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# 58<sup>th</sup> Congress/58e congrès

## Extreme Events in a Changing Climate

### Événements extrêmes dans un climat changeant

## 1001 Plenary - The Gulf of St. Lawrence, undergoing warming conditions and extreme events

Wednesday, June 5, 2024 11:00 (EDT)

**Session Chairs: John Hanesiak, Peter Jackson**

### 11:00 Peter Galbraith The Gulf of St. Lawrence, undergoing warming conditions and extreme events

The Gulf of St. Lawrence is a semi-enclosed sea that is subject to rising temperatures. Sea surface temperatures have been increasing; the May-November averages of the last three years were the warmest of the satellite record and marine heat waves have been stronger and more frequent. In winter, the Gulf can become completely covered by sea ice and nearly half of its volume of water usually gets cooled to temperatures below -1C within the winter mixed layer. But winter air temperatures have been warming at nearly twice the rate of other seasons. In the 15-year period since 2010, 10 of the 15 weakest recorded sea ice seasons have occurred. In the historical records, the Gulf has been nearly free of sea ice during 6 winters, and 4 of them have occurred in this 15 year time span. The winter mixed layer gets capped in spring, creating a cold intermediate layer that persists until late fall that determines the bottom temperature habitat over large areas. This layer has been warming and decreasing in volume since 1990 with large inter-annual variability. On two recent occasions, post-tropical storms Dorian and Fiona have disrupted the water column and mixed heat down to 45 m. Changes deeper in the water column have been even more startling. Waters deeper than roughly 150 to 200 m are entrained inwards from the continental slope by estuarine circulation, taking several years to reach the heads of the Gulf deep channels while mixing and diffusion occurs. This layer has been warming since 2009 at 300 m depth to reach 100-year record highs, up to 7.1C in 2022.



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## Extreme Events in a Changing Climate

### Événements extrêmes dans un climat changeant

## 1002 Plenary - What does Indigenous Science and Anishinaabe mowin say about Weather?

Tuesday, June 4, 2024 11:00 (EDT)

**Session Chairs: John Hanesiak, Peter Jackson**

**11:00 Myrle Ballard** What does Indigenous Science and Anishinaabe mowin say about Weather?

Indigenous peoples knowledge and Indigenous science of the land (aki) has sustained them and enabled them to survive since time immemorial. Their knowledge of weather and environmental conditions were important. Aki has changed but their knowledge still prevails. The weather and how language plays a role are important to understand and it is this knowledge of the land and its characteristics that has sustained them.



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## Extreme Events in a Changing Climate

### Événements extrêmes dans un climat changeant

## 1003 Plenary - Hailstorms and Tornadoes and Floods, oh my!

Monday, June 3, 2024 11:00 (EDT)

**Session Chairs: John Hanesiak, Peter Jackson**

**11:00 Laura Twidle** Hailstorms and Tornadoes and Floods, oh my!

Last year, Canadians were impacted by the most severe weather events, perhaps ever. There were 24 - what the insurance industry calls – catastrophes (CATs). A CAT is single event that results in at least \$30 million of insured loss, affects multiple policy holders, and multiple insurers. Before 2023, the greatest number of annual CATs we had ever seen in Canada was 15. The increasing frequency of CATs is strongly represented by an increasing population (or increasing “exposure”) and the effects of climate change. Last year posed a new challenge to the industry, when several CATs were occurring across the country simultaneously – Nova Scotia, the Northwest Territories, southern Ontario, and British Columbia. Now more than ever before, there is a need for a whole-of-society approach to minimize the impacts from extreme weather.



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## Extreme Events in a Changing Climate

### Événements extrêmes dans un climat changeant

## 1004 Plenary - Tapping into the Explosive Growth of Artificial Intelligence to Tackle Extreme-Events in a Changing Climate

Thursday, June 6, 2024 11:00 (EDT)

**Session Chairs: John Hanesiak, Peter Jackson**

**11:00 David Hall** Tapping into the Explosive Growth of Artificial Intelligence to Tackle Extreme-Events in a Changing Climate

In this talk, we'll explore the explosive growth of AI and its potential to revolutionize the prediction of extreme weather events in a changing climate. We'll showcase state-of-the-art data-driven weather and climate models, discuss their strengths, weaknesses, and the intuition behind their incredible speedups. We'll highlight NVIDIA's Earth-2 Inference Microservices (NIMs), which enable efficient AI model integration and deployment. Together, we'll delve into emerging trends in AI for weather and climate, such as generative modeling, learning from earth-observations, foundation models, adaptive learning, and AI agents. Time permitting, we'll speculate on potential impacts of AGI on society and the environment, as we consider whether we're on the cusp of this pivotal technology.



