



Supplement of

Linking glacier retreat with climate change on the Tibetan Plateau through satellite remote sensing

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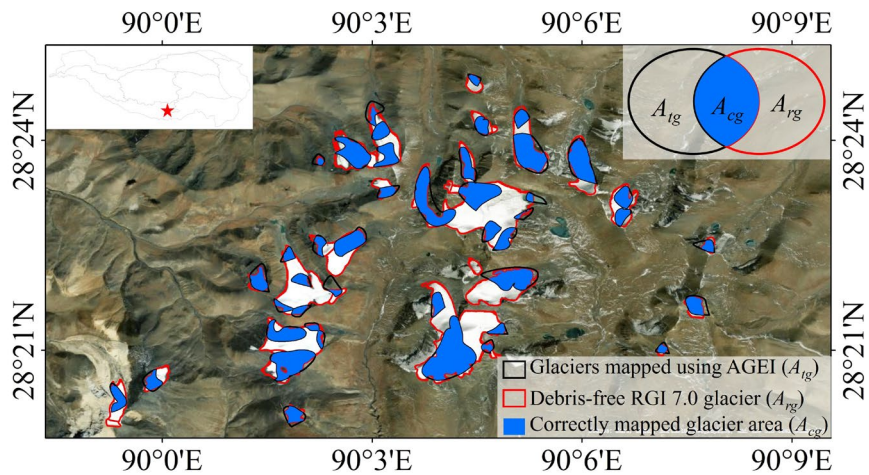


Figure S1: Accuracy of the mapped debris-free glaciers for a specific site. The base map is the Google Earth images from the © Google Earth 2020.

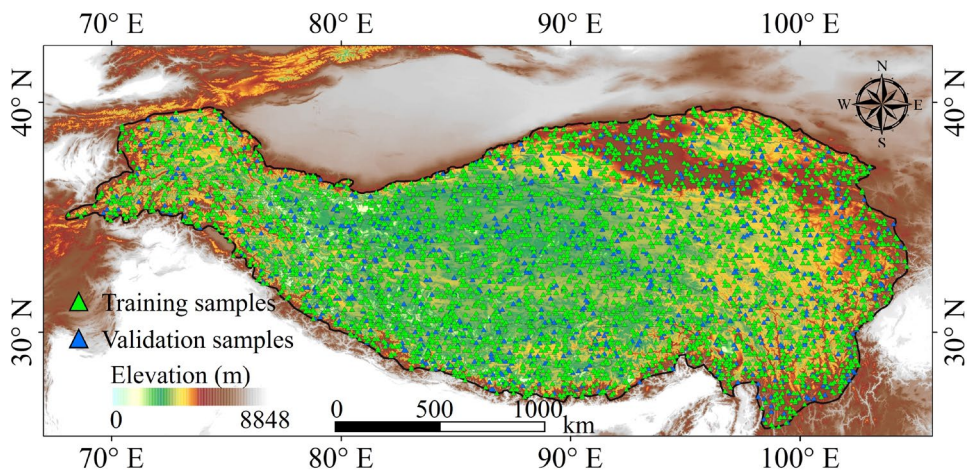


Figure S2: Locations of the training and validation samples for the ERA5-Land downscaling analysis: the number of training and validation samples are 4000 and 1000. The background image is the topographic map from the Shuttle Radar Topographic Mission (SRTM) Digital elevation model (DEM) provided by the USGS EROS Archive (EROS Centre, 2018).

Table S1: Linear regression results between the 2-m air temperature and the glacier area change

