
- Cowley, J.C., 1968. Ice model studies for the Northumberland Strait crossing, *Proc. ESC*, 25, 43-60
- Ecclestone, M.E, 2000. The geographical distribution of Eastern Snow Conference meetings: 1949-2000. *Proc. ESC*, 57, 1-6
- Henderson, T.J., 1982. Western Snow Conference – the first fifty years, *Proc. ESC*, 39, p 1-5.
- Finlayson, H.M., 1952, Snow-melt as a factor in Quebec stream-flow, *Proc. ESC*, 1, p 25-46.
- Lansing, L., 1982. Reminiscences of Eastern Snow Conferences, *Proc. ESC*, 39, 6-9
- Wiesnet, D., 1993. ESC remembrances, '74-'06, *Proc. ESC*, 50, xviii-xxii

Table 1. Aspects of the evolution of the Eastern Snow Conference (meeting date/ meeting location/presidents/affiliation) with special reference to the Atlantic Provinces including Newfoundland & Labrador.*

Date (d/m/y)	Meeting location	President and affiliation
Xx/Xx/49**	Greenfield, Ma	H.B. Kinnison
Xx/Xx/50	Greenfield, Ma	B.L. Bigwood
Xx/Xx/51	Lake Placid, NY	B.L. Hopkins
14-15/02/52	Springfield, Ma	E.F. Childs USA Corps of Engineers, Boston Ma
12-13/02/53	Albany, NY	L.N. Mann Connecticut River Power Co. NH
11-12/02/54	Greenfield, Ma	E.C. Johnson U.S. Weather Bureau, Albany NY
10-11/02/55	Burlington, Vt	H.M. Finlayson Shawinigan Water and Power, Montréal Qc
09-10/02/56	Hanover, NH	C.E. Knox U.S. Geological Survey (USGS), Boston Ma
07-08/02/57	Syracuse, NY	L. Lansing New York Cooperative Snow Survey, NY
06-07/02/58	Worcester, Ma	A.T. Simmons New England Power Co., Littleton NH
05-06/02/59	Cambridge, Ma	G. Townsend USA Corp of Engineers, Waltham Ma
04-05/02/60	Troy, NY	R.A. Lane Philadelphia Electric Co., Pa
09-10/02/61	Northfield Vt	G.S. Hayes U.S. Geological Survey, Augusta Me
08-09/02/62	New Haven Ct	R. Kresge U.S. Weather Bureau, Washington D.C.
14-15/02/63	Québec City, Qc	L. Cartier Cartier and Leclerc, Montréal Qc
13-14/02/64	Utica, NY	E. Munger Norwich University, Northfield Vt
04-05/02/65	Hanover, NH	O.Z. Bacon Kennebec Water Power Co, Waterville Me

