



Supplement of

Glacier response to the transition from lake- to land-terminating following a glacial lake outburst flood at Jinwu Glacier, southeastern Tibet

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Table S 1 Remote sensing imagery used for proglacial lake boundary extraction.

Time	ID
1990-11-16	LT05_136039_19901116
1991-11-03	LT05_136039_19911103
1992-12-07	LT05_136039_19921207
1993-11-24	LT05_136039_19931124
1994-11-11	LT05_136039_19941111
1995-07-25	LT05_136039_19950725
1996-11-16	LT05_136039_19961116
1997-11-03	LT05_136039_19971103
1998-10-05	LT05_136039_19981005
1999-10-24	LT05_136039_19991024
2000-10-02	LE07_136039_20001002
2001-10-21	LE07_136039_20011021
2002-10-24	LT05_136039_20021024
2003-10-01	LT05_136039_20031001
2004-10-29	LT05_136039_20041029
2005-09-03	LT05_136039_20050903
2006-11-20	LT05_136039_20061120
2007-11-07	LT05_136039_20071107
2008-10-24	LT05_136039_20081024
2009-11-12	LT05_136039_20091112
2010-10-30	LT05_136039_20101030
2011-10-17	LT05_136039_20111017
2012-11-04	LE07_136039_20121104
2013-11-07	LC08_136039_20131107
2014-11-10	LC08_136039_20141110
2015-10-20	LC08_136039_20151020
2016-10-22	PlanetScope
2017-10-07	
2018-10-31	
2019-10-28	
2020-10-09	
2021-10-17	
2022-10-07	
2023-10-08	
2024-10-06	
2025-10-15	

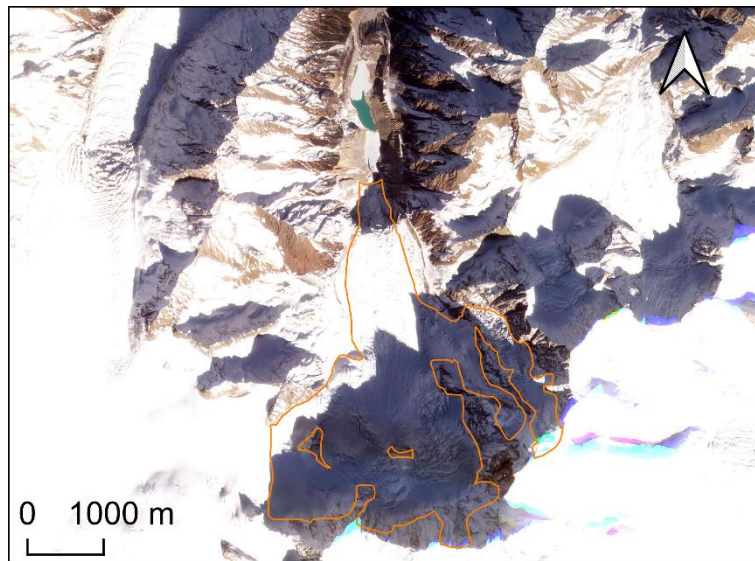


Figure S 1 Example of terrain shadows covering Jinwu Glacier. The map is based on PlanetScope imagery acquired on 4 December 2022.

Table S 2 Satellite image pairs used for velocity field calculation in this study.

Year	PlanetScope (NIR 3m)		Velocity stable terrain (m a^{-1})	
	Pre-image	Post-image	Mean	NMAD
2017	2016-09-10	2017-10-06	3.47	2.33
2018	2017-10-06	2018-09-18	1.98	1.14
2019	2018-09-18	2019-10-05	2.24	1.31
2020	2019-10-05	2020-09-03	2.86	1.73
2021	2020-09-03	2021-09-21	3.87	2.58
2022	2021-09-21	2022-09-11	2.24	1.38
2023	2022-09-11	2023-09-13	1.58	0.82
2024	2023-09-13	2024-09-18	2.31	1.41
2025	2024-09-18	2025-09-24	3.28	1.76