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## Extreme Events in a Changing Climate

### Événements extrêmes dans un climat changeant

## 2010 Severe and Extreme Convective Storms : Detection, Prediction, Climatology and the Future - Part 1

Monday, June 3, 2024 12:15 (EDT)

**Session Chairs: David Sills, John Hanesiak**

**12:15 Cameron Nixon** Hodographs and Skew-Ts of Hail-Producing Storms

**12:45 John Hanesiak** ERA5 Alberta hail environments during the 2022-23 Northern Hail Project's Field Season

**13:00 Scott Kehler** Canadian Hail Data Developments at Weatherlogics

**13:15 Milena Alpizar** Mesoscale Convective Systems and Extreme Precipitation in Northeastern North America: identification and evaluation with the Canadian Regional Climate Model (CRCM6).

**13:30 Melissa Cholette** Simulations of storms and precipitation types – The impacts of recent innovations to the Predicted Particle Properties (P3) microphysics scheme



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## Extreme Events in a Changing Climate

### Événements extrêmes dans un climat changeant

## 2011 Severe and Extreme Convective Storms : Detection, Prediction, Climatology and the Future - Part 2

Monday, June 3, 2024 14:05 (EDT)

**Session Chairs: David Sills, John Hanesiak**

**14:05 Connell Miller** Assessment of wind speeds along the damage path of the Didsbury, Alberta EF4 tornado on July 1, 2023

**14:20 Eric Van Lochem** Synoptic scale patterns associated with the Didsbury AB tornado of 1 July 2023

**14:35 David Sills** The detection and prediction of recent 'extreme' thunderstorm events in Canada

**14:50 Daniel Butt** Tornado Analysis using Artificial Intelligence and Treefall Patterns

**15:05 Lesley Elliott** Downburst Damage Assessments in Canadian Forests

**15:20 Bradley Power** Update on the Meteorological Service of Canada's Convective Alert Modernization project



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## 2020 Extreme Precipitation: Past, Present, Future

Monday, June 3, 2024 15:55 (EDT)

**Session Chairs: Neil Tandon, Megan Kirchmeier-Young**

**15:55 Ruping Mo** Pseudo Integrated Vapor Transport and Pseudo Moist Flow as Two Saturation-Adjusted Quantities for Atmospheric River Analysis

**16:10 Alissa Steeves** Extreme convective rainfall over central Nova Scotia July 21-22, 2023: A case study

**16:25 Yeechian Low** Influence of Rossby Wave and Jet Stream Patterns during Extreme Precipitation Regimes (EPRs) in eastern North America

**16:40 John Gyakum** Cold-season subtropical air mass intrusions into eastern Canada: Dynamic and thermodynamic impacts on extreme precipitation

**16:55 Thabo Mpanza** Differences between convection-parameterizing and convection-resolving simulations of future changes in extreme precipitation intensity over the subtropical Atlantic.

**17:10 Kenneth Kin Cheung Chow** Snowfall projections developed from the novel Canadian Downscaled Climate Scenarios – Multivariate CMIP6 dataset



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## 2030 Advancing research on marine extremes - Part 1

Thursday, June 6, 2024 12:15 (EDT)

**Session Chairs: Amber Holdsworth, Hayley Dosser**

**12:15 Elise Olson** Site-specific Assessments of Multiple Stressor Extremes in GFDL's Earth System Model 4.1 with Comparisons to Historical Observations and Future Projections

**12:45 Amber Holdsworth** Clustering to characterize extreme marine conditions for the benthic region of Northeastern Pacific continental margin

**13:00 Hayley Dosser** Quantifying variability in the Northeast Pacific Ocean hypoxic boundary and saturation horizons from ocean glider data along Line P

**13:15 Wiley Evans** Ocean acidification is not a slow burn in some coastal regions: rapid modulation of corrosive conditions in the northern Strait of Georgia

**13:30 Susan Allen** Anomalies in the Salish Sea due to Exceptionally Low Fraser River Flow in July 2023: SalishSeaCast View





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## 2031 Advancing research on marine extremes - Part 2

Thursday, June 6, 2024 14:05 (EDT)

**Session Chairs: Amber Holdsworth, Hayley Dosser**

**14:05 Kent Moore** The impact of retreating sea ice on extremes in air-sea heat fluxes across the marginal seas of the North Atlantic Ocean and adjoining Arctic Ocean

**14:20 Adrien Delespaul** A new high-resolution view of the structure and evolution of Cape Farewell tip jets

**14:35 Alexandra Stephens** The characterization and impact of extreme winds along Nares Strait

**14:50 Li Zhai** Variations of marine heatwaves and cold spells in Northwest Atlantic during 1993-2022

**15:05 Nancy Soontiens** The 2023 Summer Marine Heat Wave over the Newfoundland and Labrador Shelf



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## 2040 Weather and Climate Extremes - General - Part 1

Tuesday, June 4, 2024 12:15 (EDT)

**Session Chairs: Elizaveta Malinina, Nathan Gillett**

**12:15 Clair Barnes** Attribution of the severity of the the 2023 Canadian fire weather season

**12:45 Megan Kirchmeier-Young** Attribution of area burned and other characteristics of the 2023 Canadian wildfire season

**13:00 Celine Audette** Canada's Extreme 2023 Wildfire Smoke season and addressing lessons learned

**13:15 Dipanwita Ghosh Sarkar** Atmospheric Blockings over North Atlantic, their characteristics and links with forest fire risks.

