

Supplemental Information for *An ensemble of bias-adjusted CMIP6 climate simulations based on a high-resolution North American reanalysis*

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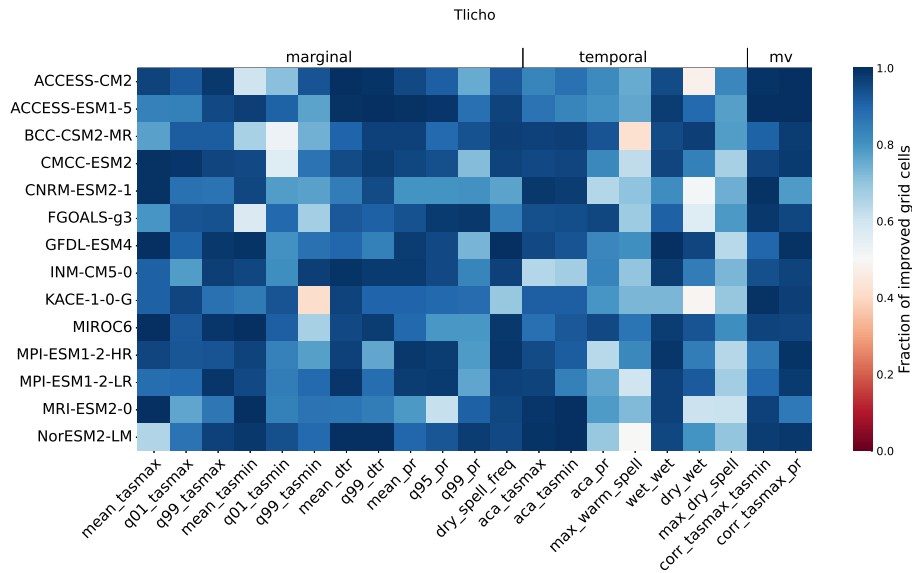


Figure S1: Heatmap of the percentage of improved grid cells (*IMP*) between the original and the bias-adjusted simulations over the Tlicho region for SSP3-7.0. The columns represent the properties (identified by their short name) while the rows represent the climate models. A value close to 1 means that the bias-adjustment improves the given property over most of the area compared to the original simulation, while a value close to 0 means that the original simulation provides a better performance.

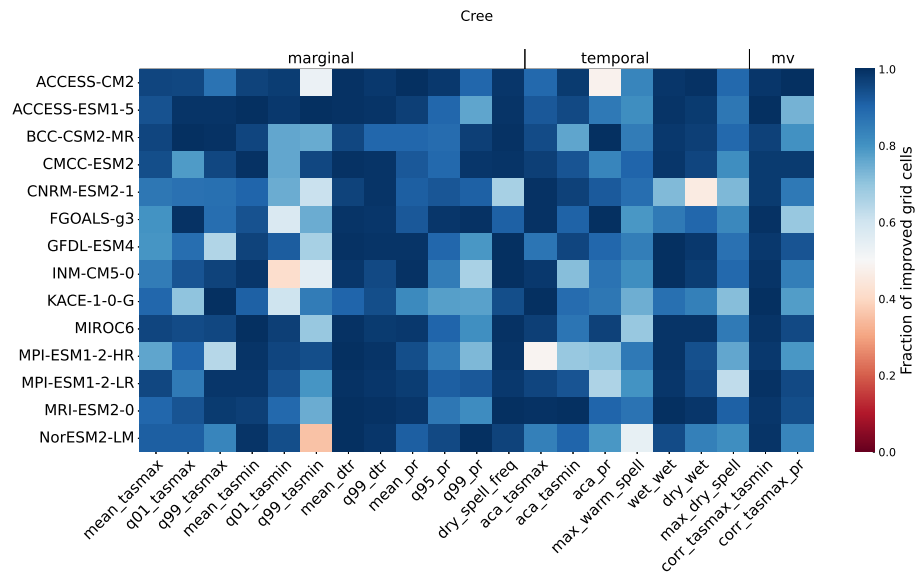


Figure S2: Heatmap of the percentage of improved grid cells (*IMP*) between the original and the bias-adjusted simulations over the Cree region for SSP3-7.0. The columns represent the properties (identified by their short name) while the rows represent the climate models. A value close to 1 means that the bias-adjustment improves the given property over most of the area compared to the original simulation, while a value close to 0 means that the original simulation provides a better performance.

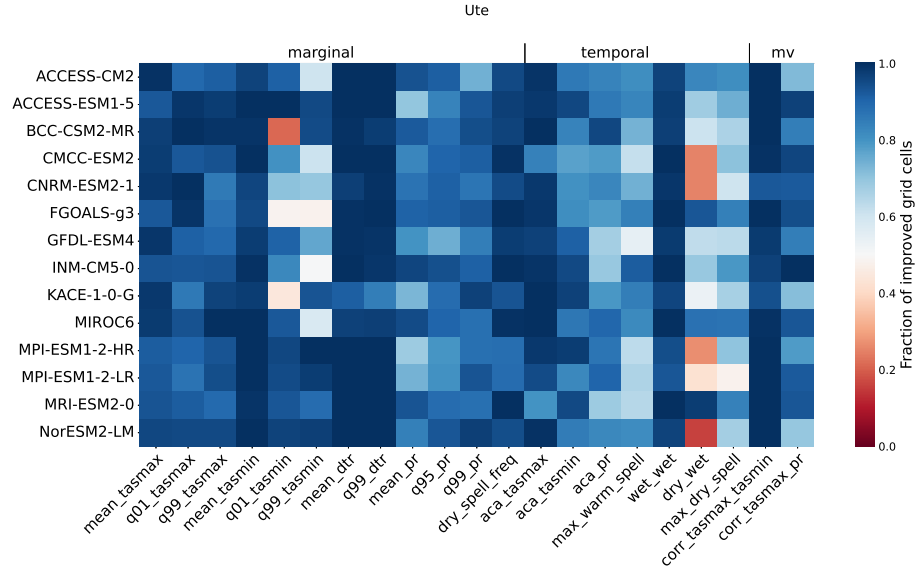


Figure S3: Heatmap of the percentage of improved grid cells (*IMP*) between the original and the bias-adjusted simulations over the Ute region for SSP3-7.0. The columns represent the properties (identified by their short name) while the rows represent the climate models. A value close to 1 means that the bias-adjustment improves the given property over most of the area compared to the original simulation, while a value close to 0 means that the original simulation provides a better performance.

