

Climate Change

Overview

The Fifth Assessment Report of the Intergovernmental Panel on Climate Change states that the warming of the climate system is unequivocal. There is a high level of confidence that this warming is a result of human activities releasing greenhouse gases to the atmosphere from the burning of fossil fuels, deforestation and agricultural activities. The Fifth Assessment Report assesses the effects of a range of future greenhouse gas emission scenarios on the future climate. Temperatures continue to rise for all scenarios with global mean temperatures averaging 1 to 5°C by the end of the century.

Changes in temperature will be accompanied by changes in precipitation. The rate of warming will be faster than has occurred in the last 2000 years and there will be an increase in the frequency and intensity of extreme temperature and precipitation events.

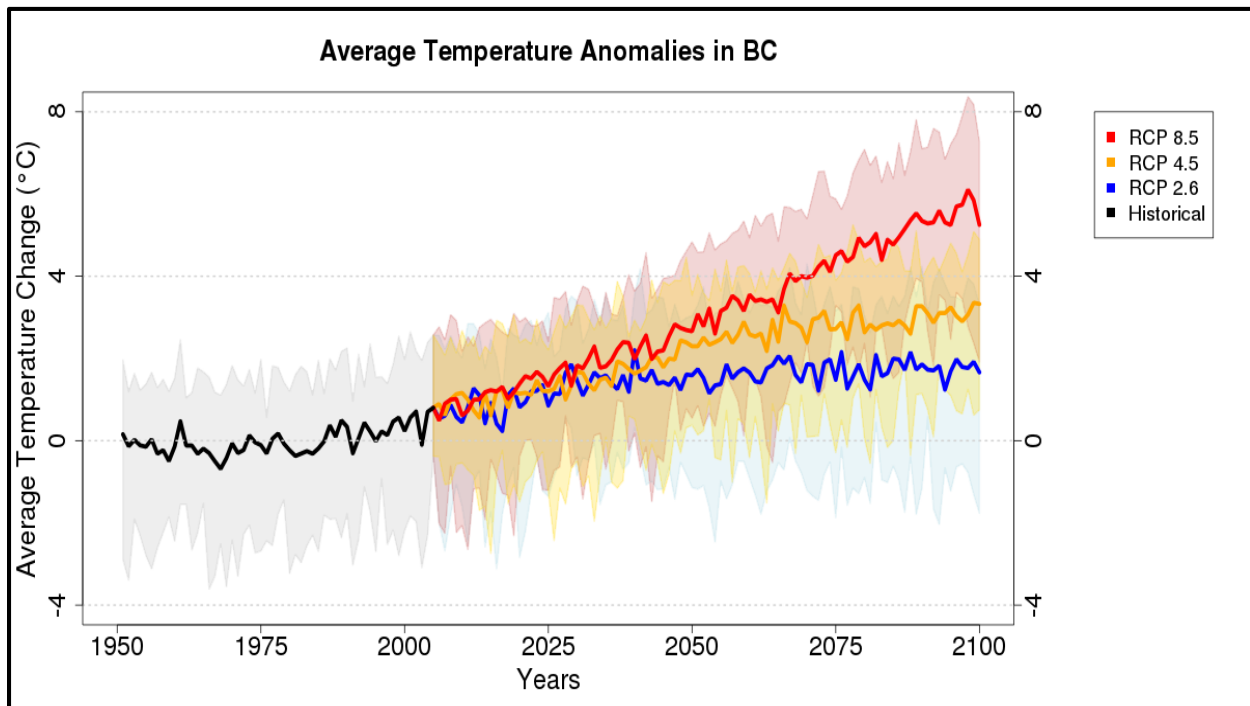


Figure 1. Simulated change in global mean temperature (°C) from 1950 to 2100 referenced to the 1950 - 2005 mean value for British Columbia. Solid lines are multi-model global averages of surface warming (relative to 1950 - 2005) for historic (black line) and future emission scenarios RCP 2.6 (blue), 4.5 (orange) and 8.5 (red). Shading denotes the 10th and 90th percentile of the individual model annual averages. The representative concentration pathways (RCP) range from a termination of emissions by 2050 (RCP2.6 blue line), by 2100 (RCP4.5 green line) and a continued increase in emissions (RCP8.5 red line). (Source: Pacific Climate Impacts Consortium 2014).