**13:30 Daniel Guerin** A brief look into the development of a wildfire simulator



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### Événements extrêmes dans un climat changeant

## 2041 Weather and Climate Extremes - General - Part 2

Tuesday, June 4, 2024 14:05 (EDT)

**Session Chairs: Elizaveta Malinina, Nathan Gillett**

**14:05 Elizaveta Malinina** The 2021 heatwave was less rare in Western Canada than previously thought

**14:20 Nathan Gillett** A rapid event attribution system for heatwaves in Canada

**14:35 Yongxiao Liang** Probability estimation for long return period hot extremes using a large ensemble of model simulations

**14:50 Matthew Pereira-Wilson** Extreme temperature events in the Pacific Northwest

**15:05 Shauna Ndoping** The Role of Near-Solstice Solar Radiation on the Pacific Northwest Heatwave of 2021

**15:20 Stephen Sobie** Comparing Indices of Heatwave Frequency and Intensity in the Pacific Northwest



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## Extreme Events in a Changing Climate

### Événements extrêmes dans un climat changeant

## 2042 Weather and Climate Extremes - General - Part 3

Tuesday, June 4, 2024 15:55 (EDT)

**Session Chairs: Elizaveta Malinina, Nathan Gillett**

**15:55 Sam Anderson** Heatwaves, streamflow, and climate change: Where and when will the streamflow response to warm anomalies change most rapidly?

**16:10 Stephen Dery** Moisture Fluxes during Three Atmospheric Rivers in September and October 2021 in British Columbia's Upper Nechako Watershed

**16:25 Hannah Louis** Modelling in a Warming World: Marine Heatwave Drivers in James Bay, Canada

**16:40 Vanessa Foord** Exploring meteorological drought trends in British Columbia and potential relationships with climate variability.

**16:55 Elliott Roocroft** Comparison of the association between waviness metrics and extreme temperature values, and future trends of association



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## Extreme Events in a Changing Climate

### Événements extrêmes dans un climat changeant

## 2043 Weather and Climate Extremes - General - Part 4

Wednesday, June 5, 2024 14:05 (EDT)

**Session Chairs: Elizaveta Malinina, Nathan Gillett**

**14:05 Lourdes Aquino** Modulating the urban heat island by synoptic patterns and their intensification with heat waves over Mexico Basin.

**14:20 Aseem Raj Sharma** Efficacy of gridded datasets in representing climate extremes across British Columbia.

**14:35 Victoria Slonosky** Using observations and newspapers to distinguish between extreme and disruptive weather events in Southern Quebec

**14:50 Renee Sieber** AI for past and future glimpses into vulnerabilities and resilience related to newspaper reports of disruptive weather

**15:05 Victoria Slonosky** Canadian Weather of the Past: Observations and Analyses of Past Weather and Climate Extremes from Historical Weather Records

**15:20 Melissa MacDonald** Understanding Extreme Weather Events in the Context of Climate Change: Analysis of MSC Public Alerts Data from 2012 to Present

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### Événements extrêmes dans un climat changeant

## 3010 Climate Variability and Predictability - Part 1

Tuesday, June 4, 2024 12:15 (EDT)

**Session Chairs: Hai Lin, Bin Yu**

**12:15 Paul Kushner** Extending Multi-parameter Pattern Scaling to Interpret Polar Amplification in Earth System Models

**12:30 Lei Wang** Diagnosing Observed Extratropical Stationary Wave Changes in Boreal Winter

**12:45 Wogu Zhong** Interannual variability of the wintertime Asian-Bering-North American teleconnection linked to Eurasian snow cover and Maritime Continent sea surface temperature

**13:00 Dae Il Jeong** Unprecedented 2021 Heatwave over Western North America: Increasing Intensity and Frequency of Humidex and Temperature Extremes in a Warming Climate

**13:15 Bin Yu** Projected changes of the warm Arctic-cold North American pattern



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### Événements extrêmes dans un climat changeant

## 3011 Climate Variability and Predictability - Part 2

Tuesday, June 4, 2024 14:05 (EDT)

**Session Chairs: Hai Lin, Bin Yu**

**14:05 Bill Merryfield** CanSIPsv3: ECCO's next-generation seasonal to interannual prediction system

**14:35 Joseph Martin** Seasonal Forecast Skill of Sea Ice in version 3 of the Canadian Seasonal to Interannual Prediction System (CanSIPS)

**14:50 Taylor Swift-LaPointe** Investigating hybrid seasonal streamflow forecasting using dynamical seasonal forecasts and long short-term memory (LSTM) neural networks.

