

MEMBER COUNTRY: Canada
National Report to SCAR for year: 2013-2014

Activity	Contact Name	Address	Telephone	Fax	Email	web site
National SCAR Committee						
Canadian Committee on Antarctic Research	Marc Meloche	Suite 1710, 360 Albert Street, Ottawa, Ontario, K1R 7X7, Canada	1(613)947-6462	1(613)943-8607	marc.meloche@polarcom.gc.ca	www.polarcom.gc.ca
	Susan File	Suite 1710, 360 Albert Street, Ottawa, Ontario, K1R 7X7, Canada	1(613)943-8605	1(613)943-8607	susan.file@polarcom.gc.ca	www.polarcom.gc.ca
	Dr. Anita Dey Nuttall	CCAR Chair, Acting Director, Canadian Circumpolar Institute, Pembina Hall, Edmonton, Alberta T6G 2E1, Canada	1(780)492-9089	1(780)492-1153	anitad@ualberta.ca	www.cci.ualberta.ca
SCAR Delegates						
1) Delegate	Dr. David J. Scott	Suite 1710, 360 Albert Street, Ottawa, Ontario, K1R 7X7, Canada	1(613)943-8605	1(613)943-8607	davidj.scott@polarcom.gc.ca	www.polarcom.gc.ca
2) Alternate Delegate	Dr. Anita Dey Nuttall	CCAR Chair, Acting Director, Canadian Circumpolar Institute, Pembina Hall, Edmonton, Alberta T6G 2E1, Canada	1(780)492-9089	1(780)492-1153	anitad@ualberta.ca	www.cci.ualberta.ca
Standing Scientific Groups						
Life Sciences						
1) Member	Dr. Kathleen Conlan	Canadian Museum of Nature, Life Sciences P.O. Box 3443, Station D Ottawa Ontario K1P 6P4	1(613)364-4063	1(613)364-4027	KCONLAN@mus-nature.ca	www.nature.ca
2) Member	Prof. Émilien Pelletier	Institut des sciences de la mer de Rimouski Université du Québec à Rimouski CP 3300 310 allée des Ursulines Rimouski, Québec G5L 3A1	1(418)723-1986 x1391	1(418)724-1842	emilien_pelletier@uqar.qc.ca	http://www.ismer.ca/Pelletier-Emilien?lang=fr
3) Member	Dr. Diana E. Varela	Department of Biology, and School of Earth and Ocean Sciences University of Victoria, PO Box 1700 Station CSC, Victoria, British Columbia V8W 2Y2 Canada	1(250) 472-5425	1(250) 721-7120	dvarela@uvic.ca	http://www.uvic.ca/science/biology/people/home/faculty/facpages/varela.php http://web.uvic.ca/%7Edvarela/

Geosciences						
1) Member	Wayne Pollard	Department of Geography, McGill University 805 Sherbrooke St. W Montreal, Quebec, Canada	1(514)398-4454	1(514)398-7437	wayne.pollard@mcgill.ca	http://www.geog.mcgill.ca/faculty/pollard/
2) Member	Luke Copland	Department of Geography, University of Ottawa Simard Hall, 60 University Rm 047 Ottawa, Ontario K1N 6N5 Canada	1(613)562-5800 x2826		luke.copland@uottawa.ca	http://www.geography.uottawa.ca/prof/lcopland.htm
3)	Prof. P. Thayyil Jayachandran	Physics Department, University of New Brunswick 8 Bailey Dr. UNB Campus PO Box 4400 Fredericton, New Brunswick E3B 5A3 Canada	1(506)447-3330	1(506)453-4581	jaya@unb.ca	http://radio.physics.unb.ca/jayachandran/
4)						
Physical Sciences						
1) Member	Dermot Antoniades	Centre d'études nordiques et Département de Géographie Pavillon Abitibi-Price 1230 2405, Rue de la Terrasse Université Laval, Québec, Québec G1K 7P4 Canada	1(418)656-2131 x.8996	1(418)656-2978	Dermot.Antoniades@cen.ulaval.ca	http://www.cen.ulaval.ca/en/membre.aspx?id=2846838&membre=dantonaiades
2) Member	Thomas James	Natural Resources Canada 9860 West Saanich Rd. PO Box 6000, 3rd Fl., Rm 3723 Sidney, British Columbia V8L 4B2 Canada	1(250)363-6403	1(250)363-6739	Thomas.James@NRCan-RNCan.gc.ca	
3)	Nathan Gillett	Environment Canada - Canadian Centre for Climate Modelling & Analysis University of Victoria (W-CIRC) 3800 Finnerty Rd. Victoria, British Columbia V8P 5C2 Canada	1(250)363-8264	1(250)363-8247	Nathan.Gillett@ec.gc.ca	
4)	Philippe Tortell	University of British Columbia: Department of Earth, Ocean and Atmospheric Sciences Vancouver Campus, 2020 - 2207 Main Mall Vancouver, British Columbia V6T 1Z4 Canada	1(604)822-4728		ptortell@eos.ubc.ca	http://www.eos.ubc.ca/about/faculty/P.Tortell.html