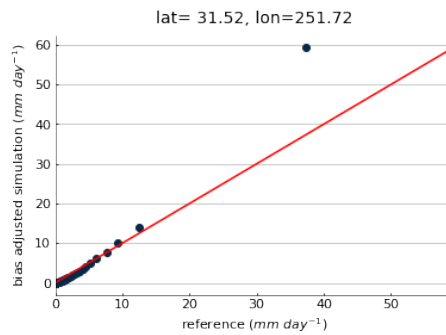


Figure S4: Q-Q plot of the precipitation at one random grid cells for the SSP3-7.0 MIROC6 bias-adjusted simulation and reference regridded on the original GCM grid over the 1981-2010 period. 100 points are plotted, one for each percentile.

Table S1: Each model and ensemble mean RMSE for the the mean daily maximum temperature and each region for SSP3-7.0 between reference and original simulation (OR) and between reference and bias-adjustment simulation (BA).The smaller RMSE is in bold.

mean_tasmax (°C)								
	Magtogoek		Tlichó		Ute		Cree	
	OR	BA	OR	BA	OR	BA	OR	BA
ACCESS-CM2	2.37	0.25	2.50	0.45	3.26	0.18	2.50	0.36
ACCESS-ESM1-5	2.01	0.32	1.42	0.23	2.61	0.27	2.86	0.41
BCC-CSM2-MR	1.42	0.16	0.87	0.21	2.07	0.08	1.63	0.11
CMCC-ESM2	2.27	0.24	1.97	0.18	2.01	0.08	1.98	0.20
CNRM-ESM2-1	1.76	0.20	1.70	0.11	3.48	0.32	1.57	0.24
FGOALS-g3	1.40	0.43	1.61	0.35	3.19	0.19	1.42	0.31
GFDL-ESM4	2.24	0.26	1.76	0.11	2.51	0.20	1.61	0.36
INM-CM5-0	1.39	0.32	1.23	0.18	2.12	0.27	1.58	0.34
KACE-1-0-G	1.59	0.20	1.58	0.51	2.59	0.11	1.92	0.42
MIROC6	2.94	0.33	3.65	0.14	3.58	0.23	3.05	0.40
MPI-ESM1-2-HR	1.62	0.10	1.60	0.20	1.53	0.10	1.32	0.33
MPI-ESM1-2-LR	1.79	0.13	1.24	0.20	2.25	0.25	1.83	0.11
MRI-ESM2-0	1.28	0.27	3.77	0.08	2.75	0.33	1.58	0.27
NorESM2-LM	1.69	0.23	1.24	0.47	2.74	0.21	1.55	0.25
average	1.84	0.25	1.87	0.24	2.62	0.20	1.89	0.29

Table S2: Same as Table S1 for the first percentile of daily maximum temperature.

q01_tasmax (°C)								
	Magtogoek		Tlicho		Ute		Cree	
	OR	BA	OR	BA	OR	BA	OR	BA
ACCESS-CM2	5.63	0.44	3.85	0.44	1.83	0.43	2.11	0.26
ACCESS-ESM1-5	4.16	0.70	3.54	0.88	4.08	0.35	4.45	0.57
BCC-CSM2-MR	7.34	0.78	2.79	0.36	3.98	0.26	3.95	0.25
CMCC-ESM2	3.20	1.20	3.51	0.30	2.58	0.43	1.03	0.41
CNRM-ESM2-1	3.16	0.59	3.42	0.59	5.84	0.55	3.37	0.61
FGOALS-g3	5.35	1.02	4.71	0.96	3.51	0.30	2.97	0.31
GFDL-ESM4	1.74	0.67	2.57	0.58	2.30	0.38	1.67	0.50
INM-CM5-0	3.23	0.75	2.79	1.07	3.60	0.40	2.54	0.35
KACE-1-0-G	4.20	0.31	4.68	0.50	2.90	0.74	2.05	0.56
MIROC6	3.42	0.88	2.68	0.48	2.09	0.27	2.42	0.37
MPI-ESM1-2-HR	3.99	0.37	2.39	0.44	1.61	0.34	2.08	0.51
MPI-ESM1-2-LR	4.40	0.29	1.69	0.35	1.88	0.50	2.20	0.54
MRI-ESM2-0	4.60	0.69	2.55	0.72	2.68	0.33	3.74	0.46
NorESM2-LM	2.40	0.62	2.21	0.52	2.74	0.27	2.72	0.64
average	4.06	0.67	3.10	0.59	2.97	0.40	2.67	0.45

Table S3: Same as Table S1 for the 99th percentile of daily maximum temperature .