**15:05 Juan Sebastian Fontecilla** Monthly forecast system at CMC

**15:20 Hai Lin** Skillful long-lead seasonal predictions in the summertime Northern Hemisphere middle latitudes



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## 3020 Atmosphere, Ocean, and Climate Dynamics

Wednesday, June 5, 2024 14:05 (EDT)

**Session Chairs: Michael Waite**

**14:05 Robert Fajber** Tagging water in an idealized aquaplanet model: the sensitivity of long range transport to dynamics an ocean heat transport

**14:20 Kwan Tsaan "Donald" Lai** Backscatter in Radiative-Convective Equilibrium

**14:35 Rosalie Cormier** Climate Change and the Changing Dynamics of the Beaufort Gyre

**14:50 Will Perrie** Is the winter Beaufort High weakening under warming climate scenarios?

**15:05 Victorien De Meyer** Analyzing North American Cyclones in Climate Models Through an Eulerian Approach

**15:20 Yoandy Alonso** Historical and Future Projections of the North American Jet Stream in Regional Climate Models







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## 3040 Climate - Community, Service and Education

Tuesday, June 4, 2024 15:55 (EDT)

**Session Chairs: Siraj ul Islam**

**15:55 G.S. Strong** The Climate Crisis – A Way Forward

**16:10 Emma Poirier** Bridging the gap between climate science and adaptation practitioners

**16:25 Charles Paterson** A brief history of surface observations in Canada since 1871 and their Usage



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## 4010 Coastal Oceanography and Inland Waters - Part 1

Monday, June 3, 2024 12:15 (EDT)

**Session Chairs: Shiliang Shan, Guoqi Han**

**12:15 Jody Klymak** Ventilation of fjords by down-fjord winds

**12:30 Benjamin O'Connor** Influence of wind-driven processes on seasonal and subseasonal variability patterns in the near-shore and shelf-break regions of Queen Charlotte Sound, British Columbia, Canada

**12:45 Susan Allen** Controls on Exchange through a Tidal Mixing Hotspot at an Estuary Constriction

**13:00 Jamie Daniel** Rip Current Observations on the West Coast of Vancouver Island

**13:15 Camryn Stang** Estuarine exchange and tidally mixed flows through inter-connected pathways in the Salish Sea

**13:30 Guoqi Han** Extreme sea levels on the Canadian Pacific coast in the 21st century



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## 4011 Coastal Oceanography and Inland Waters - Part 2

Monday, June 3, 2024 14:05 (EDT)

**Session Chairs: Guoqi Han, Shiliang Shan**

**14:05 Kyoko Ohashi** Quantifying hydrodynamic connectivity among existing and proposed Marine Protected Areas on the Scotian Shelf using the Lagrangian particle-tracking method

**14:20 Qiantong Pei** Storm-Induced Hydrodynamic Changes and Wave-Current Interaction over the Southeastern Canadian Shelf during Hurricane Fiona

**14:35 Rick Danielson** A hydrologic model calibration and simulation of eastern Canadian freshwater discharge

**14:50 Maëla Le Ménéec** Estimating uncertainties of predicted surface drifter trajectories in the Estuary and Gulf of St. Lawrence in Québec

**15:05 David Greenberg** Models for aquaculture in Nova Scotia and SW New Brunswick

**15:20 Jing Tao** Interannual Variations of Upwelling along Coast of Nova Scotia

## 4012 Coastal Oceanography and Inland Waters - Part 3

Monday, June 3, 2024 15:55 (EDT)

**Session Chairs: Guoqi Han, Shiliang Shan**

**15:55 Kent Moore** Evolving relationship of Nares Strait ice arches on sea ice along the Strait and the North Water, the Arctic's most productive polynya

**16:10 Spenser Ross** An Examination of the Wrangel Island Sea Ice Thickness Dipole

**16:25 Kevin Joshy** Wind-Driven Transient Polynyas along Kennedy Channel

**16:40 Claire Parrott** Tidewater Glacier Influence on the Marine Environment in the Canadian Arctic Archipelago

**16:55 Sarwesh Mali** Tidal-induced Extreme Bottom Current Resuspension in the Halifax Harbour





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## 4030 Ocean - Theoretical to applied science

Wednesday, June 5, 2024 14:05 (EDT)

**Session Chairs: Juliana Marson**

**14:05 Will Perrie** Modelling Wave-Ice Interactions in Three-Dimensions in the Marginal Ice Zone of the Beaufort Sea

**14:20 C. Harold Ritchie** An overview of CONCEPTS Coupled Environmental Prediction Systems and their applications

**14:35 Charlie Hebert-Pinard** Impact of Assimilation of Absolute Dynamic Topography on Arctic Ocean Circulation

**14:50 Luiz Henrique da Silva** Modeling the Baffin Bay Seasonal Freshwater Content and Budget

**15:05 Madhurima Chakraborty** Modeling Iceberg Severity on the East Canadian Coast

**15:20 Andrew Hamilton** Bring out your data! A new hydrographic data compilation for the Canadian Arctic and surrounding seas

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## 5010 Atmosphere - Theoretical to applied science - Part 1