Activity	Contact Name	Address	Telephone	Fax	Email	web site
Scientific Research Program						
AAA (Physical)						
1)						
2)						
AntEco						
1)	Dr. Kathleen Conlan	Canadian Museum of Nature, Life Sciences P.O. Box 3443, Station D Ottawa Ontario K1P 6P4	1(613)364-4063	1(613)364-4027	KCONLAN@mus-nature.ca	www.nature.ca
2)						
AnT-ERA						
1)	Dr. Kathleen Conlan	Canadian Museum of Nature, Life Sciences P.O. Box 3443, Station D Ottawa Ontario K1P 6P4	1(613)364-4063	1(613)364-4027	KCONLAN@mus-nature.ca	www.nature.ca
2)	Dr. Irene R. Schloss	Institut des sciences de la mer de Rimouski Université du Québec à Rimouski 310 allée des Ursulines Rimouski, Québec G5L 3A1	1(418)723-1986 x.1391	1(418)724-1842	irene_schloss@uqar.ca	http://www.ismer.ca/Schloss-Irene-R?lang=fr
AntClim21						
1)	Dermot Antoniades	Centre d'études nordiques et Département de Géographie Pavillon Abitibi-Price 1230 2405, Rue de la Terrasse Université Laval, Québec, Québec G1K 7P4 Canada	1(418)656-2131 x.8996	1(418)656-2978	Dermot.Antoniades@cen.ulaval.ca	http://www.cen.ulaval.ca/en/membre.aspx?id=2846838&membre=danton-iades
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PAIS						
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SERCE						
1)	Thomas James	Natural Resources Canada 9860 West Saanich Rd. PO Box 6000, 3rd Fl., Rm 3723 Sidney, British Columbia V8L 4B2 Canada	1(250)363-6403	1(250)363-6739	Thomas.James@NRCan-RNCan.gc.ca	
2)						

Activity	Contact Name	Address	Telephone	Fax	Email	web site
ACTION GROUPS						
EXPERT GROUPS						
1) ANTPAS Steering Committee	Dr. Charles T. Tarnocai	Agriculture & Agri-Food Canada 960 Carling Ave. K.W. Neatby Building, Fl. 1, Rm 1135A Ottawa, Ontario K1A 0C6 Canada	1(613)759-1857	1(613)759-1937	charles.tarnocai@agr.gc.ca	
2) GRAPE	Prof. P. Thayyil Jayachandran	Physics Department, University of New Brunswick 8 Bailey Dr. UNB Campus PO Box 4400 Fredericton, New Brunswick E3B 5A3 Canada	1(506)447-3330	1(506)453-4581	jaya@unb.ca	http://radio.physics.unb.ca/jayachandran/
3) Human Biology & Medicine	Prof. Peter Suedfeld	Department of Psychology, University of British Columbia 3533 - 2136 West Mall, Vancouver, British Columbia V6T 1Z4 Canada	1(604)822-5713	1(604)822-6923	psuedfeld@psych.ubc.ca	http://www2.psych.ubc.ca/~psuedfeld/
SCADM						
1)	Dr. Peter L. Pulsifer	National Snow and Ice Data Center 449 UCB, University of Colorado, Boulder, CO 80309, USA	1(613)620-7195	1(613)249-7067	pulsifer@nsidc.org	https://nsidc.org/research/bios/pulsifer.html
SCAGI						
1)	Dr. Peter L. Pulsifer	National Snow and Ice Data Center 449 UCB, University of Colorado, Boulder, CO 80309, USA	1(613)620-7195	1(613)249-7067	pulsifer@nsidc.org	https://nsidc.org/research/bios/pulsifer.html
2)	C. Simon L. Ommanney	56 Spinney Rd. P.O. Box 730 RR1 Glenwood, Yarmouth, Nova Scotia B0W 1W0 Canada	1(902)643-2527		simon.ommanney@ns.sympatico.ca	
NATIONAL ANTARCTIC DATA CENTRE						
A national Antarctic data centre has not yet been established.						
SCAR DATABASE						
Canada does not have responsibility for a SCAR database.						