	Zone	Coefficient (10 ³ km ² /°C)	Standard error	t-values	p-values	95% LCL	95% UCL	R ²	Adjusted R ²	RSE
Annual	I	-0.04	0.02	-1.47	0.19	-0.11	0.03	0.30	0.16	0.01
	II	-1.67	0.94	-1.77	0.13	-4.08	0.74	0.38	0.26	1.64
	III	-1.53	1.36	-1.12	0.31	-5.04	1.97	0.20	0.04	2.42
	IV	-0.20	0.15	-1.42	0.21	0.13	-0.54	0.28	0.14	0.44
	V	-0.03	0.32	-0.10	0.91	-0.87	0.80	0.01	-0.19	0.62
	VI	-5.76	3.93	-1.46	0.20	-15.86	4.36	0.29	0.15	3.28
	VII	-0.28	0.27	-1.00	0.36	-0.98	0.43	0.16	0.01	0.36
	VIII	-9.34	2.28	-4.07	0.01	-15.19	-3.43	0.76	0.72	2.90
Fall	I	-0.04	0.02	-2.21	0.07	-0.09	0.01	0.49	0.399	0.04
	II	-1.48	1.01	-1.45	0.20	-4.09	1.13	0.30	0.18	1.76
	III	-1.61	0.85	-1.89	0.11	-3.80	0.57	0.42	0.30	2.06
	IV	-0.14	0.07	-2.13	0.08	-0.32	0.03	0.48	0.37	0.38
	V	-0.14	0.16	-0.86	0.42	-0.56	0.28	0.13	-0.05	0.57
	VI	2.91	2.63	1.10	0.31	-3.86	9.69	0.19	0.04	3.52
	VII	-0.23	0.15	-1.47	0.19	-0.63	0.17	0.30	0.16	0.33
	VIII	-2.21	3.13	-0.70	0.51	-10.28	5.85	0.09	-0.09	5.75
Winter	I	-0.01	0.01	-0.68	0.52	-0.05	0.03	0.08	-0.10	0.06
	II	-0.620	0.38	-1.62	0.16	-1.60	0.36	0.34	0.21	1.70
	III	-0.37	0.69	-0.54	0.61	-2.17	1.41	0.05	-0.13	2.63
	IV	-0.10	0.09	-1.08	0.32	-0.35	0.14	0.19	0.03	0.47
	V	-0.10	0.18	-0.57	0.58	-0.58	0.36	0.06	-0.13	0.60
	VI	-4.56	1.82	-2.49	0.05	-9.26	0.13	0.55	0.46	2.61
	VII	0.07	0.16	0.45	0.66	-0.35	0.50	0.04	-0.15	0.39
	VIII	-5.16	2.09	-2.46	0.05	-10.55	0.22	0.54	0.45	4.05
Spring	I	-0.02	0.03	-0.96	0.38	-0.10	0.05	0.16	-0.01	0.06
	II	-1.28	1.19	-1.07	0.33	-4.34	1.78	0.19	0.02	1.89

	III	-0.72	1.70	-0.42	0.68	-5.10	3.643	0.04	-0.16	2.66	
	IV	-0.04	0.15	-0.30	0.77	-0.43	0.34	0.02	-0.18	0.52	
	V	0.24	0.26	0.91	0.40	-0.43	0.92	0.14	-0.03	0.57	
	VI	-1.04	2.00	-0.52	0.62	-6.19	4.10	0.05	-0.14	3.82	
	VII	-0.22	0.18	-1.20	0.28	-0.71	0.25	0.23	0.07	0.35	
	VIII	-3.52	2.41	-1.46	0.20	-9.73	2.67	0.30	0.16	5.05	
	Summer	I	-0.04	0.05	-0.92	0.39	-0.18	0.08	0.14	-0.03	0.06
		II	2.06	4.44	0.46	0.66	-9.35	13.49	0.04	-0.15	2.05
III		-2.24	2.47	-0.90	0.41	-8.62	4.12	0.14	-0.03	2.51	
IV		-0.23	0.31	-0.76	0.47	-1.04	0.56	0.10	-0.07	0.50	
V		0.71	0.28	2.51	0.05	-0.01	1.43	0.46	0.42	0.41	
VI		-5.49	2.02	-2.58	0.04	-10.42	-0.02	0.57	0.49	2.57	
VII		-0.23	0.29	-0.78	0.46	-0.98	0.52	0.11	-0.07	0.37	
VIII		-6.46	1.83	-3.29	0.02	-10.73	-1.32	0.68	0.62	3.38	

Table S2: Linear regression results between the precipitation and the glacier area change