q99_tasmax (°C)								
	Magtogoek		Tlicho		Ute		Cree	
	OR	BA	OR	BA	OR	BA	OR	BA
ACCESS-CM2	4.42	0.55	4.65	0.41	3.04	0.52	3.69	1.09
ACCESS-ESM1-5	6.43	0.47	3.41	0.25	4.84	0.44	6.79	0.35
BCC-CSM2-MR	8.91	0.30	2.92	0.33	6.25	0.16	5.55	0.25
CMCC-ESM2	4.46	0.20	2.72	0.21	3.38	0.33	3.76	0.37
CNRM-ESM2-1	3.40	0.33	3.14	0.37	2.97	0.69	3.08	0.59
FGOALS-g3	5.38	0.61	3.73	0.28	3.24	0.60	4.24	0.82
GFDL-ESM4	3.44	0.62	4.35	0.37	2.21	0.44	2.56	0.63
INM-CM5-0	4.26	0.46	4.80	0.30	4.74	0.65	3.45	0.55
KACE-1-0-G	8.28	0.75	3.37	0.58	6.34	0.52	8.68	0.90
MIROC6	4.70	0.44	6.04	0.27	9.94	0.66	4.45	0.97
MPI-ESM1-2-HR	3.58	0.36	2.81	0.40	3.27	0.36	2.29	0.75
MPI-ESM1-2-LR	3.78	0.29	4.58	0.38	3.34	0.33	3.34	0.30
MRI-ESM2-0	3.31	0.38	3.18	0.39	2.69	0.52	3.59	0.59
NorESM2-LM	4.89	0.33	4.61	0.38	4.74	0.55	3.76	0.71
average	4.95	0.43	3.88	0.35	4.36	0.48	4.23	0.63

Table S4: Same as Table S1 for the mean of the daily minimum temperature.

mean_tasmin (°C)								
	Magtogoek		Tlichó		Ute		Cree	
	OR	BA	OR	BA	OR	BA	OR	BA
ACCESS-CM2	1.84	0.20	1.72	0.48	2.52	0.20	2.07	0.19
ACCESS-ESM1-5	3.77	0.29	3.60	0.33	5.68	0.21	5.03	0.37
BCC-CSM2-MR	2.29	0.20	1.53	0.30	2.42	0.10	1.31	0.11
CMCC-ESM2	2.23	0.27	2.31	0.22	4.23	0.11	4.02	0.23
CNRM-ESM2-1	2.72	0.25	2.37	0.25	1.69	0.27	1.22	0.22
FGOALS-g3	1.77	0.45	1.84	0.46	1.87	0.24	1.55	0.28
GFDL-ESM4	1.30	0.25	2.53	0.20	1.91	0.14	1.96	0.28
INM-CM5-0	2.09	0.40	2.73	0.16	4.33	0.17	3.02	0.34
KACE-1-0-G	1.61	0.21	1.99	0.58	2.31	0.15	1.58	0.29
MIROC6	3.95	0.34	4.70	0.18	5.42	0.15	4.74	0.28
MPI-ESM1-2-HR	1.73	0.11	2.66	0.30	3.67	0.09	2.73	0.30
MPI-ESM1-2-LR	1.76	0.11	2.24	0.30	3.77	0.10	2.44	0.14
MRI-ESM2-0	1.71	0.23	3.78	0.20	3.33	0.23	4.02	0.20
NorESM2-LM	2.58	0.22	3.68	0.45	6.43	0.20	3.45	0.25
average	2.24	0.25	2.69	0.31	3.54	0.17	2.80	0.25

Table S5: Same as Table S1 for the first percentile of daily minimum temperature.

q01_tasmin (°C)								
	Magtogoek		Tlichó		Ute		Cree	
	OR	BA	OR	BA	OR	BA	OR	BA
ACCESS-CM2	5.73	0.95	3.35	1.33	7.54	2.48	7.58	1.41
ACCESS-ESM1-5	7.36	1.65	6.51	1.74	10.89	2.01	9.68	1.63
BCC-CSM2-MR	9.01	1.57	2.97	1.80	3.43	4.11	4.08	1.71
CMCC-ESM2	5.31	3.51	3.51	1.40	6.61	2.96	3.80	2.66
CNRM-ESM2-1	5.23	1.17	3.36	1.35	3.44	2.28	2.56	1.44
FGOALS-g3	8.22	2.39	4.34	1.32	3.02	3.04	3.11	2.27
GFDL-ESM4	3.37	0.96	2.88	0.90	5.74	1.43	5.94	1.26
INM-CM5-0	6.65	3.24	4.08	1.32	6.86	3.65	3.93	4.14
KACE-1-0-G	8.11	2.62	6.03	1.11	3.32	2.96	3.26	1.96
MIROC6	6.73	2.25	5.44	1.81	7.27	2.00	7.48	1.32
MPI-ESM1-2-HR	4.78	1.16	3.02	0.91	6.06	1.61	6.84	2.43
MPI-ESM1-2-LR	4.86	1.22	2.66	0.99	5.83	1.45	6.24	2.01
MRI-ESM2-0	5.06	1.42	3.48	1.43	8.00	2.59	7.86	2.76
NorESM2-LM	4.30	1.67	4.99	1.31	9.47	2.24	7.51	1.28
average	6.05	1.84	4.04	1.34	6.25	2.49	5.71	2.02

Table S6: Same as Table S1 for the 99th percentile of daily minimum temperature.

