Climate Atlas Report
Region: TORONTO

RCP 8.5: High Carbon climate future
GHG emissions continue to increase at current rates

Variable	Period	1976-2005 Mean	2021-2050 Low	2021-2050 Mean	2021-2050 High	2051-2080 Low	2051-2080 Mean	2051-2080 High
Precipitation (mm)	annual	818	702	870	1043	729	896	1078
Precipitation (mm)	spring	209	155	231	317	166	244	332
Precipitation (mm)	summer	204	126	207	297	120	204	302
Precipitation (mm)	fall	219	144	228	318	143	229	327
Precipitation (mm)	winter	185	137	204	280	147	219	299
Mean Temperature (°C)	annual	8.2	9.1	10.4	11.6	11	12.5	14.1
Mean Temperature (°C)	spring	6.5	6.2	8.4	10.6	8.1	10.3	12.7
Mean Temperature (°C)	summer	19.9	20.6	22	23.5	22.4	24.2	26.1
Mean Temperature (°C)	fall	10.2	10.8	12.3	14	12.6	14.4	16
Mean Temperature (°C)	winter	-3.8	-4	-1.5	1.2	-1.7	0.9	3.6
Tropical Nights	annual	7	10	21	34	25	43	64
Very hot days (+30°C)	annual	10	11	28	45	29	53	77
Very cold days (-30°C)	annual	0	0	0	0	0	0	0
Date of Last Spring Frost	annual	April 23	March 29	April 13	April 27	March 14	April 4	April 20
Date of First Fall Frost	annual	Oct. 24	Oct. 20	Nov. 5	Nov. 21	Oct. 31	Nov. 18	Dec. 6
Frost-Free Season (days)	annual	181	179	202	228	198	224	253

RCP 4.5: Low Carbon climate future
GHG emissions much reduced

Variable	Period	1976-2005 Mean	2021-2050 Low	2021-2050 Mean	2021-2050 High	2051-2080 Low	2051-2080 Mean	2051-2080 High
Precipitation (mm)	annual	819	699	858	1023	701	882	1071
Precipitation (mm)	spring	210	151	224	304	157	231	314
Precipitation (mm)	summer	205	128	208	300	123	208	308
Precipitation (mm)	fall	219	143	226	319	148	235	334
Precipitation (mm)	winter	185	133	201	276	140	208	281
Mean Temperature (°C)	annual	8.2	8.9	10.2	11.4	9.6	11.2	12.7
Mean Temperature (°C)	spring	6.5	6.3	8.3	10.3	7.1	9.2	11.5
Mean Temperature (°C)	summer	19.9	20.3	21.7	23.1	20.9	22.7	24.6
Mean Temperature (°C)	fall	10.2	10.5	12.1	13.7	11.2	12.9	14.6
Mean Temperature (°C)	winter	-3.8	-4.2	-1.6	0.9	-3.1	-0.4	2.2
Tropical Nights	annual	7	7	18	30	11	26	46
Very hot days (+30°C)	annual	10	9	25	43	14	36	58
Very cold days (-30°C)	annual	0	0	0	0	0	0	0
Date of Last Spring Frost	annual	April 23	March 30	April 14	April 27	March 25	April 11	April 26
Date of First Fall Frost	annual	Oct. 24	Oct. 20	Nov. 3	Nov. 19	Oct. 22	Nov. 8	Nov. 25
Frost-Free Season (days)	annual	181	178	200	223	182	208	234

Where did this data come from?

Global Climate Models (GCMs) are used to depict how the climate is likely to change in the future. Since no one climate model can be considered 'correct', it is important to use many GCMs to capture a range of possible conditions. The GCM data we used were obtained from the Pacific Climate Impacts Consortium (PCIC). PCIC collected temperature and precipitation data produced by 24 different models and used advanced statistical techniques to create high-resolution (daily, 10km) versions of the data for all of Canada (for more information visit pacificclimate.org).

What are the RCP 8.5 and RCP 4.5 future climate scenarios?

One of the most important inputs into GCM simulations of the future climate is the expected concentration of greenhouse gases (GHGs; especially carbon dioxide) in the atmosphere as a result of human activity. In the scientific literature these future GHG concentrations are used to calculate Representative Concentration Pathways (RCPs). The High Carbon scenario (RCP8.5) assumes that we continue to emit very large amounts of carbon dioxide from the burning of fossil fuels; the Low Carbon scenario (RCP4.5) assumes that drastic reductions of emissions in the coming decades will stabilize the concentration of GHGs in the atmosphere by the end of this century. We did not use RCP2.6, an even lower emissions scenario.

How are the minimum, mean, and maximum calculated?

We used an ensemble of 24 different GCMs to analyze the future climate. The mean values are the average values of this ensemble over the 1976-2005, 2021-2050 and 2051-2080 periods. The range of values in each time period is indicated by the High (90th percentile) and Low (10th percentile) values in the tables. This means about 10% of the predicted values are above the "High" value, and 10% are lower than the "Low" value.

The Climate Atlas of Canada

The Climate Atlas of Canada (climateatlas.ca) is an interactive tool for citizens, researchers, businesses, and community and political leaders to learn about climate change in Canada. It combines climate science, mapping and storytelling to bring the global issue of climate change closer to home, and is designed to inspire local, regional, and national action and solutions.

Source

Prairie Climate Centre (2019). Climate Atlas of Canada, version 2 (July 10, 2019). https://climateatlas.ca

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Prairie Climate Centre
From Risk to Resilience