BC's Future Climates

BC will have greater warming and changes in its precipitation regime than the global average. If there is limited success internationally to control future emissions (see the RCP8.5 emissions scenario in

Figure 1), BC could see a warming of 3 to 6°C by the 2080s. Under the RCP4.5 emission scenario the warming is 2 to 4°C by the 2080s. The frost free period, growing degree days and frequency of occurrence of extremely warm days will also increase. Emission scenario RCP2.6 requires emissions to cease by the 2050s is extremely unlikely to occur and is not considered further.

All models and emissions scenarios predict an increase in winter and summer temperatures across BC (Figure 2, Tables 1 and 2). Warming will be greater in northern British Columbia than in southern British Columbia and greater in the winter than in the summer, particularly the winter minimum temperature. Warming will be least in coastal areas where climate is somewhat moderated by the ocean is moderated by the oceans.

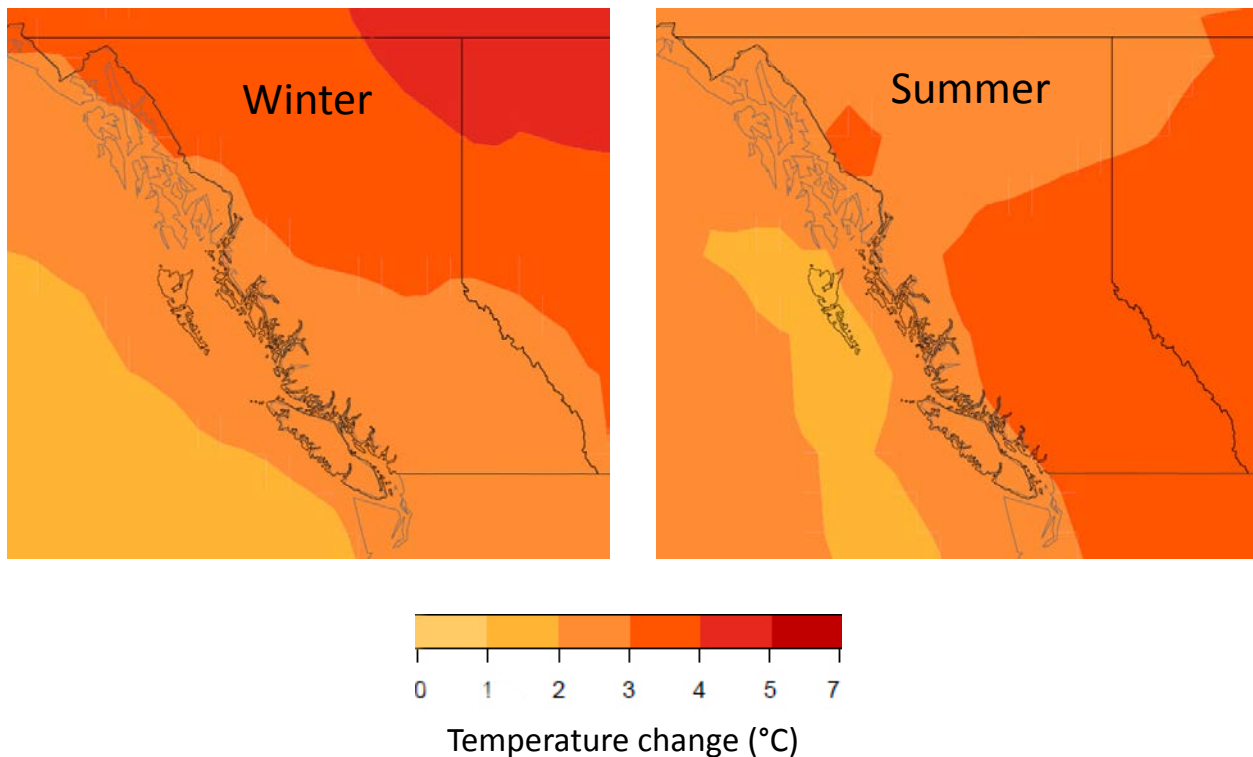


Figure 2. Median projected change in temperature (°C) from the 1961-90 base line in winter and summer for British Columbia for 2046-2065 period for RCP8.5 from 29 global climate models. (Source: Canadian Climate Change Scenarios Network 2015).