q99_tasmin (°C)								
	Magtogoek		Tlichó		Ute		Cree	
	OR	BA	OR	BA	OR	BA	OR	BA
ACCESS-CM2	2.11	0.67	3.29	0.94	2.07	1.36	1.53	1.05
ACCESS-ESM1-5	3.74	1.01	2.00	0.45	4.58	1.04	4.63	1.15
BCC-CSM2-MR	1.76	1.53	2.82	1.76	3.23	0.57	1.99	1.07
CMCC-ESM2	2.46	0.73	2.03	0.44	2.93	1.62	3.63	0.95
CNRM-ESM2-1	1.70	1.07	1.75	0.53	2.73	1.35	1.49	0.91
FGOALS-g3	2.36	1.57	2.25	1.19	1.66	1.24	1.94	1.16
GFDL-ESM4	0.98	0.64	2.68	0.60	2.40	0.81	1.40	0.62
INM-CM5-0	1.21	0.92	2.64	0.42	2.47	1.63	1.52	0.98
KACE-1-0-G	4.38	1.29	1.96	1.71	3.52	0.68	3.37	1.09
MIROC6	1.74	1.61	2.73	1.10	4.47	2.22	2.20	1.63
MPI-ESM1-2-HR	2.63	0.71	1.48	0.37	6.12	0.64	2.71	0.51
MPI-ESM1-2-LR	1.96	0.68	1.98	0.44	5.39	0.62	1.22	0.52
MRI-ESM2-0	2.12	0.52	1.52	0.40	2.45	0.71	1.01	0.51
NorESM2-LM	2.99	1.05	2.95	1.31	5.16	1.58	1.91	1.79
average	2.30	1.00	2.29	0.83	3.51	1.15	2.17	1.01

Table S7: Same as Table S1 for mean of the daily temperature range.

mean_dtr (°C)								
	Magtogoek		Tlichó		Ute		Cree	
	OR	BA	OR	BA	OR	BA	OR	BA
ACCESS-CM2	2.76	0.09	2.93	0.06	4.70	0.17	4.03	0.24
ACCESS-ESM1-5	3.34	0.07	3.46	0.11	3.93	0.10	2.84	0.11
BCC-CSM2-MR	2.77	0.07	1.43	0.11	2.71	0.10	1.89	0.08
CMCC-ESM2	2.39	0.07	1.19	0.06	4.13	0.12	2.97	0.09
CNRM-ESM2-1	2.41	0.08	1.36	0.18	2.76	0.11	1.51	0.07
FGOALS-g3	2.82	0.05	1.64	0.13	4.01	0.11	2.40	0.08
GFDL-ESM4	2.89	0.06	1.32	0.15	3.61	0.11	2.87	0.12
INM-CM5-0	2.93	0.10	2.18	0.06	3.65	0.16	2.33	0.08
KACE-1-0-G	2.42	0.17	1.45	0.15	1.58	0.17	1.18	0.19
MIROC6	2.49	0.07	1.79	0.06	2.90	0.17	2.51	0.16
MPI-ESM1-2-HR	2.89	0.06	1.56	0.11	3.77	0.12	3.05	0.08
MPI-ESM1-2-LR	3.03	0.15	1.85	0.11	4.15	0.23	3.26	0.12
MRI-ESM2-0	2.60	0.10	1.48	0.20	5.40	0.14	4.07	0.13
NorESM2-LM	2.53	0.06	3.06	0.06	4.59	0.11	3.20	0.07
average	2.73	0.09	1.91	0.11	3.71	0.14	2.72	0.12

Table S8: Same as Table S1 for the 99th percentile of the daily temperature range.

q99_dtr (°C)								
	Magtogoek		Tlicho		Ute		Cree	
	OR	BA	OR	BA	OR	BA	OR	BA
ACCESS-CM2	4.18	0.32	6.17	0.31	5.77	0.31	6.55	0.28
ACCESS-ESM1-5	5.59	0.26	7.27	0.43	5.34	0.19	4.16	0.20
BCC-CSM2-MR	4.92	0.35	3.56	0.35	2.57	0.22	1.97	0.21
CMCC-ESM2	3.69	0.29	2.29	0.22	6.13	0.21	4.93	0.31
CNRM-ESM2-1	4.66	0.30	3.20	0.30	4.52	0.24	3.64	0.22
FGOALS-g3	4.00	0.28	2.20	0.31	6.97	0.24	4.20	0.36
GFDL-ESM4	4.16	0.30	1.74	0.38	4.98	0.22	4.05	0.17
INM-CM5-0	4.16	0.43	3.87	0.27	3.65	0.29	2.50	0.37
KACE-1-0-G	3.91	0.43	2.36	0.47	1.76	0.34	2.16	0.40
MIROC6	4.02	0.34	3.06	0.24	3.72	0.44	3.52	0.30
MPI-ESM1-2-HR	4.20	0.24	1.81	0.45	6.02	0.46	5.18	0.34
MPI-ESM1-2-LR	4.11	0.41	1.50	0.25	6.60	0.34	5.42	0.39
MRI-ESM2-0	3.90	0.30	2.03	0.39	8.03	0.19	6.66	0.22
NorESM2-LM	4.31	0.29	5.40	0.38	7.42	0.22	4.47	0.29
average	4.27	0.33	3.32	0.34	5.25	0.28	4.24	0.29

Table S9: Same as Table S1 for the mean of the precipitation.