Thursday, June 6, 2024 12:15 (EDT)

**Session Chairs: Kyle Ziolkowski**

**12:15 Annie Duhamel** Étude qualitative de la réponse d'un modèle de qualité de l'air dans un contexte de réduction linéaire de la pollution anthropogénique canadienne

**12:30 Lawson Gillespie** Comparing measured and inventoried methane emissions estimates from waste facilities in Southwestern Ontario

**12:45 Sandrine Trotechaud** Air quality modeling study assessing the impact of NOx Tier III regulations on coastal emissions in Canada

**13:00 Darby Bates** Investigating Urban Air Quality Using Surface NO2 Derived from Column Measurements

**13:15 Paul Bovis** On the evaluation of the performance of a new automated atmospheric transport and dispersion modelling system for wildfire smoke across Canada and northern USA: initial results of PM2.5 concentration forecast verification

**13:30 Gianina Giacosa** Aerosols contribution to fog life cycle during the FATIMA fog study in the Northwest Atlantic Ocean



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## 5011 Atmosphere - Theoretical to applied science - Part 2

Thursday, June 6, 2024 14:05 (EDT)

**Session Chairs: Kyle Ziolkowski**

**14:05 Cynthia Whaley** Global modelling of lightning and wildfires in a changing climate

**14:20 Gabor Friczka** Cloud-Ground Lightning Trends in Canada: A Look at 26 Years of Data from the Canadian Lightning Detection Network

**14:35 Yucheng Zi** Roles of Planetary Waves during Fast and Slow Sudden Stratospheric Warming Events

**14:50 Frédéric Fabry** Weather driven complementarity between daily energy demand at one location and renewable supply at another: Adding the time dimension

**15:05 Maxim Couillard** Why is there less convection in elevated areas?

**15:20 Amber Ross** Performance assessment of the Low Porosity Double Fence wind shield configuration for improving solid precipitation measurement





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## 5012 Atmosphere - Theoretical to applied science - Part 3

Thursday, June 6, 2024 15:55 (EDT)

**Session Chairs: Kyle Ziolkowski**

**15:55 Sébastien Chouinard** Review of recent progress and future outlook for the NWEP systems at CCMEP

**16:10 Emily McCullough** Automatic detection of layers within Arctic mixed-phase clouds

**16:25 Yann Blanchard** Radiation closure experiment and retrieval of ice cloud properties from ground-based, end-to-end simulator and numerical weather model perspectives

**16:40 Peter Taylor** A note on saturation transitions between water vapor and cloud droplets

**16:55 Joelle Dionne** A Spring and Summer of Fogs in Urban Halifax



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## 5020 Atmosphere - Community, Service and Education

Wednesday, June 5, 2024 14:05 (EDT)

**Session Chairs: Serge Desjardins**

**14:05 Gordon Burr** The case of DRAW (Data Rescue: Archives and Weather): How a weather data rescue project became a participatory science archives by engaging student communities

**14:20 Robyn Dyck** MSC/COMET Applied Numerical Weather Prediction (NWP) Course: investing in the meteorologists of today, preparing for the impact and probability based forecasting of the future.

**14:35 Qian Li** The new Canadian Weather Radar Network – from Project to Operations

**14:50 Chris Fogarty** The Canadian Hurricane Centre - Forecast Product Improvements

**15:05 weiqing Zhang** A record-breaking wildfire smoke event over Southern Ontario from 2023 June 6 to June 7



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## 6010 Satellite Earth Observation: A unique view of our planet and a critical need for Canada - Part 1

Monday, June 3, 2024 12:15 (EDT)

**Session Chairs: Kaley Walker, Alec Casey**

**12:15 C. Thomas McElroy** The Atmospheric Chemistry Experiment MAESTRO spectrophotometer on CSA's SCISAT satellite in its 21st year

**12:30 Paul Jeffery** Validation of the version 4 MAESTRO ozone and NO<sub>2</sub> measurements

**12:45 Kaley Walker** The Canadian Atmospheric Chemistry Experiment: 20 years of Validation and Science Results

**13:00 Jiansheng Zou** Time series analyses for the ACE-FTS and MIPAS CFC-11, CFC-12 data products

**13:15 Doug Degenstein** OSIRIS - Another Year of Data



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## 6011 Satellite Earth Observation: A unique view of our planet and a critical need for Canada - Part 2

Monday, June 3, 2024 14:05 (EDT)

**Session Chairs: Kaley Walker, Alec Casey**

**14:05 Kyle Ziolkowski** The use of Satellite Imagery for Operational Forecasters: Observations and Future Needs

**14:20 Zhipeng Qu** Pre-launch broadband radiative closure assessment for the EarthCARE mission

**14:35 Jean-Pierre Blanchet** Progresses towards the Canadian HAWC/AVENIR Mission on NASA Atmosphere Observing System

**14:50 Landon Rieger** Suborbital testing of the HAWC limb imaging instruments on the NASA ER-2 airplane

**15:05 Emily Tracey** Comparison Between Ground-based Lidar Measurements from MPLCAN and Simulated Retrievals from the Aerosol Limb Imager





