

Figure S1. Mean annual precipitation (mm) for (a) observation and corrected data of (b) BMA and (c-i) individual GCMs for the historical period (1979–2013). The mean value of annual precipitation in whole QTP was denoted in each subgraph as m. The numbering (I–X) of each subregion (consistent with Figure 1) is also indicated in each subfigure.

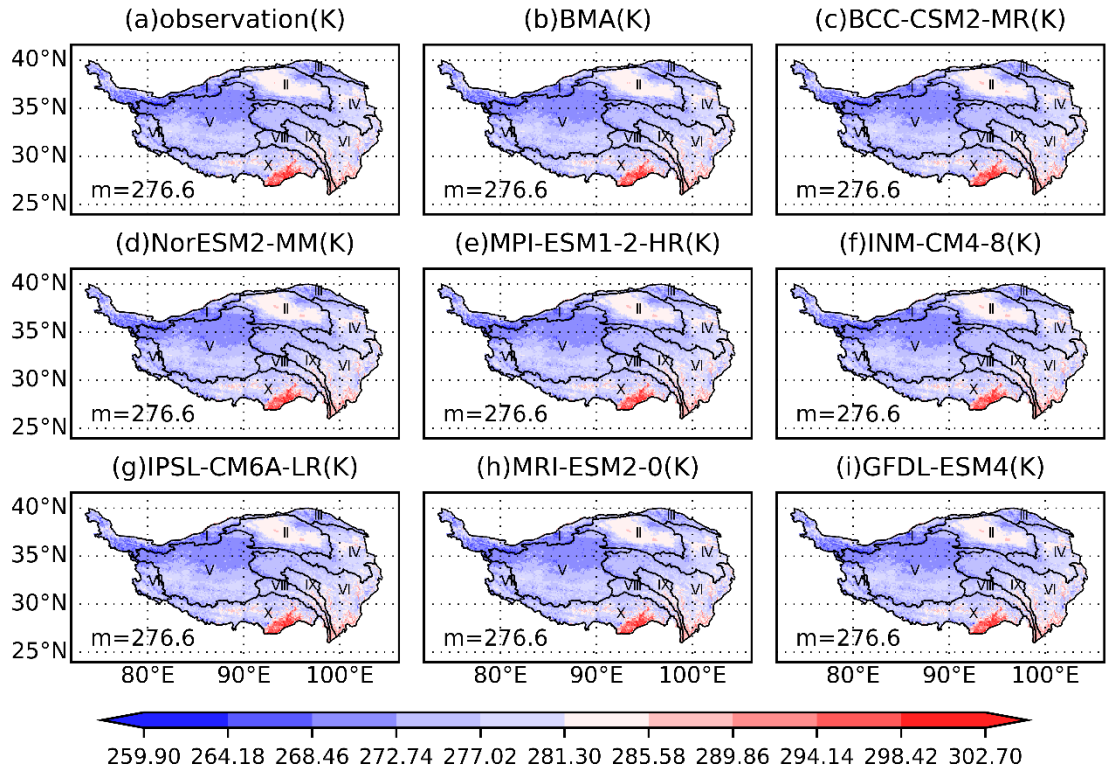


Figure S2. Mean annual value same as Figure S1 but for maximum surface temperature.