mean_pr (mm d ⁻¹)								
	Magtogoek		Tlicho		Ute		Cree	
	OR	BA	OR	BA	OR	BA	OR	BA
ACCESS-CM2	0.42	0.08	0.23	0.04	0.59	0.09	0.76	0.05
ACCESS-ESM1-5	0.52	0.10	0.52	0.03	0.36	0.12	0.57	0.05
BCC-CSM2-MR	0.30	0.07	0.27	0.03	0.42	0.08	0.31	0.05
CMCC-ESM2	0.27	0.06	0.24	0.04	0.75	0.11	0.37	0.05
CNRM-ESM2-1	0.35	0.07	0.30	0.06	0.46	0.09	0.35	0.05
FGOALS-g3	0.61	0.07	0.28	0.04	0.98	0.12	0.40	0.04
GFDL-ESM4	0.50	0.06	0.45	0.05	0.35	0.08	0.53	0.04
INM-CM5-0	0.48	0.06	0.37	0.04	0.80	0.07	0.54	0.05
KACE-1-0-G	0.37	0.10	0.19	0.03	0.32	0.11	0.32	0.09
MIROC6	0.46	0.07	0.25	0.04	0.67	0.07	0.62	0.05
MPI-ESM1-2-HR	0.47	0.06	0.35	0.03	0.33	0.12	0.38	0.06
MPI-ESM1-2-LR	0.40	0.07	0.48	0.03	0.49	0.18	0.45	0.07
MRI-ESM2-0	0.48	0.07	0.20	0.05	0.87	0.10	0.56	0.05
NorESM2-LM	0.40	0.10	0.20	0.04	0.47	0.10	0.36	0.07
average	0.43	0.07	0.31	0.04	0.56	0.10	0.47	0.05

Table S10: Same as Table S1 for the 95th percentile of precipitation.

q95_pr (mm d ⁻¹)								
	Magtogoek		Tlicho		Ute		Cree	
	OR	BA	OR	BA	OR	BA	OR	BA
ACCESS-CM2	1.57	0.45	0.93	0.24	2.30	0.44	3.05	0.25
ACCESS-ESM1-5	1.55	0.51	1.78	0.21	1.93	0.53	1.91	0.25
BCC-CSM2-MR	2.38	0.41	1.28	0.14	2.81	0.56	1.61	0.28
CMCC-ESM2	1.74	0.37	0.89	0.17	2.85	0.58	1.53	0.27
CNRM-ESM2-1	1.47	0.36	1.19	0.28	2.10	0.37	1.58	0.30
FGOALS-g3	3.83	0.34	1.54	0.23	4.31	0.65	2.91	0.27
GFDL-ESM4	1.70	0.36	1.27	0.28	1.69	0.53	1.60	0.26
INM-CM5-0	2.08	0.36	1.22	0.19	2.80	0.36	1.23	0.27
KACE-1-0-G	1.71	0.47	0.80	0.18	2.30	0.63	1.79	0.48
MIROC6	1.62	0.35	0.81	0.22	2.38	0.34	1.73	0.27
MPI-ESM1-2-HR	1.93	0.40	1.46	0.17	2.01	0.54	1.45	0.34
MPI-ESM1-2-LR	1.90	0.36	1.78	0.17	2.36	0.75	1.72	0.31
MRI-ESM2-0	1.64	0.38	0.65	0.28	2.74	0.49	1.71	0.28
NorESM2-LM	2.47	0.38	0.98	0.18	3.68	0.48	2.23	0.28
average	1.97	0.39	1.18	0.21	2.59	0.52	1.86	0.29

Table S11: Same as Table S1 for the 99th percentile of precipitation.

q99_pr (mm d ⁻¹)								
	Magtogoek		Tlicho		Ute		Cree	
	OR	BA	OR	BA	OR	BA	OR	BA
ACCESS-CM2	3.02	1.19	1.92	0.77	4.24	1.23	5.30	0.85
ACCESS-ESM1-5	3.64	1.34	2.60	0.58	6.86	1.56	2.80	0.98
BCC-CSM2-MR	4.94	1.06	4.16	0.73	6.84	1.11	5.48	1.06
CMCC-ESM2	4.12	1.18	1.61	0.67	8.66	1.59	4.93	0.87
CNRM-ESM2-1	3.99	1.10	2.15	0.86	5.59	1.18	4.08	1.03
FGOALS-g3	8.45	1.09	5.63	0.75	10.92	1.73	9.59	1.01
GFDL-ESM4	3.51	1.13	1.90	0.84	3.86	1.13	2.57	0.77
INM-CM5-0	3.70	1.08	2.55	0.79	5.77	1.16	2.59	0.97
KACE-1-0-G	4.16	1.12	2.71	0.67	7.03	1.51	5.25	1.44
MIROC6	2.65	1.28	2.30	0.68	5.03	0.96	2.64	0.88
MPI-ESM1-2-HR	3.86	1.18	1.78	0.65	6.31	1.60	2.53	0.88
MPI-ESM1-2-LR	5.47	1.09	2.81	0.65	8.72	2.10	3.74	0.99
MRI-ESM2-0	4.11	1.23	3.00	0.87	5.87	1.24	2.67	0.88
NorESM2-LM	8.03	1.23	4.14	0.76	12.87	1.37	8.44	0.88
average	4.55	1.16	2.81	0.73	7.04	1.39	4.47	0.96

Table S12: Same as Table S1 for dry spell frequency.

dry_spell_freq								
	Magtogoek		Tlichó		Ute		Cree	
	OR	BA	OR	BA	OR	BA	OR	BA
ACCESS-CM2	0.07	0.02	0.05	0.02	0.13	0.01	0.13	0.01
ACCESS-ESM1-5	0.11	0.01	0.13	0.01	0.13	0.02	0.14	0.01
BCC-CSM2-MR	0.06	0.02	0.09	0.01	0.09	0.01	0.11	0.01
CMCC-ESM2	0.05	0.02	0.07	0.01	0.20	0.01	0.12	0.01
CNRM-ESM2-1	0.05	0.02	0.06	0.02	0.09	0.01	0.06	0.01
FGOALS-g3	0.07	0.02	0.08	0.01	0.22	0.01	0.11	0.01
GFDL-ESM4	0.11	0.01	0.14	0.01	0.09	0.01	0.13	0.01
INM-CM5-0	0.11	0.01	0.11	0.01	0.23	0.01	0.18	0.00
KACE-1-0-G	0.05	0.03	0.04	0.01	0.08	0.02	0.06	0.01
MIROC6	0.08	0.01	0.09	0.01	0.18	0.01	0.16	0.01
MPI-ESM1-2-HR	0.07	0.01	0.09	0.01	0.07	0.02	0.08	0.01
MPI-ESM1-2-LR	0.08	0.01	0.13	0.01	0.13	0.03	0.12	0.01
MRI-ESM2-0	0.10	0.01	0.07	0.01	0.20	0.01	0.15	0.01
NorESM2-LM	0.05	0.02	0.08	0.01	0.10	0.02	0.09	0.01
average	0.07	0.02	0.09	0.01	0.14	0.01	0.12	0.01