10-11/02/66	Hartford, Ct	G.H. Scruton Shawinigan Engineering Co., Montréal Qc
09-10/02/67	Niagara Falls, On	J.A.S. Milne Ontario Hydro, Toronto, On
08-09/02/68	Boston, Ma	N. Lally USA Corps of Engineers, Waltham Ma
06-07/02/69	Portland, Me	L.L. Cross Chas. T. Main Inc., Boston Ma
12-13/02/70	Albany, NY	D.R. Campbell N.E. Power Service Co., Westboro Ma
04-05/02/71	Fredericton, Nb	G.P. Williams National Research Council, Canada, Ottawa On
03-05/02/72	Oswego, NY	D.N. McMullen Energy and Resources Ontario, Toronto On
08-09/02/73	Amherst, Ma	R.E. Lautzenheiser Nat'l Weather Service, Boston Ma
07-08/02/74	Ottawa, On	R.E. Falconer Asrc State University of New York, Albany NY
06-07/02/75	Manchester, NH	C.D. Hopkins Jr. River Forecast Center, Hartford Ct
05-06/02/76	Glens Falls, NY	R.B.B. Dickison University of New Brunswick, Fredericton NB
03-04/02/77	Belleville, On	A.R. Eschner State University of New York, Syracuse NY
02-03/02/78	Hanover, NH	J.E. Peters Water Survey of Canada, Halifax NS
06-07/06/79***	Alexandria Bay, NY	D.V. Dunlap New Brunswick NJ
05-06/06/80	Peterborough, On	S.S. Lazier Queen's University, Kingston On
04-05/06/81	Syracuse, NY	W. Tobiasson U.S.A. Cold Regions Research Engineering Lab (CRREL) Hanover NH
19-23/04/82	Reno, Nv (Joint Wsc)	B.E. Goodison Meteorological Service of Canada, Downsview On
02-03/06/83	Toronto, On	P.L. Hansen Ducks Unlimited (Canada), Barrie On
07-08/06/84	Washington, DC	D.R. Wiesnet Satellite Hydrology Assoc, Falls Church Va
06-07/06/85	Montréal, Qc	W.P. Adams Trent University, Peterborough On
05-06/06/86	Hanover, NH	H.J. Snelling Meteorology Section, USAF/ETAC, Scotts AFB, Il
03-04/06/87	Fredericton, Nb	J-L. Bisson Hydro-Québec, Montréal Qc
08-09/06/88	Lake Placid, NY	D. Daugharty Forestry Resources, UNB, Fredericton Nb
08-09/06/89	Québec City, Qc	J. Foster NASA Goddard Space Center, Greenbelt Md
07-08/06/90	Bangor, Me	H.G. Jones Inrs-Eau, Université Du Québec À Québec Qc
05-07/06/91	Guelph, On	N. Elhadi Dept of Environment and Water Resources Nb
03-04/06/92	Oswego, NY	T. Pangburn USA CRREL, Hanover NH
08-10/06/93	Québec City, Qc (Joint Wsc)	T. Prowse National Hydrology Research Institute, Saskatoon Sk
15-16/06/94	Dearborn, Mi	D. Cowing USGS, Augusta Me
07-08/06/95	Toronto, On	C.H. Taylor Trent University, Peterborough On
02-03/05/96	Williamsburg, Va	M. Ferrick USA CRREL. Hanover NH
04-08/05/97	Banff, Ab (Joint Wsc)	M. Demuth National Hydrology Research Institute, Saskatoon Sk
02-03/06/98	Jackson, NH	R. Davis USA CRREL, Hanover NH
02-03/06/99	Fredericton, Nb	R. Brown A.E.S. Environment Canada, Dorval Qc
17-19/05/00	Syracuse, NY	D. Hall Nasa Goddard Space Center, Greenbelt Md
17-19/05/01	Ottawa, On	M. Albert ERDC and CRREL, Hanover NH
5-7/06/02	Stowe, Vt	J. Pomeroy University of Wales UK
4-6/06/03	Sherbrooke, Qc	K. Rancourt Mt Washington Observatory NH
9-11/06/04	Portland, Me	M. Ecclestone Trent University, Peterborough On
7-10/06/05	Waterloo, On	S. Taylor USA CRREL, Hanover NH
7-9/06/06	Newark, De	C. Duguay University of Fairbanks, Fairbanks Ak
28/05-01/06/07	St John's Nfld & Labrador	A. Klein Texas A&M University, South College Tx

* Bold indicates link with Atlantic Provinces.

** The ESC was founded in 1939. We believe that the meeting of 1949 was actually meeting number 6. Although papers were published earlier, volume 1 of the proceedings was based on the meetings of 1952.

*** Note change from winter to summer meetings.

Table 2. Newfoundland and Labrador in the Proceedings of the ESC., 1952 to Present – Some Examples.

Although this is the first ESC meeting to be held in this Province, ice and snow research in and about the Province of Newfoundland and Labrador has been a focus of interest for the ESC since its earliest years. Here is a selection, from the Proceedings, of the papers concerned.

Snow-melt as a factor in Québec stream flow, Finlayson, H.M., Shawinigan Water and Power Co., ESC 1952, p. 25-46 (example of early interest in power generation in Québec-Labrador, uses data from Labrador. See Fig. 1).

Annual snowfall in Eastern Canada, Potter, J.G., Meteorological Service of Canada, ESC, 1955, p. 35-47 (early example of many Canada-wide studies in which east coast data are critical, uses data from St. John's, Gander and Goose Bay).

Explorations in Labrador, Nutt, D.C., Dartmouth College, NH. ESC 1955, p.98-106 (exploration and science along the Labrador coast from the research vessel Blue Dolphin)

Snow measurement in the vicinity of Knob Lake, central Labrador-Ungava, winter 1964-65, Findlay, B.F. and P. Adams, McGill U., ESC, 1966. p. 26-40

Patterns of snow accumulation in a forest tundra environment, Thom, B.G. and H. Granberg, McGill U., ESC, 1970, p.76-86.