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## 6012 Satellite Earth Observation: A unique view of our planet and a critical need for Canada - Part 3

Monday, June 3, 2024 15:55 (EDT)

**Session Chairs: Kaley Walker, Alec Casey**

**15:55 Ray Nassar** Detection of methane emissions from permafrost peatlands with TROPOMI XCH<sub>4</sub> observations

**16:10 Paul Jeffery** Extreme carbon monoxide emission events observed by MOPITT

**16:25 Ray Nassar** Arctic Observing Mission (AOM): An update on progress and partnerships

**16:40 Jean-Philippe MacLean** The GHGSat constellation: Land and offshore methane detection and quantification



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## Extreme Events in a Changing Climate

### Événements extrêmes dans un climat changeant

## 6013 Satellite Earth Observation: A unique view of our planet and a critical need for Canada - Part 4

Tuesday, June 4, 2024 12:15 (EDT)

**Session Chairs: Kaley Walker, Alec Casey**

**12:15 Alex Cabaj** Using RADARSAT observations to investigate Arctic lake ice phenology

**12:30 Shaheen Ghayourmanesh** Application of daily VIIRS clear-sky composites for monitoring seasonal cycle of freshwater ice over Canada

**12:45 Alexander Trishchenko** Summer Snowfall Amounts and Minimum Snow/Ice Variations in Canadian Arctic

**13:00 Gregory Smith** Assimilation of synthetic SWOT Observations for the Canadian East Coast using the Regional Ice Ocean Prediction System

**13:15 Richard Lawford** Earth Observations and Water-Food connections in the Red River Basin



## 6030 Advances and Applications of Artificial Intelligence (AI) in Meteorology - Part 1

Thursday, June 6, 2024 12:15 (EDT)

**Session Chairs: Miguel Tremblay, Ann Dacres**

**12:15 Christopher Subich** The state of the art in AI weather forecasting and ECCO's research plans

**12:45 Ervig Lapalme** NWP AI-based models verifications against observations

**13:00 Syed Zahid Husain** Leveraging Data-Driven Weather Emulators to Guide Physics-Based NWP Models: A Fusion of Forecasting Paradigms

**13:15 Christian Saad** On the development of artificial intelligence downscaling applications for medium-range forecasts of weather elements at CCMEP

**13:30 Reinel Sospedra-Alfonso** Deep learning-based bias adjustment of Arctic sea ice forecasts from version 3 of the Canadian Seasonal to Interannual Prediction System (CanSIPsv3)



## 6031 Advances and Applications of Artificial Intelligence (AI) in Meteorology - Part 2

Thursday, June 6, 2024 14:05 (EDT)

**Session Chairs: Miguel Tremblay, Ann Dacres**

**14:05 Christopher Subich** Why are AI forecasting models so fast?

**14:20 Dominique Brunet** Towards state-of-the-art nowcasting with a foundational AI model: an ECCO-IBM collaboration

**14:35 Vikram Khade** Investigation of a Deep Learning based simulator to increase the ensemble size in an EnKF with the recentering technique : experiments with the Lorenz 1996 model

**14:50 Jill Psotka** Extending the skillful range of hub-height wind forecasts using self-organizing maps

**15:05 Jonathan Gadoury** Using Machine Learning to model severe weather risk in insurance

**15:20 Renee Sieber** Analyzing Public Engagement with Official Weather Alerts in Northern Climates to Develop New Computational Approaches to Improving Communication



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## 6040 Leveraging Artificial Intelligence for Enhanced High-Resolution Regional Climate Modeling of Extreme Events under Climate Change

Thursday, June 6, 2024 15:55 (EDT)

**Session Chairs: Yanping Li**

**15:55 Qingyun Duan** Calibration of Parameters of Distributed Land Surface Models Using a Deeping Learning Technique

**16:25 Kiri Daust** Practical Applications of Deep-Learning Based Climate Downscaling

**16:40 Danqiong Dai** Detecting Canadian wetland surface water extent: integrating deep learning, remote sensing techniques and high-resolution land surface model

**16:55 Nicolaas Annau** ClimatExML: Designing AI Software for the Computational Demands of High-Resolution Climate Models

**17:10 Zhenhua Li** Bias-Correction of Convection-Permitting Climate Simulations Using Machine-Learning and Multivariate Quantile Mapping





## 7010 Towards development of Canada's Digital Twin of the Ocean: Observations, Modelling, Forecasting, Analyses and Applications

Tuesday, June 4, 2024 15:55 (EDT)

**Session Chairs: Youyu Lu, Nancy Soontiens**

**15:55 Youyu Lu** Multi-scale variations of ocean temperature off the coast of Nova Scotia and their potential relevance ecosystem and fishery