Table S13: Same as Table S1 for amplitude of the annual cycle of the daily maximum temperature.

aca_tasmax (°C)								
	Magtogoek		Tlichó		Ute		Cree	
	OR	BA	OR	BA	OR	BA	OR	BA
ACCESS-CM2	7.14	0.23	3.85	0.75	5.21	0.35	2.32	0.55
ACCESS-ESM1-5	5.43	0.32	3.77	0.66	4.51	0.36	2.95	0.60
BCC-CSM2-MR	8.94	0.22	8.03	1.56	8.64	0.27	4.39	0.80
CMCC-ESM2	4.86	0.74	4.36	0.49	2.88	0.60	3.88	0.45
CNRM-ESM2-1	3.95	0.33	4.68	0.29	3.46	0.46	4.97	0.33
FGOALS-g3	7.97	0.44	4.31	0.65	5.42	0.52	5.79	1.00
GFDL-ESM4	2.52	0.49	6.02	0.96	4.03	0.41	1.80	0.52
INM-CM5-0	4.00	0.60	2.92	1.33	4.44	0.24	4.30	0.42
KACE-1-0-G	9.77	0.80	5.78	0.73	11.05	0.35	9.76	1.67
MIROC6	3.66	0.28	4.57	0.93	9.80	0.77	3.89	0.89
MPI-ESM1-2-HR	4.94	0.27	3.48	0.48	4.20	0.48	1.52	0.83
MPI-ESM1-2-LR	4.19	0.32	4.84	0.67	3.79	0.30	2.80	0.65
MRI-ESM2-0	4.50	0.63	5.29	0.82	2.38	0.69	5.74	0.35
NorESM2-LM	5.04	0.29	8.67	0.87	5.60	0.34	3.18	0.63
average	5.49	0.42	5.04	0.80	5.39	0.44	4.09	0.69

Table S14: Same as Table S1 for the amplitude of the annual cycle of the daily minimum temperature.

aca_tasmin (°C)								
	Magtogoek		Tlichó		Ute		Cree	
	OR	BA	OR	BA	OR	BA	OR	BA
ACCESS-CM2	4.84	0.37	2.69	0.63	2.68	0.57	3.63	0.49
ACCESS-ESM1-5	4.10	0.53	2.75	0.54	2.96	0.38	2.38	0.26
BCC-CSM2-MR	5.15	0.31	5.38	1.16	2.55	0.52	2.04	0.79
CMCC-ESM2	5.09	1.01	4.42	0.32	2.36	0.66	3.33	0.60
CNRM-ESM2-1	3.46	0.32	4.36	0.29	1.80	0.41	3.04	0.46
FGOALS-g3	6.68	0.40	3.39	0.63	2.06	0.45	3.14	0.88
GFDL-ESM4	2.09	0.58	4.96	0.83	2.41	0.41	3.26	0.39
INM-CM5-0	5.35	0.94	2.56	1.38	3.50	0.49	2.11	0.98
KACE-1-0-G	7.97	0.89	6.14	0.60	3.62	0.59	4.11	1.27
MIROC6	2.46	0.60	3.74	0.82	2.53	0.54	2.37	0.67
MPI-ESM1-2-HR	5.74	0.36	2.59	0.40	3.49	0.55	1.51	0.70
MPI-ESM1-2-LR	5.45	0.31	2.24	0.48	2.68	0.68	2.51	0.47
MRI-ESM2-0	3.93	0.55	6.80	0.94	4.08	0.55	7.04	0.50
NorESM2-LM	4.29	0.37	8.25	0.81	2.15	0.47	3.47	1.00
average	4.76	0.54	4.31	0.70	2.78	0.52	3.14	0.68

Table S15: Same as Table S1 for relative amplitude of the annual cycle of the precipitation.

aca_pr (%)								
	Magtogoek		Tlichó		Ute		Cree	
	OR	BA	OR	BA	OR	BA	OR	BA
ACCESS-CM2	26.33	9.82	42.07	16.71	41.58	13.82	25.81	21.68
ACCESS-ESM1-5	19.07	9.78	40.81	12.65	38.08	12.34	38.54	15.57
BCC-CSM2-MR	24.05	11.13	68.26	18.22	65.75	12.73	94.04	15.21
CMCC-ESM2	17.11	8.90	30.56	10.73	31.99	12.34	36.70	15.01
CNRM-ESM2-1	19.69	12.65	34.35	17.36	38.56	14.56	62.83	27.60
FGOALS-g3	19.74	8.92	73.05	12.18	34.69	11.59	118.25	17.75
GFDL-ESM4	17.53	11.05	32.60	9.28	27.94	12.32	45.78	14.53
INM-CM5-0	15.79	7.99	36.21	11.30	35.71	17.18	52.63	17.95
KACE-1-0-G	19.32	11.38	32.20	11.20	41.49	13.85	47.08	16.28
MIROC6	20.64	7.34	55.32	12.79	40.47	11.60	65.83	17.99
MPI-ESM1-2-HR	19.38	10.64	25.85	12.87	49.53	15.44	25.56	13.74
MPI-ESM1-2-LR	21.15	11.94	35.03	10.57	57.48	15.75	33.64	18.11
MRI-ESM2-0	21.03	8.05	39.20	15.87	28.85	16.13	42.92	20.31
NorESM2-LM	16.82	10.27	34.64	14.64	36.38	10.88	35.87	15.56
average	19.83	9.99	41.44	13.31	40.61	13.61	51.82	17.66