A BRIEF SUMMARY OF SCIENTIFIC HIGHLIGHTS:

Canadian research in the Antarctic is largely undertaken by individual scientists in partnership with researchers from other countries with scientific research programs in the Antarctic. Scientific highlights include the following:

- **Understanding the nature and origin of massive ground ice and its response to climate change:** This 2009 to 2013 project funded by the National Aeronautics and Space Administration (NASA) enhanced understanding of the nature and origin of massive ground ice in the McMurdo Dry Valleys region in response to climate change (participants: Wayne Pollard, McGill University; Denis Lacelle, University of Ottawa; Lyle Whyte, McGill University).
- **Increasing data regarding Antarctica ice sheets:** RADARSAT-2 enabled greater data and coverage of coastal Antarctica in 2013 and will provide greater coverage of central Antarctica from 2014-16 (Canadian Space Agency).
- **Inventorying mountain glaciers and ice caps:** Mapping and cataloguing of approximately 198,000 glaciers has been undertaken for the Randolph Glacier Inventory to better assess, model and project glacier mass balance which can in turn provide a better understanding of future sea-level change. Approximately 74 scientists from 18 countries participated (J. Graham Cogley, Trent University led this initiative alongside Tad Pfeffer, University of Colorado).
- **Understanding glacier melt contribution to global sea-level rise:** Based on data from the Randolph Glacier Inventory, work has been undertaken to update projections and improve quantification of the contribution of glacier melt to global sea-level rise (participants: Valentina Radic, University of British Columbia and J. Graham Cogley, Trent University along with researchers from the University of Cambridge and the University of Alaska Fairbanks).
- **Improving glacial isostatic adjustment (GIA) correction to better predict sea level rise from the Antarctic ice mass balance:** Ice sheet history was used to inform a forward model prediction in order to improve the glacial isostatic adjustment correction that is used with estimates of the Antarctic mass balance obtained from the Gravity Recovery and Climate Experiment (GRACE) satellites (participants: Thomas James, Geological Survey of Canada and University of Victoria along with researchers from the California Institute of Technology and University of Colorado in the US and the Delft University of Technology in the Netherlands).
- **Understanding the relationship between the composition of carbon in cryoconite organic matter (COM) and the local glacier environment:** With samples from Greenland, the Canadian Arctic, and Antarctica, research has shown that the composition of carbon in cryoconite organic matter (COM) depends on the local glacier environment, and that it can have a significant impact on carbon cycling and sequestration on glacier surfaces (participants: Brent G. Pautler, University of Toronto; Ashley Dubnick, University of Alberta; Martin J. Sharp, University of Alberta; André J. Simpson, University of Toronto; Myrna J. Simpson, University of Toronto).
- **Understanding climate change impacts on salinity in the Antarctic ocean:** Research led by McGill University has demonstrated that a layer of freshwater on the surface of the ocean around Antarctica is trapping warm water which can have implications for ocean heat and carbon storage (Casimir de Lavergne; Jaime Palter; Eric Galbraith, McGill University).
- **Understanding climate change effects on coastal phytoplankton:** As part of a joint project with the Argentinean research agency, Diana Varela and Irene Schloss are examining climate change effects on the physiology and ecology of coastal phytoplankton in Antarctic marine waters, which will be compared with results from Arctic coastal waters (participants: Diana Varela, University of Victoria; Irene Schloss, Institut des sciences de la mer de Rimouski).
- **Understanding winter krill food dynamics in the Weddell Sea:** A research cruise to the Weddell Sea was undertaken to investigate sea ice and midwater communities in the Southern Ocean during the transition from winter to spring (participant: Evgeny Pakhomov, University of British Columbia in collaboration with the Alfred Wegener Institute, Germany).
- **Understanding the response of seafloor marine life to natural and human disturbance in McMurdo Sound, Antarctica:** One of the longest time series of monitoring benthic (seafloor) marine life in Antarctica runs from 1988 to the present offshore of McMurdo Station, Antarctica. This time series has shown that response to pollution by the station is dramatic but localized but recovery following remediation efforts has been extremely slow. A large scale natural disturbance created by the blockage of McMurdo Sound by the B-15 iceberg in 2002-2005 was felt 100 km away by the benthos. In collaboration with US scientists, recent collections are being analyzed to determine whether the benthos has yet recovered (participants: Kathleen Conlan, Canadian Museum of Nature; Bruce Laurich (Student), Carleton University).
- **Temporal and spatial retrospective analysis of length frequency data sets of Antarctic krill in the Southern Ocean:** This international collaborative project involves temporal and regional inter-comparisons of age and length structure, growth and mortality of krill; the improvement of methods used to measure mortality and the compilation of a krill larvae database. This is a joint ongoing project between the British Antarctic Survey, United Kingdom; Sea Fisheries Institute, Hamburg; Long-term Ecological Research Program, US; and the Department of Earth, Ocean and Atmospheric Sciences, University of British Columbia (researcher: Evgeny Pakhomov, University of British Columbia).
- **Identifying similarities and differences in community and food web structure (carbon cycling) between ecosystems within and outside the Antarctic:** This comparative analysis uses stable isotopes of several different midwater ecosystems, tropical, Antarctic, Arctic, and temperate, to find similarities and differences in their food web structures. It has initiated collaborative work with Australian and New Zealand researchers (researcher: Evgeny Pakhomov, University of British Columbia).