**16:10 Michael Casey** Cold temperature spikes in near-bottom water off Halifax during late fall to early spring

**16:25 Kamel Chikhar** Importance of ocean observations in ECCO's Global Ocean Analysis GLOPS: The SynObs Project

**16:40 Vanessa Sutton-Pande** Enhancing End-User Engagement in Ocean Observation and Ocean Forecasting Systems: Development of a Visualization and Access Application

**16:55 Jonathan Kellogg** CIOOS: Developing a strong foundation for Canada's digital ocean

**17:10 Youyu Lu** Discussion on ideas and collaborations toward development of Canada's Digital Twins of the Ocean: Observations, Modelling, Forecasting, Analyses and Applications

## 7020 Developing Ocean Modelling Capacity in Canada - Part 1

Tuesday, June 4, 2024 12:15 (EDT)

**Session Chairs: Paul Myers, Susan Allen**

**12:15 Martin Taillefer** Military Oceanography – A Collaborative Way Forward

**12:30 Frederic Dupont** Updating to NEMO4 and CICE6 in CONCEPTS prediction systems

**12:45 Dorina Surcel Colan** Updates of GIOPS and RIOPS operational systems at ECCO

**13:00 Susan Allen** Investigation of the Addition of Alkalinity to an Outfall Plume in the Strait of Georgia

**13:15 Cassidy Donaldson** Evaluations of a 3D numerical model of the Salish Sea in small river plume regions

**13:30 Tahya Weiss-Gibbons** Sensitivity of Arctic Ocean Model Simulations to River Runoff and Temperature Forcing From Hydrological Models



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## 7021 Developing Ocean Modelling Capacity in Canada - Part 2

Tuesday, June 4, 2024 14:05 (EDT)

**Session Chairs: Susan Allen, Paul Myers**

**14:05 Zhenxia Long** Impacts of Arctic anticyclones on the freshwater content in the Beaufort Sea

**14:20 Ana Belen HERAS DURAN** Year-round perspective on marine physical dynamics and sea ice in Jones Sound, Nunavut, based on observations and model.

**14:35 Sarah MacDermid** Canada's Three Oceans multi-decade ocean – sea-ice hindcast: A Hudson's Bay sea-ice study.

**14:50 Pouneh Hoshyar** Exploring Western Labrador Sea Dynamics for Ocean and Climate Implications

**15:05 Paul Myers** Freshwater exchange from the Labrador Current into the sub-polar North Atlantic

**15:20 K. Andrew Peterson** Quantification of Constrained Scales with an Ensemble Analysis



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## 7030 Collaborative Earth System Modelling in Canada - Part 1

Monday, June 3, 2024 12:15 (EDT)

**Session Chairs: Clint Seinen, Paul Kushner**

**12:15 Ivy Tan** A New Estimate of the Climate Sensitivity in CMIP Earth System Models

**12:30 Carsten Abraham** The Canadian Atmospheric Model version 5.2

**12:45 Vivek Arora** The new CanESM6 land surface component for CMIP7 simulations

**13:00 Neil Swart** Developing CanESM6 and preparing for Canada's CMIP7 contribution

**13:15 Paul Kushner** The Collaborative Platform for CanESM (CP4C) – Progress in 2023-2024



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## 7031 Collaborative Earth System Modelling in Canada - Part 2

Monday, June 3, 2024 14:05 (EDT)

**Session Chairs: Paul Kushner, Clint Seinen**

**14:05 Christian Seiler** Constraining Carbon Cycle Simulations Using Global Earth Observations and Machine Learning

**14:20 Claude-Michel Nzotungicimpaye** Upgrading the representation of soil carbon processes in the UVic ESCM

**14:35 Pierre Etienne Banville** Examining the climate system drivers of the local and non-local biogeophysical effects of afforestation

**14:50 Tom Markland** Investigating scenario dependence of the biophysical impacts of reforestation

**15:05 Nathan Gillett** Accounting for carbon cycle feedbacks when attributing global warming to emissions

## 7032 Collaborative Earth System Modelling in Canada - Part 3

Monday, June 3, 2024 15:55 (EDT)

**Session Chairs: Paul Kushner, Clint Seinen**

**15:55 Jake Eager-Nash** Millennial timescale climate change in the Canadian Earth System Model

**16:25 Noah Stanton** How does tropospheric VOC chemistry affect climate? Investigations using the Community Earth System Model Version 2

**16:40 Erica Rosenblum** Most CMIP6 models do not capture the signature of Pacific Water in the Canadian Basin

**16:55 Sylvie Leroyer** Towards Modernization of Surface and Atmospheric Components of the Short-Range ECCO's Numerical Weather Prediction System

**17:10 Jason Milbrandt** Representation of Clouds and Precipitation in NWP, RCMs, and GCMs – Thoughts on the Future of Cloud Microphysics Parameterization in Atmospheric Models in Canada (and Beyond)

## 7040 Simulation of weather and climate extremes using regional climate models

Thursday, June 6, 2024 12:15 (EDT)