Table S16: Same as Table S1 for the maximum length of the warm spell.

max_warm_spell (days)								
	Magtogoek		Tlicho		Ute		Cree	
	OR	BA	OR	BA	OR	BA	OR	BA
ACCESS-CM2	14.56	11.71	6.78	7.56	12.47	8.67	15.92	11.16
ACCESS-ESM1-5	16.97	14.91	7.38	7.84	20.26	16.88	20.50	19.60
BCC-CSM2-MR	17.21	15.32	7.94	10.33	10.03	8.84	7.76	7.56
CMCC-ESM2	14.94	11.73	10.87	12.26	14.96	12.91	12.65	9.27
CNRM-ESM2-1	18.88	16.99	11.51	11.18	22.75	18.51	12.72	11.55
FGOALS-g3	13.97	11.51	10.74	10.88	17.19	12.16	12.28	8.36
GFDL-ESM4	16.23	14.11	9.24	8.78	14.82	18.83	10.53	9.15
INM-CM5-0	15.89	13.63	11.08	11.29	26.69	13.46	14.06	8.87
KACE-1-0-G	14.43	12.29	9.38	9.55	16.99	12.90	14.59	9.46
MIROC6	14.17	13.26	20.40	18.95	9.25	8.70	11.38	8.92
MPI-ESM1-2-HR	15.51	13.72	14.74	13.92	23.09	20.64	18.08	14.88
MPI-ESM1-2-LR	15.80	14.03	14.49	12.70	18.36	16.02	18.47	16.57
MRI-ESM2-0	14.27	11.69	8.82	7.46	11.48	12.51	16.68	12.85
NorESM2-LM	19.39	15.13	6.59	9.25	11.78	8.88	8.11	8.53
average	15.87	13.57	10.71	10.85	16.44	13.57	13.84	11.20

Table S17: Same as Table S1 for wet-wet transition.

wet_wet								
	Magtogoek		Tlicho		Ute		Cree	
	OR	BA	OR	BA	OR	BA	OR	BA
ACCESS-CM2	0.06	0.02	0.05	0.01	0.10	0.01	0.09	0.01
ACCESS-ESM1-5	0.10	0.01	0.12	0.01	0.11	0.01	0.10	0.01
BCC-CSM2-MR	0.05	0.02	0.07	0.01	0.07	0.01	0.07	0.01
CMCC-ESM2	0.05	0.02	0.05	0.01	0.20	0.01	0.09	0.01
CNRM-ESM2-1	0.05	0.01	0.05	0.01	0.09	0.01	0.05	0.01
FGOALS-g3	0.06	0.02	0.07	0.01	0.20	0.01	0.08	0.01
GFDL-ESM4	0.09	0.01	0.12	0.01	0.08	0.01	0.10	0.00
INM-CM5-0	0.10	0.01	0.10	0.01	0.22	0.01	0.14	0.01
KACE-1-0-G	0.05	0.02	0.04	0.01	0.07	0.01	0.05	0.01
MIROC6	0.07	0.01	0.07	0.01	0.15	0.01	0.12	0.01
MPI-ESM1-2-HR	0.06	0.01	0.07	0.01	0.06	0.01	0.06	0.01
MPI-ESM1-2-LR	0.07	0.02	0.11	0.01	0.12	0.01	0.09	0.01
MRI-ESM2-0	0.09	0.02	0.07	0.01	0.17	0.01	0.11	0.01
NorESM2-LM	0.05	0.03	0.07	0.01	0.09	0.01	0.07	0.01
average	0.07	0.02	0.08	0.01	0.12	0.01	0.09	0.01

Table S18: Same as Table S1 for the dry-wet transition.

dry_wet								
	Magtogoek		Tlichó		Ute		Cree	
	OR	BA	OR	BA	OR	BA	OR	BA
ACCESS-CM2	0.01	0.01	0.01	0.01	0.03	0.01	0.04	0.01
ACCESS-ESM1-5	0.01	0.01	0.02	0.01	0.02	0.01	0.04	0.01
BCC-CSM2-MR	0.02	0.01	0.02	0.00	0.02	0.01	0.04	0.01
CMCC-ESM2	0.01	0.01	0.02	0.00	0.01	0.01	0.03	0.01
CNRM-ESM2-1	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01
FGOALS-g3	0.01	0.01	0.01	0.01	0.03	0.01	0.04	0.01
GFDL-ESM4	0.02	0.01	0.03	0.00	0.02	0.01	0.04	0.01
INM-CM5-0	0.01	0.01	0.02	0.01	0.02	0.01	0.05	0.01
KACE-1-0-G	0.01	0.01	0.01	0.01	0.02	0.01	0.02	0.01
MIROC6	0.01	0.01	0.02	0.00	0.03	0.01	0.05	0.01
MPI-ESM1-2-HR	0.01	0.01	0.02	0.01	0.01	0.01	0.03	0.01
MPI-ESM1-2-LR	0.01	0.00	0.02	0.01	0.02	0.02	0.03	0.01
MRI-ESM2-0	0.01	0.01	0.01	0.01	0.03	0.01	0.04	0.01
NorESM2-LM	0.01	0.01	0.02	0.00	0.01	0.02	0.02	0.01
average	0.01	0.01	0.02	0.01	0.02	0.01	0.03	0.01

