

# Metadata: Climate data - High resolution projections

Title	Climate data - High resolution projections
	<p>Under the Climate Change Modelling and Monitoring Program, Environmental Monitoring and Reporting Branch (EMRB) has been funding grant projects focused on enhancing the governments regional climate science and modelling capacity and refining regional climate change information in Ontario.</p> <p>WHAT'S NEW: The recent 2014 Best in Science Symposium was truly a success. The event brought together an unprecedented cross-section of over 150 Ontario leaders and experts dedicated to understanding and addressing climate change. Presentations from academia and OPS staff highlighted the important role science plays in driving action on climate change across the province. Proceeding of the Nov 27-28 2014 BIS Symposium containing all presentations is available for downloading at <a href="https://www.ontario.ca/sites/default/files/moe_mapping/downloads/4Other/CC/PDF/2014-BIS-Symposium-Proceedings.pdf">https://www.ontario.ca/sites/default/files/moe_mapping/downloads/4Other/CC/PDF/2014-BIS-Symposium-Proceedings.pdf</a> .</p> <p>The following is a list of all MOECC-EMRB funded projects on regional climate modelling and impact assessment in chronicle order.</p> <p>In 2009-10, EMRB funded the following grant projects:</p> <ol style="list-style-type: none"> <li>1. OURANOS: Modelling distribution and trends of major climate indicators across Ontario (45km x 45km grids) using a Canadian model (CRCM) <a href="http://www.ouranos.ca/Ontario/Results_html/index.htm">http://www.ouranos.ca/Ontario/Results_html/index.htm</a> .</li> <li>2. University of Regina: Modelling distribution and trends of major climate indicators across Ontario (25km x 25km grids) using the UK Providing Regional Climate for Impact Studies (PRECIS) model <a href="http://env.uregina.ca/moe/rcm/">http://env.uregina.ca/moe/rcm/</a> In 2010-11, EMRB funded additional climate modelling projects focused at downscaling climate change indicators to a finer resolution.</li> <li>3. University of Toronto/SciNet: Modelling Ontario's climate change at high-resolution (10km x 10km) with US Weather Research and Forecasting (WRF) model on the SciNet Supercomputer System. Final report is at <a href="https://files.ontario.ca/moe_mapping/downloads/4Other/CC/PDF/2009-10_UT_Report.pdf">https://files.ontario.ca/moe_mapping/downloads/4Other/CC/PDF/2009-10_UT_Report.pdf</a> .</li> <li>4. University of Regina: Modelling Ontario's climate change at high resolution (25km x 25km) with UK PRECIS Model and further downscaling to 10km x 10km resolution. <a href="http://env.uregina.ca/moe/ds/">http://env.uregina.ca/moe/ds/</a> .</li> <li>5. University of Toronto-Scarborough: Developing future climate change projections over Ontario at annual, seasonal and monthly scales using statistical downscaling. <a href="http://www.scar.utoronto.ca/~gough/stn_results.htm">http://www.scar.utoronto.ca/~gough/stn_results.htm</a> . Final report is at <a href="https://files.ontario.ca/moe_mapping/downloads/4Other/CC/PDF/2009-10_UTS.pdf">https://files.ontario.ca/moe_mapping/downloads/4Other/CC/PDF/2009-10_UTS.pdf</a> .</li> <li>6. York University: Assessing potential changes in extreme winds over Ontario using high resolution data from observation and models. Final report is at <a href="https://www.ontario.ca/sites/default/files/moe_mapping/downloads/4Other/CC/PDF/2009-10_YorkU_Extreme_Winds.pdf">https://www.ontario.ca/sites/default/files/moe_mapping/downloads/4Other/CC/PDF/2009-10_YorkU_Extreme_Winds.pdf</a> .</li> </ol> <p>In 2011-12, EMRB funded additional climate modelling projects focused at further improving high-resolution regional climate models and better assess uncertainties.</p> <ol style="list-style-type: none"> <li>7. York University: Developing High-Resolution (45km x 45km) Probabilistic Climate Projections over Ontario from Multiple Regional and Global Climate Models. Report and data downloads are at <a href="http://haze.hprn.yorku.ca/moe/">http://haze.hprn.yorku.ca/moe/</a> . Final report is at <a href="https://files.ontario.ca/moe_mapping/downloads/4Other/CC/PDF/2010-11_YorkU_Prob_s.pdf">https://files.ontario.ca/moe_mapping/downloads/4Other/CC/PDF/2010-11_YorkU_Prob_s.pdf</a> .</li> <li>8. University of Regina: Developing High-Resolution (25km x 25km) Probabilistic Climate Projections over Ontario from Large Ensemble Runs of the UK Providing Regional Climate for Impact Studies (PRECIS) Model. Data can be downloaded at <a href="http://env.uregina.ca/moe/">http://env.uregina.ca/moe/</a>.</li> <li>9. University of Toronto/SciNet: Improving Regional Climate Modelling over Ontario at High-Resolution (10km x 10km) with US Weather Research and Forecasting (WRF) model Coupled with HydroGeosphere on the SciNet Supercomputer System. Final report is at <a href="https://files.ontario.ca/moe_mapping/downloads/4Other/CC/PDF/2010-11_UT_Report_s.pdf">https://files.ontario.ca/moe_mapping/downloads/4Other/CC/PDF/2010-11_UT_Report_s.pdf</a> .</li> </ol> <p>In 2012-13, EMRB funded additional climate modelling projects focused on further improving high-resolution regional climate modelling of extreme events and data distribution for easy access to all practitioners.</p> <ol style="list-style-type: none"> <li>10. York University: Developing High-Resolution (45km x 45km) Probabilistic Climate Projections of Extreme Events over Ontario from Multiple Regional and Global Climate Models. Results can be found at <a href="http://haze.hprn.yorku.ca/moe/moe1">http://haze.hprn.yorku.ca/moe/moe1</a> .</li> <li>11. University of Regina: Developing Future Projected IDF Curves across the Entire Province and to Make the Project Results and All Associated Data Publicly Available on a Data Portal. Results can be found at the Ontario Climate Change Data Portal (CCDP) <a href="http://ontarioccdp.ca">http://ontarioccdp.ca</a> .</li> </ol>