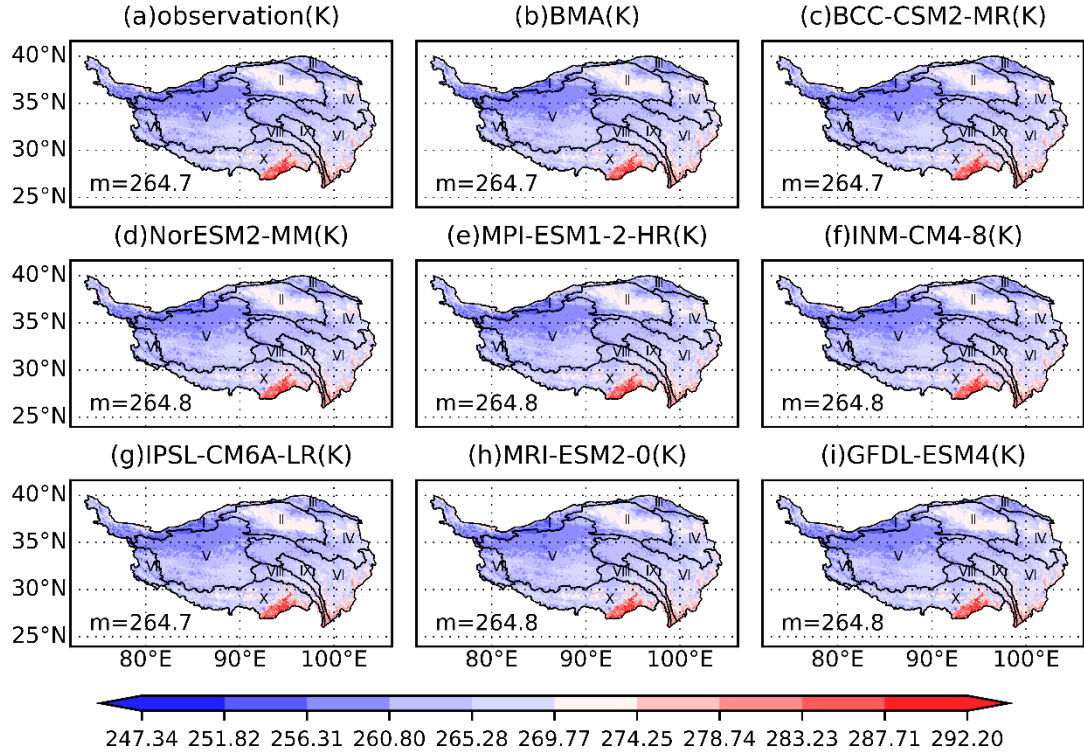


Figure S3. Mean annual value same as Figure S1 but for minimum surface temperature.