Table S19: Same as Table S1 for the maximum length of dry spell.

max_dry_spell (days)								
	Magtogoek		Tlichó		Ute		Cree	
	OR	BA	OR	BA	OR	BA	OR	BA
ACCESS-CM2	6.87	6.98	17.24	15.93	25.93	14.98	26.35	15.86
ACCESS-ESM1-5	7.94	7.13	17.15	14.63	21.16	13.80	26.68	13.90
BCC-CSM2-MR	7.66	7.28	20.87	14.02	19.58	14.65	27.74	15.00
CMCC-ESM2	7.32	7.28	16.76	15.87	21.20	18.19	23.80	15.77
CNRM-ESM2-1	8.36	9.22	20.01	20.01	15.74	18.17	16.00	16.57
FGOALS-g3	7.86	6.61	18.79	13.93	26.80	15.62	25.06	15.53
GFDL-ESM4	8.39	6.78	21.67	16.70	17.76	15.72	25.03	12.25
INM-CM5-0	7.72	6.65	19.66	13.62	28.94	14.63	30.05	14.71
KACE-1-0-G	7.34	8.72	15.93	14.47	21.45	18.15	18.48	17.46
MIROC6	7.97	7.04	21.45	14.53	27.61	14.65	28.66	16.98
MPI-ESM1-2-HR	7.43	6.73	16.61	14.47	21.73	22.19	21.60	19.12
MPI-ESM1-2-LR	7.41	7.42	22.11	15.34	30.63	29.87	23.38	20.36
MRI-ESM2-0	8.64	7.08	15.75	14.37	27.91	14.46	28.53	16.71
NorESM2-LM	6.41	6.33	16.11	15.45	18.62	15.32	21.96	16.04
average	7.67	7.23	18.58	15.24	23.22	17.17	24.52	16.16

Table S20: Same as Table S1 for correlation between daily maximum temperature and daily minimum temperature.

corr_tasmax_tasmin								
	Magtogoek		Tlicho		Ute		Cree	
	OR	BA	OR	BA	OR	BA	OR	BA
ACCESS-CM2	0.03	0.01	0.02	0.00	0.05	0.01	0.03	0.00
ACCESS-ESM1-5	0.03	0.00	0.02	0.00	0.05	0.01	0.04	0.00
BCC-CSM2-MR	0.02	0.00	0.01	0.00	0.05	0.01	0.03	0.01
CMCC-ESM2	0.02	0.00	0.01	0.00	0.04	0.01	0.03	0.00
CNRM-ESM2-1	0.03	0.00	0.02	0.00	0.04	0.01	0.03	0.00
FGOALS-g3	0.03	0.00	0.02	0.00	0.06	0.01	0.04	0.01
GFDL-ESM4	0.03	0.00	0.01	0.00	0.04	0.00	0.02	0.00
INM-CM5-0	0.04	0.01	0.02	0.00	0.05	0.01	0.03	0.00
KACE-1-0-G	0.03	0.01	0.02	0.00	0.04	0.01	0.03	0.01
MIROC6	0.02	0.00	0.01	0.00	0.05	0.01	0.03	0.00
MPI-ESM1-2-HR	0.03	0.00	0.01	0.00	0.05	0.01	0.03	0.00
MPI-ESM1-2-LR	0.03	0.00	0.01	0.00	0.05	0.00	0.03	0.00
MRI-ESM2-0	0.03	0.00	0.01	0.00	0.05	0.00	0.03	0.00
NorESM2-LM	0.03	0.00	0.02	0.00	0.07	0.01	0.04	0.01
average	0.03	0.00	0.01	0.00	0.05	0.01	0.03	0.00

Table S21: Same as Table S1 for the correlation between the daily maximum temperature and precipitation.

corr_tasmax_pr								
	Magtogoek		Tlicho		Ute		Cree	
	OR	BA	OR	BA	OR	BA	OR	BA
ACCESS-CM2	0.30	0.15	0.38	0.09	0.11	0.05	0.23	0.08
ACCESS-ESM1-5	0.17	0.11	0.45	0.07	0.20	0.06	0.07	0.03
BCC-CSM2-MR	0.09	0.04	0.22	0.04	0.09	0.04	0.06	0.02
CMCC-ESM2	0.12	0.03	0.24	0.03	0.28	0.08	0.17	0.05
CNRM-ESM2-1	0.11	0.03	0.09	0.04	0.10	0.05	0.17	0.11
FGOALS-g3	0.15	0.05	0.14	0.03	0.30	0.10	0.14	0.09
GFDL-ESM4	0.17	0.07	0.27	0.04	0.11	0.05	0.11	0.04
INM-CM5-0	0.22	0.07	0.32	0.07	0.25	0.09	0.20	0.11
KACE-1-0-G	0.09	0.06	0.20	0.06	0.08	0.03	0.08	0.03
MIROC6	0.09	0.04	0.19	0.06	0.18	0.06	0.19	0.07
MPI-ESM1-2-HR	0.15	0.05	0.23	0.05	0.15	0.09	0.07	0.03
MPI-ESM1-2-LR	0.18	0.07	0.31	0.08	0.20	0.12	0.12	0.04
MRI-ESM2-0	0.18	0.06	0.07	0.03	0.17	0.05	0.15	0.05
NorESM2-LM	0.22	0.11	0.31	0.07	0.15	0.12	0.15	0.09
average	0.16	0.07	0.25	0.05	0.17	0.07	0.14	0.06