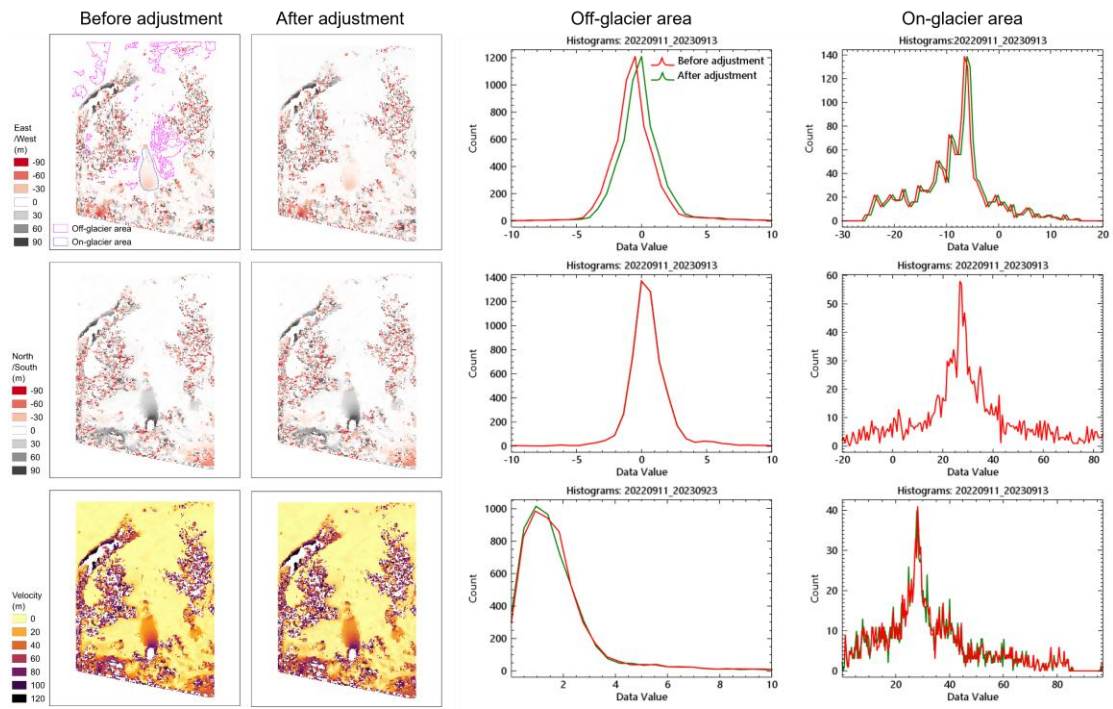


Figure S 2 An example of reducing uncertainty in north/south and east/west geolocation between two image pairs by detecting and correcting systematic shifts in selected non-glacier areas, adjusting them to zero.