Solar and net radiation over melting snow in sub Arctic woodland, Petzold, D.E. and R.G. Wilson, McGill U., ESC, 1974, p. 51-71 (includes the Churchill Falls watershed).

Snow depth mapping from aerial photographs for use in permafrost prediction, Nicholson, F.H., McGill U., ESC, 1975, p. 124-136 (for use in the iron mines).

Measurement of the water equivalent of freshly fallen snow in Canada's Atlantic Provinces, MacNeil, C.F. and A.D.J. O'Neill, Atmospheric Environment Service Canada (AES), Nova Scotia, ESC, 1977, p. 118-129).

Vegetation-snow relationship in Labrador, Adams, P. and D.R. Barr, Trent U., Ontario, ESC, 1979, p. 1-25.

Use of a computer mapping package in displaying areal representations of a snow cover, Roulet, N. T., Trent U., ESC, 1980, p. 185-188 (field work took place in the Elizabeth Lake, Labrador watershed).

Bergy-bits motion due to wind, current and Coriolis forces, Doyle, R. and M. Arockiasamy, Faculty of Engineering, Memorial University of Newfoundland, ESC, 1984, p.182-198 (a contribution to the prediction of ice berg movement off Newfoundland, by local researchers).

Vegetation-snow depth relationships in the Boreal forest-tundra ecotone of Eastern Canada, Petzold, D.E. and T. Mulhern, U. of Maryland, ESC, 1988, p. 42-49)

Studies of snow cover-permafrost relationships at Schefferville, Granberg, H. and others, ESC, U. de Sherbrooke, Québec, 1986, p. 1-5 (Schefferville is in Québec but almost entirely surrounded by Labrador. The mines there straddled the border and lay between the Churchill Falls, Labrador and Baie James, Québec, watersheds. Many studies, including others in this same ESC Proceedings, from the McGill Station in Schefferville apply to Labrador).

Timing and duration of river break-up, Prowse, T.D. and C.R. Omelin, National Hydrology Research Inst. (NHRI), Saskatoon, ESC, 1987, 192-196 (another example of a nation-wide study of great relevance to Newfoundland and Labrador).

High frequency dynamic response of the east coast seasonal sea ice zone, Nazarenko, D.M., McGill U., ESC, 1989, p. 74-81 (study of sea ice from Baffin Bay to the Grand Banks).

Snow accumulation and climate over the Grand Lake catchment, Newfoundland, Banfield, C.E., Memorial U., Newfoundland, ESC, 1991, p. 133-148 (by a Newfoundland researcher about Newfoundland!)

Ship superstructure icing climatology of coastal eastern North America, Ryerson, C.C., USA Cold Regions Research and Engineering Lab., Hanover, NH, ESC, 1991, 201-212.)

Coastal influences on winter precipitation in southwest Labrador, Newell, J.P., ESC, 1992, p. 107-114 (data from Mary's Harbour and Battle Harbour, Labrador).

Atlantic sea-surface temperatures and New England snowfall, Hartley, S., U. of Denver, ESC 1996, p. 43-53 (Newfoundland and Labrador ocean blamed for snowfall in the U.S.A.!)

Y Cymry’N Erbyn Yr Eira, The influence of snow on the Welsh settlements of North America, Pomeroy, J.W. and H.G. Jones, NHRI, Saskatoon and Institut national de la recherche scientifique-eau, U. de Québec, ESC, 1996, p. 181-188 (discusses snow in Wales and N. America, including Newfoundland. Note the first settlers arrived in the 12th century!)

Spatial and temporal variability of Canadian monthly snow depths, 1946-1995, Brown, R.D. and R.O. Braaten, AES, Environment Canada and U. of Victoria, B.C., ESC, 1997, p. 248-259 (another example of a Canada-wide study including Newfoundland and Labrador).

One for the history books: the winter of 2000-2001 in St. John’s, Newfoundland, Whiffen, B., Meteorological Service of Canada, Mount Pearl, Nfld., ESC, 2002, p. 235-241 (record snowfall by 50cm. The ESC should have met in St. John’s that year!)

Canada-wide simulation of lake ice cover duration, thickness and composition (1980-1996), Duguay, C.R.I., (U. of Alaska), F.C.Pivot, (York U., Ontario), R.D. Brown, (Environment Canada, Montréal) and G.M. Flato (U. of Victoria, B.C.), ESC, 2006 (presented at ESC Meeting, Waterloo ON; yet another Canada-wide study needing and of use to Newfoundland and Labrador).