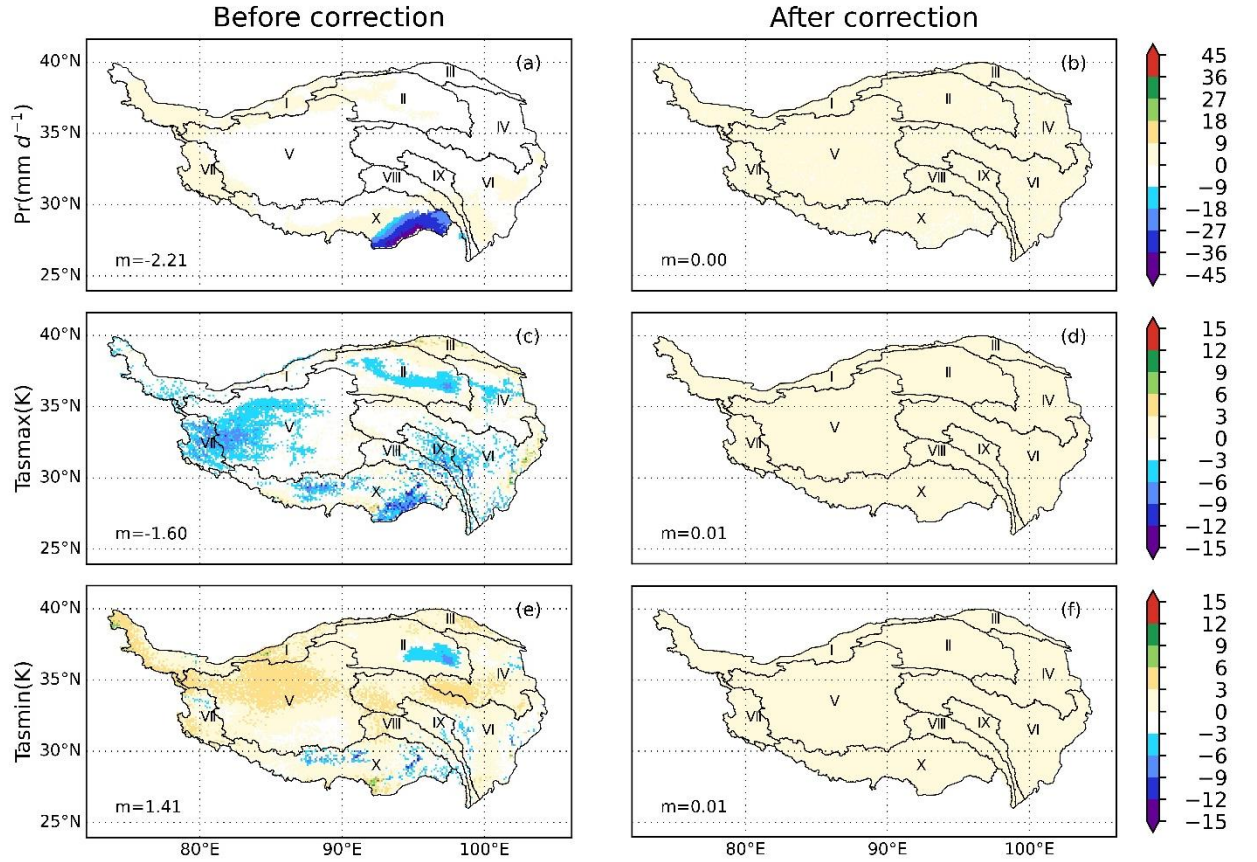


Figure S4. Quantiles Bias (QB) of BMA in the 95th percentile of precipitation, maximum and minimum temperatures for the historical period (1979-2013). (a, c, e) Bias in extreme precipitation (mm), extreme maximum temperature (K),

and extreme minimum temperature(K) before bias-correction, (b, d, f) bias in extreme precipitation (mm), extreme maximum temperature (K), and extreme minimum temperature (K) after bias correction. The 95th percentile of daily precipitation was estimated using rainy days with precipitation more than 0.1 mm. Difference of Figure 4-6. The biases here are not absolute. The mean value of QB in the whole QTP was denoted in each subgraph as m. The numbering (I–X) of each subregion (consistent with Figure 1) is also indicated in each subfigure.

Table S1. Subregions wise BMA projected change in mean annual precipitation (mm), the division of three future is same as Fig. 12 and the historical mean is from 1985 to 2010.

Basin	Historic mean (mm)	SSP126			SSP245			SSP370			SSP585		
		Near (2025-2049)	Mid (2050-2074)	Far (2075-2100)	Near (2025-2049)	Mid (2050-2074)	Far (2075-2100)	Near (2025-2049)	Mid (2050-2074)	Far (2075-2100)	Near (2025-2049)	Mid (2050-2074)	Far (2075-2100)
HXB	240.5	255.8	264.3	255.4	241	254.6	277.7	247.6	257	291.1	269.1	276.3	306.5
IDR	157.6	186.9	199.4	194	172	181.6	180	176	188.9	199.3	193.5	207.5	233.1
IQTB	261.4	294.9	303.7	299.4	286.8	306.1	317.7	287.8	307.9	356.1	290.1	320.4	389.1
MKR	602	611.1	619.5	636	575.1	617.9	687.4	568.2	603.7	735.9	569.3	638.5	786.8
QDB	167.6	188	198	191	172.7	190.2	207.8	180.7	191	226.3	189.3	204.3	235.9
SWR	652.7	661	662	670.5	631.4	655.5	709.7	621.4	648.7	763.3	628	683.6	823.6
TMR	144.7	160.5	168.9	160	164.5	165.1	179.5	166	175.2	195.2	173.8	193.7	213.9
YZR	598.1	609.2	624.6	647.7	579.5	615.5	670	566.6	599.7	700.4	576.2	631.9	726.1
YLZBR	1101.2	1089.8	1088.9	1126.7	1032.7	1085.9	1117.7	1034.5	1062.9	1170.5	1026.8	1116.3	1272.9
YR	500.1	507.5	542.6	551.3	476.1	515.4	577.8	482.3	497.4	576.2	486	526.3	598.6

Table S2. Subregions wise BMA projected change in maximum surface temperature (°C).