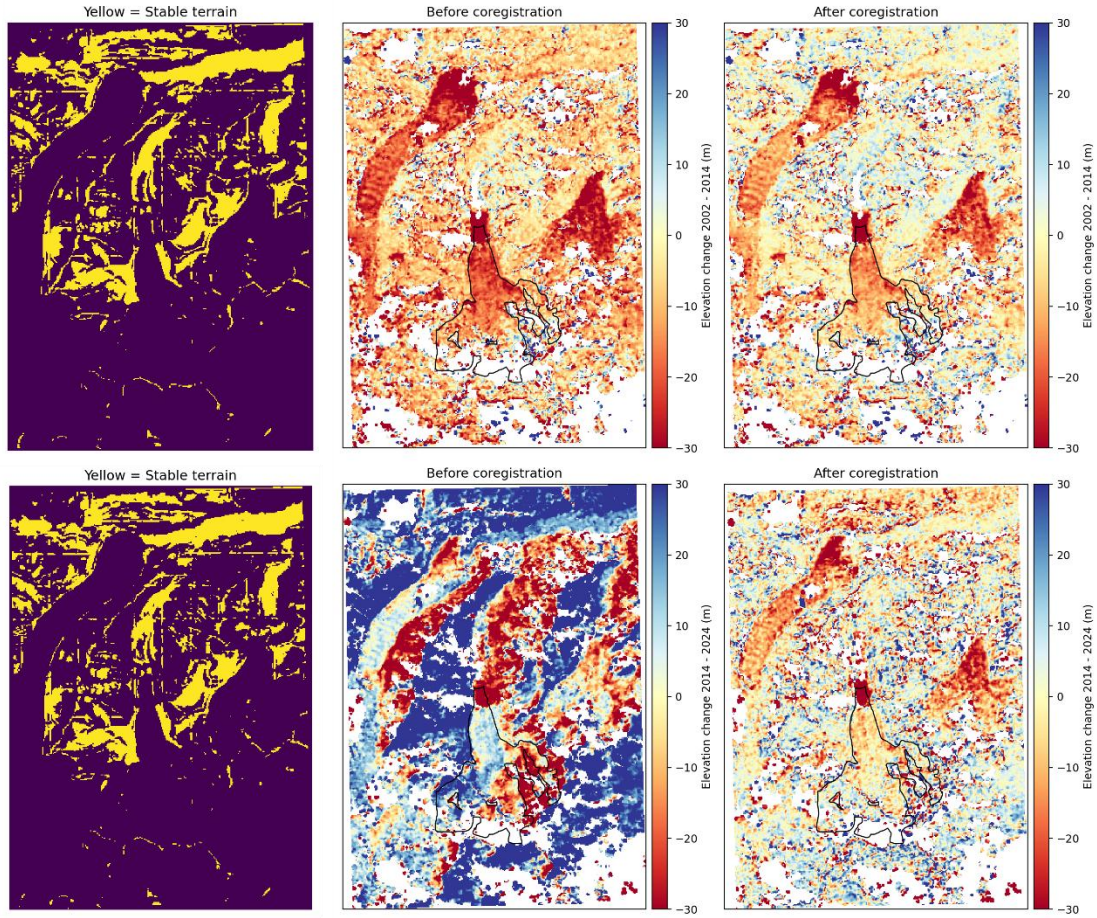


Figure S 3 DEM co-registration

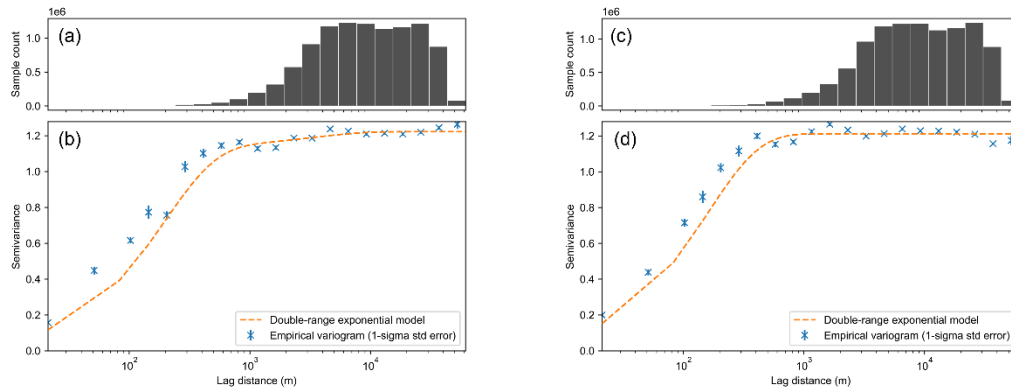


Figure S 4 Empirical variograms of standardized DEM-differencing errors over stable terrain for (a, b) 2002–2014 and (c, d) 2014–2025. Panels (a) and (c) show the sample counts for each lag-distance bin, while panels (b) and (d) show the empirical semivariances and their 1 σ uncertainties. Dashed lines indicate the fitted double-range exponential models used for uncertainty propagation.

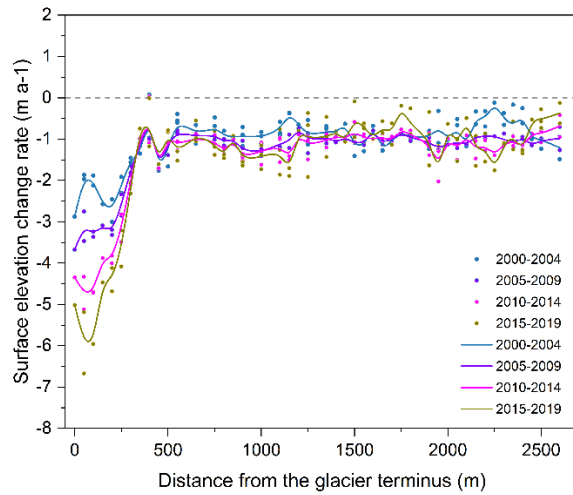


Figure S 5 Longitudinal profiles of glacier surface elevation change rates as a function of distance from the glacier terminus for 2000 – 2004, 2005 – 2009, 2010 – 2014, and 2015 – 2019, based on (Hugonnet et al., 2021). Dots indicate sampled values at 50 m intervals, and solid lines denote the corresponding smoothed curves.