Changes in precipitation (Figure 3, Tables 1 and 2) will accompany changes in temperature. Southern and coastal BC are expected to get drier in the summer while central and northern BC will be wetter. Winters will be wetter across BC, and we can expect an increase in precipitation intensity and reduction in the return period of extreme events. Warming will result in less precipitation falling as snow, reduced snow packs, and earlier spring snow melt with the snow disappearing up to a month earlier under the highest warming scenarios. There will be an increase in the evaporative demand of the atmosphere.

Tables 1 and 2 present examples of the mean projected future climate for six locations in BC. Table 1 shows that without a reduction in emissions there will be substantial changes to the climate across BC.

Table 2 presents somewhat more optimistic view for the 2080s that assumes emissions are drastically reduced by this time. Even then the changes in climate are large enough to have significant impacts on BC's ecosystems and society's use of our resources.

For more climate trend information including historic climate data and summaries of projected changes by resource region please go to the Pacific Climate Impacts Consortium web site or the ClimateBC web-based interactive map.

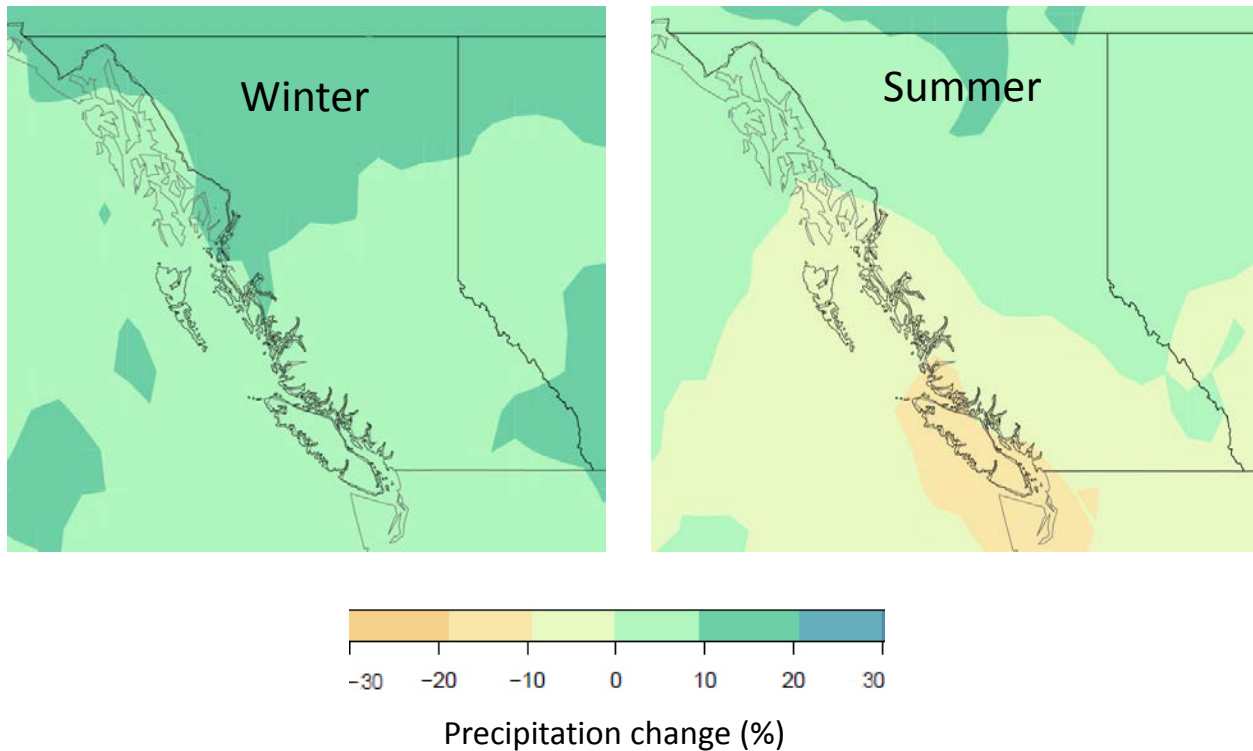


Figure 2. Median projected relative change in precipitation (%) from the 1961-90 base line in winter and summer for British Columbia for 2046-2065 period for RCP8.5 from 29 global climate models. (Source: Canadian Climate Change Scenarios Network 2015).

