Climate Atlas Report

Municipality: Winnipeg

RCP 8.5: High Carbon climate future

GHG emissions continue to increase at current rates

Variable	Period	1976-2005	2021-2050			2051-2080		
		Mean	Low	Mean	High	Low	Mean	High
Precipitation (mm)	annual	523	405	554	718	410	557	719
Precipitation (mm)	spring	119	65	130	207	74	139	216
Precipitation (mm)	summer	227	125	230	343	118	220	345
Precipitation (mm)	fall	113	62	121	190	67	121	189
Precipitation (mm)	winter	65	42	72	105	46	77	113
Mean Temperature (°C)	annual	2.9	3.5	5.3	7	5.5	7.7	9.8
Mean Temperature (°C)	spring	2.9	1.7	5.1	8.4	4	7.2	10.5
Mean Temperature (°C)	summer	18.6	19	20.7	22.6	20.7	23	25.3
Mean Temperature (°C)	fall	4.8	4.8	7	9.1	7	9.3	11.5
Mean Temperature (°C)	winter	-15	-16	-12.2	-8.6	-12.9	-9.1	-5.2
Tropical Nights	annual	2	1	7	16	5	21	39
Very hot days (+30°C)	annual	14	12	31	51	25	52	77
Very cold days (-30°C)	annual	12	0	4	12	0	1	4
Date of Last Spring Frost	annual	May 15	April 18	May 7	May 23	April 5	April 28	May 15
Date of First Fall Frost	annual	Sep. 27	Sep. 19	Oct. 7	Oct. 26	Sep. 28	Oct. 18	Nov. 5
Frost-Free Season (days)	annual	131	126	150	177	142	169	199

RCP 4.5: Low Carbon climate future

GHG emissions much reduced

Variable	Period	1976-2005	2021-2050			2051-2080		
		Mean	Low	Mean	High	Low	Mean	High
Precipitation (mm)	annual	523	404	550	710	402	553	721
Precipitation (mm)	spring	119	67	129	206	71	134	209
Precipitation (mm)	summer	227	132	228	346	121	223	339
Precipitation (mm)	fall	113	64	120	194	64	122	191
Precipitation (mm)	winter	65	45	73	108	44	75	110
Mean Temperature (°C)	annual	2.9	3.4	5.1	6.8	4.3	6.2	8.3
Mean Temperature (°C)	spring	2.9	1.9	5	8.2	3	6.1	9.4
Mean Temperature (°C)	summer	18.6	18.6	20.4	22.2	19.4	21.4	23.5
Mean Temperature (°C)	fall	4.8	4.6	6.8	9	5.4	7.7	10
Mean Temperature (°C)	winter	-15	-16.2	-12.4	-9	-14.6	-10.8	-6.9
Tropical Nights	annual	2	0	6	14	2	10	23
Very hot days (+30°C)	annual	14	11	28	45	17	38	60
Very cold days (-30°C)	annual	12	0	5	13	0	3	8
Date of Last Spring Frost	annual	May 15	April 21	May 9	May 27	April 12	May 5	May 22
Date of First Fall Frost	annual	Sep. 27	Sep. 18	Oct. 6	Oct. 25	Sep. 20	Oct. 9	Oct. 30
Frost-Free Season (days)	annual	131	120	146	172	126	154	186

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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