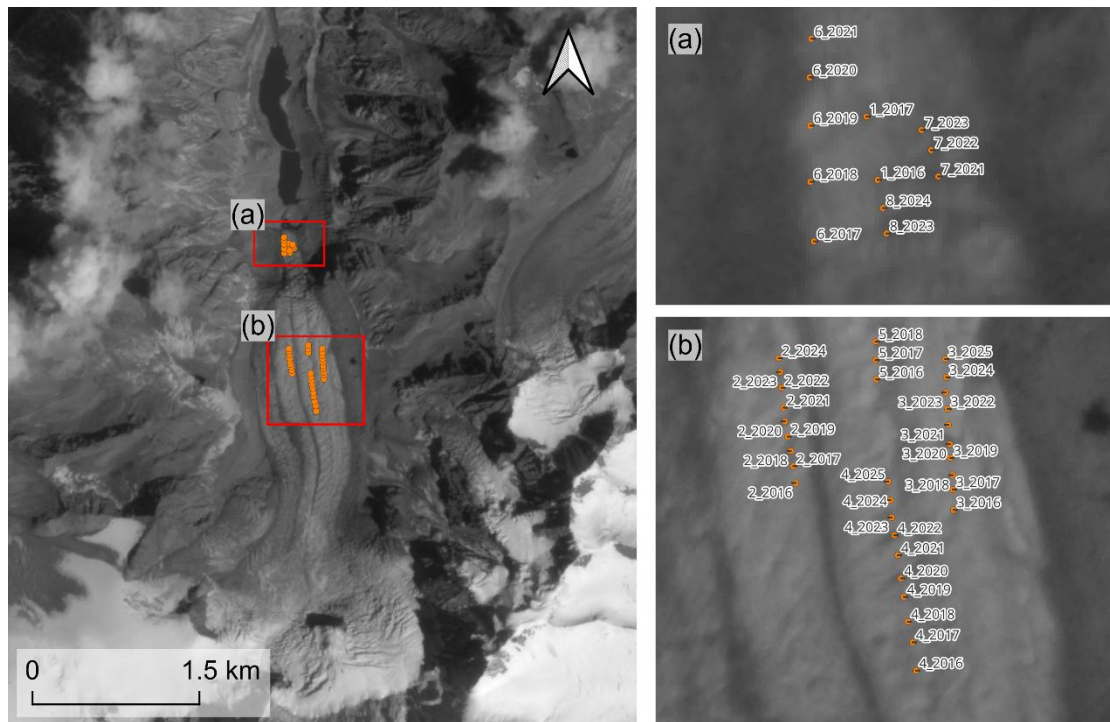


Figure S 6 Reference points selected for manual displacement measurements. The basemap is an image from PlanetScope taken on September 3, 2020.