12. Trent University: Assessing climate change impacts on Lake Simcoe ecosystems. Final Report as a published paper can be found at [https://www.ontario.ca/sites/default/files/moe\\_mapping/downloads/4Other/CC/PDF/2012-13-TU-LSWN.pdf](https://www.ontario.ca/sites/default/files/moe_mapping/downloads/4Other/CC/PDF/2012-13-TU-LSWN.pdf) .
13. Engineering Canada: Vulnerability assessment of climate change impacts on an OCWA facility in Ontario. Final Report is at [https://www.ontario.ca/sites/default/files/moe\\_mapping/downloads/4Other/CC/PDF/2012-13-EC-PIEVC.pdf](https://www.ontario.ca/sites/default/files/moe_mapping/downloads/4Other/CC/PDF/2012-13-EC-PIEVC.pdf) .
- In 2013-14, EMRB funded additional climate modelling projects focused on updating the above projections with the new IPCC AR5 GCM results, further improving high-resolution regional climate modelling science, and promoting usage of the above climate projections for adaptation assessment.
14. York University: Updating the High-Resolution (45km x 45km) Probabilistic Climate Projections over Ontario from Multiple Regional and Global Climate Models published by IPCC AR5. Final Report is at [https://www.ontario.ca/sites/default/files/moe\\_mapping/downloads/4Other/CC/PDF/2013-14-YU-CCP.pdf](https://www.ontario.ca/sites/default/files/moe_mapping/downloads/4Other/CC/PDF/2013-14-YU-CCP.pdf) . The New Data Portal is at <http://lamps.math.yorku.ca/drupal/node/11> .
15. University of Regina: Updating Future Projected IDF Curves across the Entire Province and to Make the Project Results and All Associated Data Publicly Available on the above Ontario Climate Change Data Portal. Project is expected to be completed in July 2015.
16. York University: Developing high-resolution regional climate projections over Ontario using stochastic ensemble. Final Report is at [https://www.ontario.ca/sites/default/files/moe\\_mapping/downloads/4Other/CC/PDF/2013-14-YU-WRF.pdf](https://www.ontario.ca/sites/default/files/moe_mapping/downloads/4Other/CC/PDF/2013-14-YU-WRF.pdf) .
17. University of Toronto - St. George: Assessing climate change impacts on carbon cycle over ecosystems in Ontario's Far North. Final Report is at [https://www.ontario.ca/sites/default/files/moe\\_mapping/downloads/4Other/CC/PDF/2013-14-UT-CCFN.pdf](https://www.ontario.ca/sites/default/files/moe_mapping/downloads/4Other/CC/PDF/2013-14-UT-CCFN.pdf) .
18. York University: Assessing climate change impacts on the James Bay Lowland (JBL) in Ontario's Far North. Final Report is at [https://www.ontario.ca/sites/default/files/moe\\_mapping/downloads/4Other/CC/PDF/2013-14-YU-JBL.pdf](https://www.ontario.ca/sites/default/files/moe_mapping/downloads/4Other/CC/PDF/2013-14-YU-JBL.pdf) .
19. University of Toronto - Scarborough: Projecting climate change impacts on human health in Ontario. Final Report is at [https://www.ontario.ca/sites/default/files/moe\\_mapping/downloads/4Other/CC/PDF/2013-14-UT-Health.pdf](https://www.ontario.ca/sites/default/files/moe_mapping/downloads/4Other/CC/PDF/2013-14-UT-Health.pdf) .