- **Understanding nutritional and physiological factors in penguin breeding performance:** Research has been taken to better understand nutritional and physiological factors in *Pygoscelis* penguin breeding performance (participant: Kirsten Gorman, Simon Fraser University in collaboration with the Palmer Station, Antarctica, Long-term Ecological Research Program, US National Science Foundation).
- **Understanding the freshwater Lake Untersee:** Research and observation is being carried out in Queen Maud Land through NASA/SETI to better understand Lake Untersee, a deep and large freshwater lake in which unique microbial life exists (participant: Wayne Pollard, McGill University).
- **Understanding depletion and recovery of the ozone layer:** The Canadian-led SCISAT mission under the Atmospheric Chemistry Experiment (ACE) initiative continues to examine questions relating to ozone in the polar regions to better understand the depletion and recovery of the ozone layer (Deputy Mission Scientist: Kaley Walker, University of Toronto).
- **Increasing access to and awareness and exchange of cryospheric information:** The Canadian Cryosphere Information Network/Polar Data Catalogue continues to enhance public awareness of and access to cryospheric information and facilitate information exchange through collaborative partnerships (Principal investigator: Ellsworth LeDrew, University of Waterloo).
- **Understanding post-course outcomes of an undergraduate tourism field trip to the Antarctic Peninsula:** With a focus on later decisions of participating students it was found that the field trip had an impact on choices made regarding academic pursuits and career paths. It was also found that the trip increased awareness of the impacts of tourism, Antarctic region sustainability issues, and global issues (researchers: Margaret Johnston, Lakehead University; Jackie Dawson, University of Ottawa; Pat Maher, University of Northern British Columbia).