Basin	Historic mean (°C)	ssp126			ssp245			ssp370			ssp585		
		Near (2025-2049)	Mid (2050-2074)	Far (2075-2100)	Near (2025-2049)	Mid (2050-2074)	Far (2075-2100)	Near (2025-2049)	Mid (2050-2074)	Far (2075-2100)	Near (2025-2049)	Mid (2050-2074)	Far (2075-2100)
HXB	3.7	3.0	3.4	3.2	3.0	4.0	4.6	2.9	4.3	6.0	3.2	5.0	7.1
IDR	3.5	3.1	3.4	3.2	3.0	4.0	4.5	3.1	4.5	6.1	3.2	4.9	6.8
IQTB	0.6	1.5	1.9	1.8	1.5	2.5	3.1	1.4	3.0	4.6	1.5	3.4	5.5
MKR	7.7	7.1	7.5	7.3	7.1	8.1	8.6	7.0	8.6	10.0	7.2	9.0	10.9
QDB	5.8	6.5	6.8	6.7	6.5	7.4	8.0	6.4	7.8	9.3	6.7	8.3	10.3
SWR	5.8	5.4	5.9	5.7	5.5	6.4	6.9	5.4	6.9	8.4	5.5	7.3	9.3
TMR	1.2	1.7	2.1	2.0	1.6	2.8	3.4	1.6	3.2	4.9	1.8	3.7	6.0
YZR	5.6	6.4	6.8	6.6	6.4	7.3	7.8	6.3	7.7	9.2	6.5	8.2	10.1
YLZBR	7.3	7.8	8.2	8.1	7.8	8.7	9.3	7.7	9.2	10.8	7.9	9.7	11.7
YR	5.3	5.8	6.2	6.0	5.8	6.8	7.3	5.7	7.2	8.7	5.9	7.7	9.7

Table S3. Subregions wise BMA projected change in minimum surface temperature (°C).

Basin	Historic mean (°C)	ssp126			ssp245			ssp370			ssp585		
		Near (2025-2049)	Mid (2050-2074)	Far (2075-2100)	Near (2025-2049)	Mid (2050-2074)	Far (2075-2100)	Near (2025-2049)	Mid (2050-2074)	Far (2075-2100)	Near (2025-2049)	Mid (2050-2074)	Far (2075-2100)
HXB	-8.3	-8.8	-8.4	-8.7	-8.8	-7.7	-6.9	-8.9	-7.3	-5.3	-8.6	-6.6	-4.1
IDR	-9.1	-9.2	-8.9	-9.1	-9.2	-8.2	-7.7	-9.0	-7.7	-6.1	-8.8	-7.2	-5.1

IQTB	-11.5	-10.3	-9.9	-10.1	-10.3	-9.3	-8.7	-10.3	-8.7	-7.1	-10.0	-8.2	-6.1
MKR	-4.3	-4.7	-4.4	-4.6	-4.6	-3.8	-3.3	-4.6	-3.2	-1.9	-4.4	-2.8	-1.0
QDB	-6.4	-5.4	-5.1	-5.3	-5.4	-4.4	-3.8	-5.5	-4.0	-2.3	-5.2	-3.4	-1.3
SWR	-5.5	-5.7	-5.3	-5.6	-5.6	-4.8	-4.3	-5.6	-4.2	-2.9	-5.4	-3.8	-2.0
TMR	-10.6	-9.8	-9.4	-9.6	-9.7	-8.6	-7.9	-9.8	-8.2	-6.2	-9.6	-7.6	-5.1
YZR	-6.3	-5.4	-5.0	-5.2	-5.3	-4.4	-3.9	-5.3	-3.9	-2.5	-5.1	-3.4	-1.6
YLZBR	-3.9	-3.1	-2.7	-2.9	-3.1	-2.2	-1.7	-3.1	-1.7	-0.3	-2.9	-1.4	0.5
YR	-6.9	-6.2	-5.8	-6.1	-6.2	-5.1	-4.5	-6.2	-4.6	-2.9	-6.1	-4.1	-1.9