Table 1: 1981-2010 normals and median projections for three periods from 15 global climate models for RCP8.5 for selected climate variables for 6 locations in BC. (Source ClimateBCv5.31). MAT = mean annual temperature (°C), MWMT = mean warmest month temperature (°C), MCMT = mean coldest month temperature (°C), MAP = mean annual precipitation (mm), MSP = May-September precipitation (mm), PAS = precipitation as snow (mm water equivalent), FFP = Frost free period (days), DD5 = Degree days above 5°C base.

Location	Period	MAT C	MWMT C	MCMT C	MAP mm	MSP mm	PAS mm	FFP Days	DD5 Ddays	Eref mm	CMD mm
Cranbrook A											
	1981-2010	5.5	17.7	-7	413	193	115	116	1614	710	436
	2020s	7.1	19.6	-5.9	432	183	109	137	1964	756	489
	2050s	8.8	21.8	-4.4	441	177	83	160	2373	817	536
	2080s	10.8	24.4	-2.4	452	172	56	182	2879	893	592
Dease Lake											
	1981-2010	-0.1	12.9	-15.1	461	252	195	75	835	453	184
	2020s	1.1	14.3	-14.3	494	264	195	95	1062	478	194
	2050s	2.9	16	-12.5	523	280	184	123	1376	510	210
	2080s	5.1	18.2	-10.3	555	293	171	152	1782	550	236
Ft St John A											
	1981-2010	3.3	15	-9.4	539	224	214	98	1180	545	271
	2020s	4.3	16.4	-9.6	572	229	218	118	1415	575	298
	2050s	6.1	18.3	-7.9	600	235	184	142	1744	640	323
	2080s	8.1	20.7	-5.7	629	234	142	167	2178	695	364
Kelowna A											
	1981-2010	8.8	20.4	-2	350	159	42	169	2160	756	501
	2020s	10.2	22	-1.3	337	144	34	185	2518	808	574
	2050s	11.9	24.2	0.2	343	139	21	209	2970	869	618
	2080s	14	26.8	2.2	350	134	11	243	3535	923	672
P George A											
	1981-2010	4.7	16.1	-7.4	637	271	205	117	1394	602	245
	2020s	5.9	17.5	-7.5	669	278	199	139	1654	632	270
	2050s	7.6	19.4	-5.9	699	284	157	161	2013	676	293
	2080s	9.6	21.9	-3.7	731	281	108	183	2476	739	336
Port Hardy A											
	1981-2010	9	15.4	3.7	2066	422	75	222	1733	561	50
	2020s	9.8	16.3	4.4	2087	416	54	244	1965	585	87
	2050s	11.1	17.9	5.5	2153	407	32	283	2366	612	113
	2080s	12.7	19.9	7.1	2227	397	17	325	2884	647	147

Table 2: Median projections for 2080s from 15 global climate models for RCP5.5 for selected climate variables for 6 locations in BC. (Source ClimateBCv5.31). Variable abbreviations explained in Table 1.

Location	MAT	MWMT	MCMT	MAP	MSP	PAS	FFP	DD5	Eref	CMD
	C	C	C	mm	mm	mm	Days	Ddays	mm	mm
Cranbrook A	8.6	21.5	-4.4	446	180	88	158	2330	831	530
Dease Lake	2.7	15.8	-12.8	521	278	186	120	1342	509	211
Ft St John A	5.9	18	-8	597	232	189	140	1713	639	325
Kelowna A	11.8	23.9	0.1	346	140	22	207	2920	865	613
P George A	7.4	19.2	-6	698	281	164	159	1978	675	294
Port Hardy A	11.1	17.9	5.5	2178	410	34	281	2344	612	111