**Session Chairs: Dominique Paquin, Alejandro Di Luca**

**12:15 Yanping Li** High-Resolution Regional Climate Modeling and Projection over Western Canada using a Weather Research Forecasting Model with a Pseudo-Global Warming Approach

**12:45 Kim Lahaie** Comparing the simulation of hourly precipitation using 2.5 and 12-km versions of the Canadian Regional Climate Model

**13:00 Timothy C. Y. Chui** A Dynamically Downscaled Convection-Permitting Reanalysis and Pseudo-Global Warming Dataset for British Columbia

**13:15 Olivier Asselin** Blue in Green: Forestation Mitigates European Heat Extremes by Turning Blue Water Green

**13:30 Aranildo Lima** The effect of climate change on the simulated streamflow of six Canadian rivers based on the CanRCM4 regional climate model



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## 8010 Changing Arctic: Science and Policy Studies

Tuesday, June 4, 2024 15:55 (EDT)

**Session Chairs: Matthew Asplin**

**15:55 Konrad Gajewski** Impacts of climate variability on terrestrial and freshwater systems in the Arctic: lessons from the past

**16:10 David Fissel** Analysis of Thirty Years of Sea-ice Velocities in the Canadian Beaufort Sea using Upward Looking Sonar Instruments, 1990 to 2020

**16:25 Romina Piunno** Modulation of Convective Overturning in the Labrador Sea by Large-Scale Modes of Atmospheric Variability

**16:40 May Wang** Establishing a new community-based sea ice monitoring site in coastal Nunatsiavut (Kaipokok Bay)

**16:55 Matthew Asplin** Insights on the 2022-23 Ice Season Using Ice Profiling Sonar in the Coastal Waters of Nunatsiavut, Newfoundland and Labrador, Canada

**17:10 Emma Harrison** The Nunatsiavut Sea Ice Observers Program: Community-based monitoring of environmental change and social impacts in Nunatsiavut, northern Labrador





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## 8020 Multidisciplinary - Theoretical to applied science - Part 1

Thursday, June 6, 2024 14:05 (EDT)

**Session Chairs: Rick Danielson**

**14:05 Vanessa Foord** Using weather and microclimate measurements to assess wildfire risk in different forest stand types.

**14:20 Victor Manuel Peñaranda-Vélez** The Topographic Random Cascade Approach for Downscaling and Extreme Event Modeling of Coarse-Scale Precipitation Products over Complex Terrain Regions. Study case: the metropolitan area of Mexico City.

**14:35 Rajesh Shrestha** Future changes in consecutive ice-influenced and open-water streamflow extremes in a subarctic river basin

**14:50 Alex Cabaj** Modelling Northern Hemisphere lake ice phenology using the Canadian Lake Ice Model

**15:05 Alex Cabaj** Assessing the impact of differing snow inputs to reanalysis-based snow-on-sea-ice reconstructions



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## 8021 Multidisciplinary - Theoretical to applied science - Part 2

Thursday, June 6, 2024 15:55 (EDT)

**Session Chairs: Rick Danielson**

**15:55 Gérard Croteau** A look back at a 41 year career at MSC.

**16:10 Benoit Archambault** Highlights of the Next Innovation Cycle at the Meteorological Service of Canada: Innovation Cycle 4

**16:25 Kai Wong** Automatic weather station temperature measurement uncertainties using thermistor probes

**16:40 Philippe Barnéoud** Characterizing large-scale migrations of a boreal forest pest using a combination of moths trapping and atmospheric transport and dispersion modelling

**16:55 SUKANYA GHOSH** Urban and Non-Urban Environmental Components and their impacts on Vector-Borne and Human Infectious Disease risks via effects on local Climate in Canada

**17:10 Rick Danielson** A study of dependence among environmental measures



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## 8030 Multidisciplinary- Community, Service and Education

Tuesday, June 4, 2024 14:05 (EDT)

**Session Chairs: Vanessa Foord**

**14:05 Paige Aldridge** WMO Initiative on the Environmental Sustainability of Observing Systems and Methods: Advancing Ideas Through International Engagement

**14:20 Rabah Hachelaf** Recent Advancements in Canadian Operational Radar Production and Services Post CWRRP (Canadian Weather Radar Replacement Program)

**14:35 Laura Lam** Validation of actual reported cases of drifting vessels

**14:50 Charles Lin** Consumers and citizens making impact on Canada's Net Zero challenge

**15:05 Stephanie Arnold** Expanding Horizons and Expectations: Lessons from innovations in adaptation

**15:20 Serge Desjardins** THE RIPPLE EFFECT CAUSED BY THE ESTABLISHMENT OF A PERMANENT CELL WITHIN THE CONGRESS SCIENTIFIC PROGRAM COMMITTEE / L'EFFET DE VAGUE PROVOQUÉ PAR LA MISE EN PLACE D'UNE CELLULE PERMANENTE AU SEIN DU COMITÉ DU PROGRAMME SCIENTIFIQUE DU CONGRÈS