20. York University: Assessing climate change impact on hydrological cycle over the Lake Simcoe Basin. Final Report is at [https://www.ontario.ca/sites/default/files/moe\\_mapping/downloads/4Other/CC/PDF/2013-14-YU-LSHC.pdf](https://www.ontario.ca/sites/default/files/moe_mapping/downloads/4Other/CC/PDF/2013-14-YU-LSHC.pdf) .
21. University of Guelph: Projecting climate change impacts on water quantity and quality, and soil quality over an agricultural land in Southern Ontario. Final Report is at [https://www.ontario.ca/sites/default/files/moe\\_mapping/downloads/4Other/CC/PDF/2013-14-UG-AGR.pdf](https://www.ontario.ca/sites/default/files/moe_mapping/downloads/4Other/CC/PDF/2013-14-UG-AGR.pdf) .
- In 2014-15, EMRB funded the following grant projects:
22. Design and Delivery of Training Course: "Assessing and Interpreting Climate Change Information for Decision Making". Final report is at [https://www.ontario.ca/sites/default/files/moe\\_mapping/downloads/4Other/CC/PDF/2014-15-RSI-Train.pdf](https://www.ontario.ca/sites/default/files/moe_mapping/downloads/4Other/CC/PDF/2014-15-RSI-Train.pdf) . The Training Materials (Binder) can be found at [http://www.risksciences.com/courses/using\\_cc\\_info\\_for\\_decision\\_making](http://www.risksciences.com/courses/using_cc_info_for_decision_making) .
23. Assessing Climate Change Impacts on Droughts and Food Security over Ontario. Final report is at: [https://www.ontario.ca/sites/default/files/moe\\_mapping/downloads/4Other/CC/PDF/Final-Report-23.pdf](https://www.ontario.ca/sites/default/files/moe_mapping/downloads/4Other/CC/PDF/Final-Report-23.pdf)
24. A Climate Change Risks Assessment and Adaptation Strategy for York Region, Ontario. Final report is at: [https://www.ontario.ca/sites/default/files/moe\\_mapping/downloads/4Other/CC/PDF/Final-Report-24.pdf](https://www.ontario.ca/sites/default/files/moe_mapping/downloads/4Other/CC/PDF/Final-Report-24.pdf)
25. Assessing Climate Change Impacts on Carbon Cycles in the Ontario's Far North Ecosystems (Phase 2). Final report is at: [https://www.ontario.ca/sites/default/files/moe\\_mapping/downloads/4Other/CC/PDF/Final-Report-25.pdf](https://www.ontario.ca/sites/default/files/moe_mapping/downloads/4Other/CC/PDF/Final-Report-25.pdf)
26. Assessing Climate Change Impacts on Transportation Infrastructure in Northern Ontario. Final report is at: [https://www.ontario.ca/sites/default/files/moe\\_mapping/downloads/4Other/CC/PDF/Final-Report-26.pdf](https://www.ontario.ca/sites/default/files/moe_mapping/downloads/4Other/CC/PDF/Final-Report-26.pdf)
- In 2015-16, in response to recommendations made in the Climate Ready Report and the latest Ontario Climate Change Strategy Document, EMRB/MOECCE funded the following projects to continue improving the climate data, its accessibility and risk assessment/management practices in Ontario.
27. Design and Delivery of Training Course: "Assessing and Interpreting Climate Change Information for Decision Making". Final report is at: [https://www.ontario.ca/sites/default/files/moe\\_mapping/downloads/4Other/CC/PDF/Final-Report-27.PDF](https://www.ontario.ca/sites/default/files/moe_mapping/downloads/4Other/CC/PDF/Final-Report-27.PDF)

