Climate Atlas Report

Municipality: Whitehorse

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	310	272	339	406	296	372	454
Precipitation (mm)	spring	42	26	45	67	28	50	77
Precipitation (mm)	summer	118	87	128	175	88	138	198
Precipitation (mm)	fall	84	61	93	128	68	103	146
Precipitation (mm)	winter	67	44	73	106	49	80	115
Mean Temperature (°C)	annual	-1.6	-1.4	0.5	2.5	0.1	2.6	5
Mean Temperature (°C)	spring	-1	-1.5	1.1	3.9	-0.5	3.1	6.4
Mean Temperature (°C)	summer	11.9	11.9	14	16.1	13.5	16.2	18.8
Mean Temperature (°C)	fall	-1.6	-1.9	0.5	2.8	-0.1	2.5	5.1
Mean Temperature (°C)	winter	-16.3	-18.5	-13.8	-9.3	-16.7	-11.6	-7
Tropical Nights	annual	0	0	0	0	0	0	0
Very hot days (+30°C)	annual	1	0	3	9	0	9	24
Very cold days (-30°C)	annual	25	5	16	29	1	10	23
Date of Last Spring Frost	annual	June 4	May 3	May 19	June 6	April 17	May 6	May 26
Date of First Fall Frost	annual	Aug. 29	Aug. 20	Sep. 9	Sep. 27	Sep. 2	Sep. 22	Oct. 14
Frost-Free Season (days)	annual	82	80	110	138	104	135	167

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	310	264	334	410	283	353	425
Precipitation (mm)	spring	42	25	45	68	28	48	72
Precipitation (mm)	summer	118	82	125	172	81	129	181
Precipitation (mm)	fall	84	59	91	126	63	98	134
Precipitation (mm)	winter	67	47	73	104	50	79	112
Mean Temperature (°C)	annual	-1.7	-1.9	0.2	2.2	-0.6	1.3	3.4
Mean Temperature (°C)	spring	-1	-2.1	0.8	3.8	-1.2	1.8	4.8
Mean Temperature (°C)	summer	11.9	11.9	13.8	16.1	12.7	14.8	17
Mean Temperature (°C)	fall	-1.6	-2.5	0.1	2.5	-1.2	1.2	3.5
Mean Temperature (°C)	winter	-16.3	-18.9	-14.2	-9.8	-17.3	-12.7	-8.4
Tropical Nights	annual	0	0	0	0	0	0	0
Very hot days (+30°C)	annual	1	0	2	9	0	5	14
Very cold days (-30°C)	annual	24	5	18	32	3	14	26
Date of Last Spring Frost	annual	June 4	May 5	May 21	June 8	April 26	May 14	June 2
Date of First Fall Frost	annual	Aug. 29	Aug. 17	Sep. 6	Sep. 25	Aug. 23	Sep. 12	Oct. 1
Frost-Free Season (days)	annual	82	77	105	133	89	118	148

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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