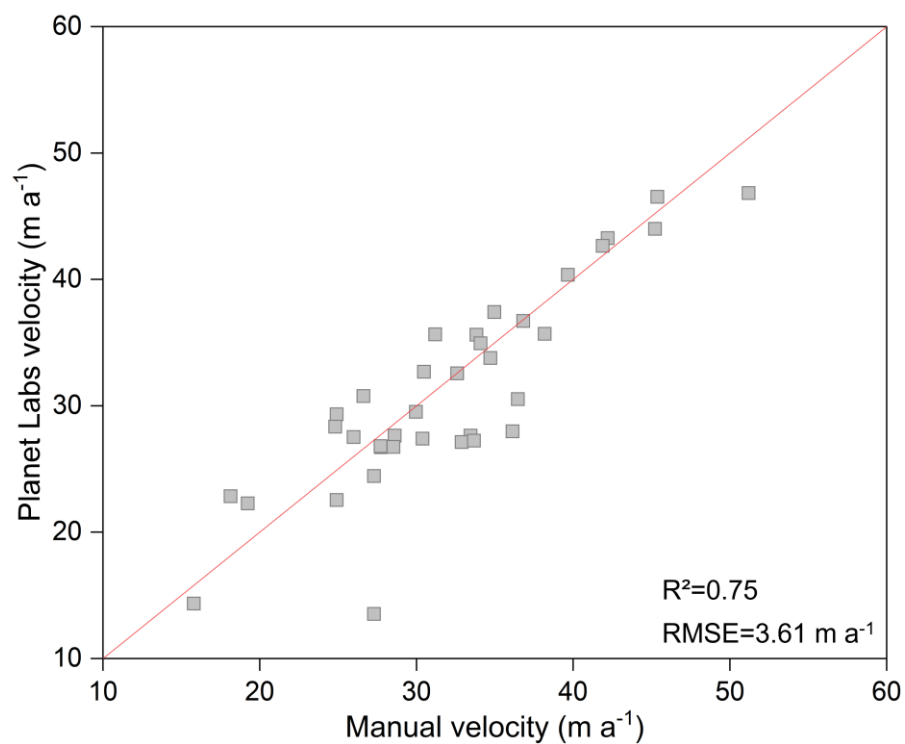


Figure S 7 Plotted comparison between Planet and manual estimates.

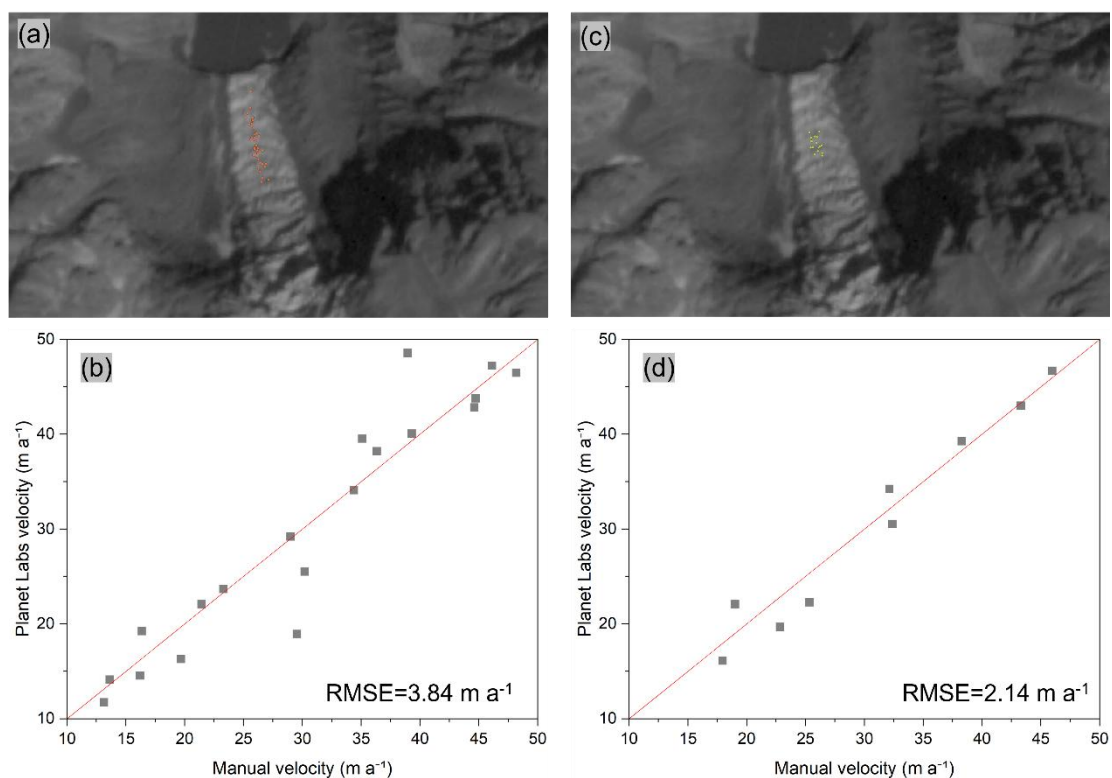


Figure S 8 Validation of PlanetScope-derived ice velocities using manual feature tracking. (a, c) Locations of manually tracked surface features on the glacier tongue. (b, d) Comparison between manually measured velocities and PlanetScope-derived velocities.