## Abstract

28. Upper Air Climate Trends Observed by the O-Qnet Profiler Network in Central and Southern Ontario. Final report is at [https://www.ontario.ca/sites/default/files/moe\\_mapping/downloads/4Other/CC/PDF/FinalTechReport\\_28.pdf](https://www.ontario.ca/sites/default/files/moe_mapping/downloads/4Other/CC/PDF/FinalTechReport_28.pdf)
29. Developing Extreme Climate Indices for Building Code Calculation in Ontario from the IPCC AR5 Multi-model Ensemble. Final report is at [https://www.ontario.ca/sites/default/files/moe\\_mapping/downloads/4Other/CC/PDF/FinalTechReport\\_29.pdf](https://www.ontario.ca/sites/default/files/moe_mapping/downloads/4Other/CC/PDF/FinalTechReport_29.pdf). Data can be viewed and downloaded at <http://lamps.math.yorku.ca/OntarioClimate/buildingCode/index.html>
30. High Resolution Climate Change Projections for Ontario and the Great Lakes Basin Region: (Phase 1). Final report is at [https://www.ontario.ca/sites/default/files/moe\\_mapping/downloads/4Other/CC/PDF/FinalTechReport\\_30.pdf](https://www.ontario.ca/sites/default/files/moe_mapping/downloads/4Other/CC/PDF/FinalTechReport_30.pdf)
31. Developing a Common Set of Ontario-specific High Resolution Regional Climate Projections. Project is expected to be completed in Summer 2018.
32. Developing Additional High Resolution Regional Projections and A Centralized Climate Data Portal. Project is expected to be completed in Summer 2018.
33. State of the Science – Risk Assessment and Management Frameworks/Tools. Final report is at [https://www.ontario.ca/sites/default/files/moe\\_mapping/downloads/4Other/CC/PDF/FinalTechReport\\_33.pdf](https://www.ontario.ca/sites/default/files/moe_mapping/downloads/4Other/CC/PDF/FinalTechReport_33.pdf)
34. Assessing Climate Change Impacts on Carbon Cycles in the Ontario's Far North Ecosystems – Phase 3. Final report is at [https://www.ontario.ca/sites/default/files/moe\\_mapping/downloads/4Other/CC/PDF/FinalTechReport\\_34.pdf](https://www.ontario.ca/sites/default/files/moe_mapping/downloads/4Other/CC/PDF/FinalTechReport_34.pdf)
35. Projecting Ontario's Future Precipitation Extremes based on Historical IDF Curves and Projected Temperature. Final report is at [https://www.ontario.ca/sites/default/files/moe\\_mapping/downloads/4Other/CC/PDF/FinalTechReport\\_35.pdf](https://www.ontario.ca/sites/default/files/moe_mapping/downloads/4Other/CC/PDF/FinalTechReport_35.pdf)
36. Projecting Climate Change Impacts on Algae Bloom over Ontario's Inland Lakes. Project is expected to be completed in Spring 2017.