	Zone	Coefficient (km ² /mm)	Standard error	t-values	p-values	95% LCL	95% UCL	R ²	Adjusted R ²	RSE
Annual	I	0.07	1.41	0.05	0.96	-3.55	3.68	0.31	0.20	0.07
	II	-12.68	15.75	-0.81	0.46	-53.18	27.81	0.11	-0.06	1.98
	III	15.68	11.96	1.31	0.25	-15.06	46.42	0.26	0.11	2.34
	IV	1.89	11.05	0.17	0.87	-26.52	30.30	0.01	-0.19	0.53
	V	31.56	12.71	2.48	0.06	-1.10	64.22	0.55	0.46	0.42
	VI	121.06	112.48	1.08	0.33	-168.07	410.19	0.19	0.03	3.54
	VII	6.92	16.90	0.41	0.70	-36.54	50.37	0.03	-0.16	0.39
	VIII	75.08	51.02	1.47	0.20	-56.08	206.24	0.30	0.16	5.04
Fall	I	1.34	3.53	0.38	0.72	-7.75	10.42	0.03	-0.17	0.07
	II	0.87	5.18	0.02	0.99	-13.84	13.58	0.01	-0.20	2.10
	III	15.12	39.43	0.38	0.72	-86.24	116.47	0.03	-0.17	2.67
	IV	49.18	59.88	0.82	0.45	-104.73	203.10	0.12	-0.06	0.50
	V	9.71	23.16	0.42	0.69	-49.83	69.24	0.03	-0.16	0.61

	VI	-114.08	262.20	-0.44	0.68	-788.10	559.93	0.04	-0.16	3.86
	VII	-7.17	30.17	-0.24	0.82	-84.72	70.39	0.01	-0.19	0.40
	VIII	-266.96	266.38	-1.00	0.36	-951.72	417.79	0.17	0.00	5.50
Winter	I	15.34	11.72	1.31	0.25	-14.78	45.47	0.26	0.11	0.06
	II	84.29	47.43	1.78	0.14	-37.63	206.20	0.39	0.26	1.65
	III	136.09	69.90	1.95	0.11	-43.59	315.76	0.43	0.32	2.05
	IV	45.67	64.56	0.71	0.51	-120.28	211.63	0.09	-0.09	0.51
	V	59.82	129.32	0.46	0.66	-272.60	392.24	0.04	-0.15	0.61
	VI	-131.91	203.95	-0.65	0.55	-656.19	392.37	0.08	-0.11	3.77
	VII	169.48	233.29	0.73	0.50	-430.20	769.16	0.10	-0.09	0.38
	VIII	97.08	84.87	1.14	0.30	-121.10	315.25	0.21	0.05	5.37
Spring	I	-1.38	3.03	-0.45	0.67	-9.17	6.42	0.04	-0.15	0.07
	II	-78.33	54.44	-1.44	0.21	-218.26	61.60	0.29	0.15	1.77
	III	118.31	52.52	2.25	0.07	-16.71	253.32	0.51	0.40	1.91
	IV	-37.59	20.33	-1.85	0.12	-89.86	14.67	0.41	0.29	0.41
	V	-81.17	29.89	-2.72	0.04	-158.00	-4.33	0.60	0.52	0.39
	VI	260.81	111.23	2.32	0.07	-28.12	543.75	0.52	0.42	2.73
	VII	13.66	60.05	0.23	0.83	-140.72	168.03	0.01	-0.19	0.40
	VIII	152.25	41.67	3.65	0.01	45.13	259.37	0.73	0.67	3.15
Summer	I	-0.06	2.63	-0.02	0.98	-6.83	6.71	0.01	-0.20	0.07
	II	-23.26	18.94	-1.23	0.27	-71.93	25.42	0.23	0.08	1.84
	III	20.17	22.24	0.91	0.41	-37.01	77.35	0.14	-0.03	2.51
	IV	7.93	12.44	0.64	0.55	-24.06	39.92	0.08	-0.11	0.51
	V	-25.24	14.99	-1.68	0.15	-63.77	13.28	0.36	0.23	0.50
	VI	108.31	214.03	0.51	0.63	-441.87	658.48	0.05	-0.14	3.83
	VII	14.02	23.01	0.61	0.57	-45.14	73.17	0.07	-0.12	0.39
	VIII	-163.77	95.44	-1.72	0.15	-409.09	81.56	0.37	0.24	4.79