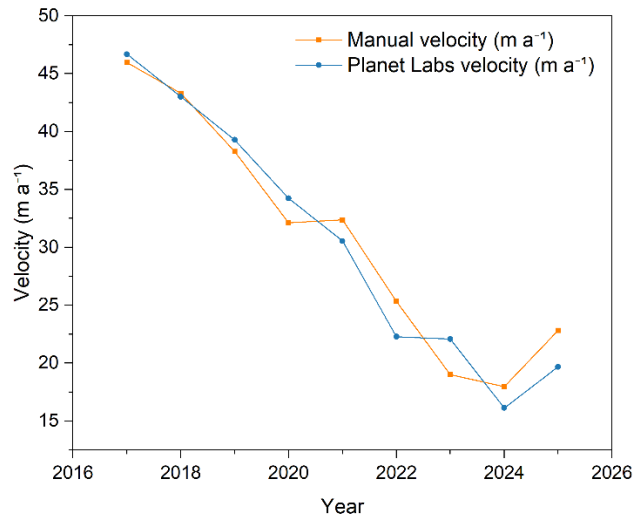


Figure S 9 Comparison between manually measured feature velocities and PlanetScope-derived velocities in the near-terminus section of Jinwu Glacier. The velocities were measured within the 100 m section near the glacier terminus from 2017 to 2025. The manual and PlanetScope-derived velocities show consistent interannual variations, supporting the reliability of the detected near-terminus velocity decrease.

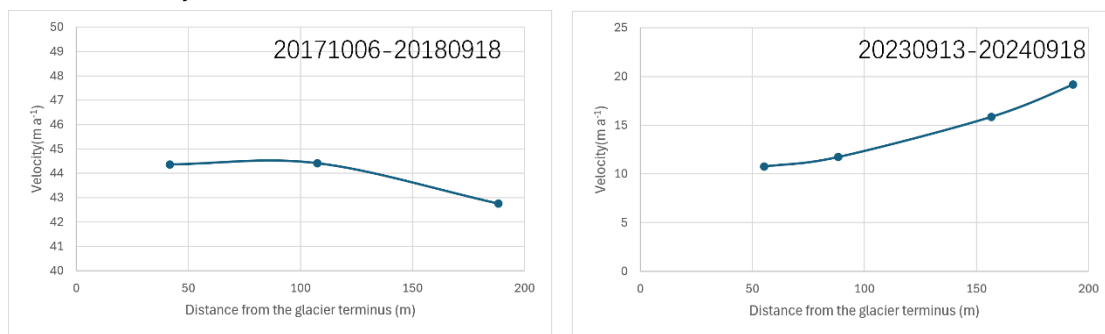


Figure S 10 Near-terminus velocity gradients derived from manually tracked feature points along the glacier centerline.

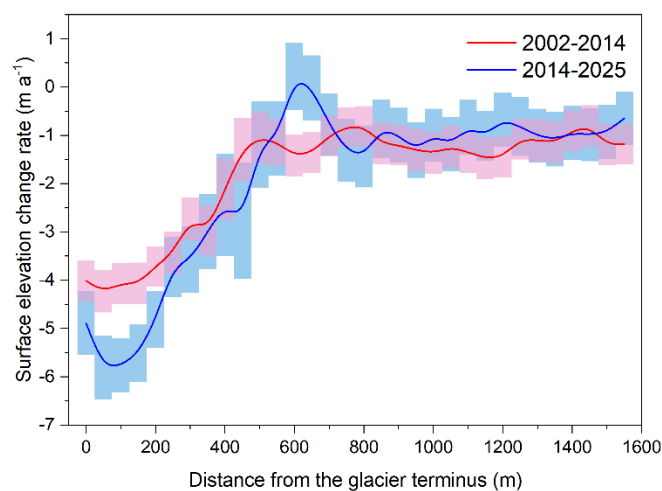


Figure S 11 Surface elevation-change rates along the centerline of Jinwu Glacier during 2002–2014 and 2014–2025. The x-axis indicates the distance from the glacier terminus. Red and blue solid lines represent the mean surface elevation-change rates for 2002–2014 and 2014–2025, respectively. Shaded areas indicate the corresponding uncertainty ranges.

Hugonnet, R., McNabb, R., Berthier, E., Menounos, B., Nuth, C., Girod, L., Farinotti, D., Huss, M., Dussaillant, I., Brun, F., and Kaab, A.: Accelerated global glacier mass loss in the early twenty-first century, *Nature*, 592, 726-731, [10.1038/s41586-021-03436-z](https://doi.org/10.1038/s41586-021-03436-z), 2021.