Results from these MOE funded research projects will provide valuable information for practitioners to conduct climate change impact and adaptation assessments over Ontario.

Listing of climate variable which are considered in Completed MOE Climate Modelling Transfer Payments (projected to 2100)

#### Temperature related

Annual Mean Temperature  
 Mean Diurnal Range (Mean of the period max-min]  
 Temperature Seasonality  
 Mean daily temperature  
 Mean daily maximum temperature  
 Mean daily minimum temperature  
 Max Temperature of Warmest Period  
 Min Temperature of Coldest Period  
 Temperature Annual Range  
 Mean Temperature of Wettest Quarter  
 Mean Temperature of Driest Quarter  
 Mean Temperature of Warmest Quarter  
 Mean Temperature of Coldest Quarter  
 Heat wave return-period analyses  
 99th percentile of daily maximum temperature - probabilistic  
 1st percentile of daily maximum temperature - probabilistic  
 99th percentile of daily minimum temperature - probabilistic  
 1st percentile of daily minimum temperature - probabilistic  
 Cooling Degree Days (CDD) - probabilistic  
 Heating Degree Days (HDD) probabilistic

#### Precipitation/humidity related

Annual Precipitation  
 Precipitation of Wettest Period  
 Precipitation of Driest Period  
 Precipitation Seasonality  
 Precipitation of Wettest Quarter  
 Precipitation of Driest Quarter  
 Precipitation of Warmest Quarter  
 Precipitation of Coldest Quarter  
 Intensity, Duration and Frequency (IDF) curves at selected monitoring locations  
 Flooding return-period analyses

	<p>precipitation return period analyses</p> <p>Snow water equivalent (SWE)  Monthly mean of SWE  Max daily SWE  99th percentile of daily precipitation rate- probabilistic  Specific humidity  Relative humidity</p> <p>Wind related</p> <p>Surface winds gusts and return-period analyses</p> <p>Soil related</p> <p>Soil moisture  Soil temperature</p> <p>Other variables</p> <p>Total clouds  Net surface long wave radiation flux  Net surface short wave radiation flux  Total downward short wave radiation flux</p> <p>Most of the publicly available data from these projects are with temporal scales of annual, seasonal and monthly; some are down to daily and even hourly scales.</p>
<b>Status</b>	
<b>Contact</b>	<p>Voice: <b>(416) 235-5805</b></p> <p>Email: <b>picemail.moe@ontario.ca</b></p> <p>Organisation: <b>Ontario Ministry of the Environment and Climate Change</b></p> <p>Role: <b>Point of contact</b></p>
<b>Cited Responsible Parties</b>	<p>Voice: <b>(416) 235-5805</b></p> <p>Email: <b>picemail.moe@ontario.ca</b></p> <p>Organisation: <b>Ontario Ministry of the Environment and Climate Change</b></p> <p>Role: <b>Point of contact</b></p>
<b>Geographical Bounds</b>	<p>West bound: <b>-95.15699</b>  East bound: <b>-74.30798</b>  South bound: <b>41.6723</b>  North bound: <b>56.850117</b></p>
<b>Date stamp</b>	2017-04-07T11:17:25