

# Climate Atlas Report

## Municipality: Québec



### 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	1217	1106	1301	1517	1146	1358	1582
Precipitation (mm)	spring	261	194	285	379	217	307	411
Precipitation (mm)	summer	360	265	374	492	257	375	505
Precipitation (mm)	fall	329	242	344	453	246	353	469
Precipitation (mm)	winter	267	215	297	387	229	322	418
Mean Temperature (°C)	annual	4.3	5.2	6.5	7.8	7.3	8.8	10.6
Mean Temperature (°C)	spring	3.3	3.1	5.3	7.8	4.9	7.4	10.5
Mean Temperature (°C)	summer	17.7	18.3	19.7	21.1	20.1	21.9	23.8
Mean Temperature (°C)	fall	6.4	7	8.6	10.1	8.9	10.6	12.3
Mean Temperature (°C)	winter	-10.5	-10.4	-7.9	-5.2	-7.7	-5.2	-2.6
Tropical Nights	annual	1	1	5	11	6	16	31
Very hot days (+30°C)	annual	4	4	14	26	14	34	54
Very cold days (-30°C)	annual	2	0	1	2	0	0	0
Date of Last Spring Frost	annual	May 8	April 10	April 28	May 13	March 27	April 18	May 7
Date of First Fall Frost	annual	Sep. 30	Sep. 24	Oct. 14	Nov. 1	Oct. 4	Oct. 24	Nov. 15
Frost-Free Season (days)	annual	143	138	165	194	156	187	219

### 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	1217	1081	1284	1489	1118	1322	1528
Precipitation (mm)	spring	261	194	279	370	200	288	386
Precipitation (mm)	summer	360	258	370	501	263	376	497
Precipitation (mm)	fall	330	238	342	457	250	353	464
Precipitation (mm)	winter	267	207	293	387	222	304	394
Mean Temperature (°C)	annual	4.3	5	6.2	7.6	5.8	7.3	8.9
Mean Temperature (°C)	spring	3.3	2.9	5.1	7.4	3.7	6.1	9
Mean Temperature (°C)	summer	17.7	18	19.4	20.7	18.7	20.4	22.1
Mean Temperature (°C)	fall	6.4	6.8	8.3	9.7	7.5	9.1	10.8
Mean Temperature (°C)	winter	-10.5	-10.7	-8.1	-5.5	-9.5	-6.8	-4.1
Tropical Nights	annual	1	0	4	8	1	7	16
Very hot days (+30°C)	annual	4	3	12	24	6	20	35
Very cold days (-30°C)	annual	2	0	1	3	0	0	1
Date of Last Spring Frost	annual	May 8	April 10	April 30	May 16	April 4	April 26	May 14
Date of First Fall Frost	annual	Oct. 1	Sep. 23	Oct. 11	Oct. 28	Sep. 25	Oct. 16	Nov. 3
Frost-Free Season (days)	annual	143	134	161	191	140	170	203

## 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](http://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](http://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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