Table S4. Subregions wise BMA projected change in the average annual maximum five-day precipitation (mm). Here, the five-day precipitation is calculated by summing the daily precipitation over the basin using a five-day moving window. The annual maximum five-day precipitation represents the maximum value of the five-day precipitation for each year. Finally, the average is taken over all statistical periods to reflect the level of change in future extreme precipitation compared to historical data. The maximum change rates for different scenarios in different future periods are highlighted in bold in the table. The division of three future is same as Table S1 and the historical mean is from 1985 to 2010.

Basin			HXB	IDR	IQTB	MKR	QDB	SWR	TMR	YZR	YLZBR	YR
Historic mean (mm)			19.8	17	21.3	42.1	13.5	42.9	14.7	35.6	76.7	34.3
SSP126	Near	mean (mm)	21.2	20.9	21.5	43.9	15.4	46.5	15.1	36.5	79.6	35.9
		change rate(%)	7.1	<b>22.9</b>	0.9	4.3	14.1	8.4	2.7	2.5	3.8	4.7
	Mid	mean (mm)	22.9	22.7	24.5	47.2	16.6	47.3	17.4	37.4	79.5	39.9
		change rate(%)	15.7	<b>33.5</b>	15	12.1	23	10.3	18.4	5.1	3.7	16.3
	Far	mean (mm)	21.4	22.3	24.2	46.3	15.5	46.7	15.9	37.5	74.9	38.5
		change rate(%)	8.1	<b>31.2</b>	13.6	10	14.8	8.9	8.2	5.3	-2.3	12.2
SSP245	Near	mean (mm)	20.1	17.4	20.7	41.3	13.4	44.6	16.8	35.2	74.4	31.6
		change rate(%)	1.5	2.4	-2.8	-1.9	-0.7	4	<b>14.3</b>	-1.1	-3	-7.9
	Mid	mean (mm)	21	19.9	22.4	43.7	15.2	44.7	14.5	35.8	78.6	35.9
		change rate(%)	7.1	<b>22.9</b>	0.9	4.3	14.1	8.4	2.7	2.5	3.8	4.7
	Far	mean (mm)	21.9	17.7	22.8	50.5	16.2	49.9	17	38.2	79.4	39
		change rate(%)	7.1	<b>22.9</b>	0.9	4.3	14.1	8.4	2.7	2.5	3.8	4.7
SSP370	Near	mean (mm)	20.3	19.2	20.6	40.8	13	43.7	14.5	34.1	72.4	29.8
		change rate(%)	2.5	<b>12.9</b>	-3.3	-3.1	-3.7	1.9	-1.4	-4.2	-5.6	-13.1
	Mid	mean (mm)	21	20.6	21.6	44.9	14.3	49.3	16	35.7	79.4	34.1
		change rate(%)	6.1	<b>21.2</b>	1.4	6.7	5.9	14.9	8.8	0.3	3.5	-0.6
	Far	mean (mm)	23	21.2	25.5	54.5	17.5	56.2	17.8	42.8	85.6	39.8
		change rate(%)	16.2	<b>24.7</b>	19.7	29.5	29.6	31	21.1	20.2	11.6	16
SSP585	Near	mean (mm)	20.1	21.1	19.9	40.3	13.4	42.8	14.8	34	68.5	32.1
		change rate(%)	1.5	<b>24.1</b>	-6.6	-4.3	-0.7	-0.2	0.7	-4.5	-10.7	-6.4
	Mid	mean (mm)	20.7	21.8	20.9	47	13.7	47.6	17	37.9	77.7	34.2
		change rate(%)	4.5	<b>28.2</b>	-1.9	11.6	1.5	11	15.6	6.5	1.3	-0.3
	Far	mean (mm)	22.6	24	28.8	57.7	17.7	59.2	17.9	44.1	95.8	40.4
		change rate(%)	14.1	<b>41.2</b>	35.2	37.1	31.1	38	21.8	23.9	24.9	17.8