

# Supplement

For manuscript:

Mass balances of Yala and Rikha Samba Glacier, Nepal from 2000 to 2017

- 5 **Table S1: dGPS data collected and its usage for Yala and Rikha Samba Glacier. The accuracy of the dGPS measurements mainly depends on access and measurement duration.**

<b>Yala Glacier</b>			
<b>Date</b>	<b>Product</b>	<b>Usage</b>	<b>Accuracy measurements</b>
8.5.2012	dGPS (Magellan, ProMark-3)	stake locations	±0.3 m
		velocity	±0.4 m
		surface profiles	±0.4 m
3.11.2012	Garmin GPSmap 60CSx	terminus	<10 m
6.5.2014	dGPS (Topcon)	stake locations velocity	±0.3 m
5.5.2014		terminus	±0.4 m
5.5.2014			±1-2 m
8.5.2016	dGPS (Topcon)	terminus	±1-3 m
		stake locations	±0.3 m
25.4.2017	dGPS (Topcon)	stake locations	±0.3 m
<b>Rikha Samba Glacier</b>			
30.9.2013	dGPS (Topcon)	terminus	±1-2 m
3.10.2013		stake locations	±0.3 m
3-7.10.2015	dGPS (Topcon)	stake locations	±0.3 m

**Table S2: Maps and data sources evaluated for glacier surface and area change analysis for Yala Glacier. The estimated accuracy of topographic map is based on map scale (e.g. in 1:50,000 map = 50m).**

<b>Publishing year</b>	<b>Name</b>	<b>Map ID</b>	<b>Scale</b>	<b>Accuracy</b>	<b>Map source</b>	<b>Reference</b>	<b>Usage</b>
1965	Survey of India Map	71 H/12	1:63,360	±48–63 m (estimated)	Aerial photos 1957/58, field surveys; scanned map	Survey of India	Problems with transformation and scale, not used
1990	Schneider Map / Austrian Alpine Club Map	Langthang Himal Ost 0/11	1:50,000	±40–50 m (estimated)	Aerial photos 1970/71, field surveys; scanned map	Kostka et al., 1990	Transformation problem, not used
1984	GEN map	Yala Glacier	1:5,000	XY: ±4–5 m Z: ±0.45 m (estimated), terminus ~2-3 m	Ground photogrammetry, field surveys 1981; scanned map	Yokoyama, 1984, provided by K. Fujita	Terminus; for area and surface change not used due to transformation problems
1995	Nepal Topographic Map/ Finn Map	2885-15	1:50,000	>10 m (estimated)	Aerial photo 1992, field surveys; vector map		Transformation problems, not used
2014	ICIMOD glacier inventory	Yala Glacier	~1:50,000	±30 m, terminus and outline ±15 m	Landsat 7 ETM+, vector map	Bajracharya et al. 2014	Terminus Glacier outlines modified

11 **Table S3: Overview of used remote sensing data for Yala and Rikha Samba Glacier.**

Year	Sensor	Scene ID	Geometric resolution	Usage
<b>Yala Glacier</b>				
23.11.1974	Hexagon KH-9	DZB1209-500101L006001 DZB1209-500101L007001	±7.6 m (varying from 6 – 9 m)	Frontal variations
2000	SRTM3	2128125658	±90 m	DEM (SRTM-3) GCP generation (z)
Feb 2000	Landsat 7 ETM+		±30 m	Frontal variations Glacier outline
15.1.2012	GeoEye-1 (stereo)	201201150500576160303 1609567	±0.5 m (Pan) ±1.65 m (Multispectral)	DEM (DEM2012) Orthoimage for glacier outline
2013	Landsat-8	LC81410402013322LGN0 0	±15 m (Pan) ±30 m (Multispectral)	GCP generation (x,y)
<b>Rikha Samba Glacier</b>				
7.3.1989	Landsat MSS 4		±60 m	Terminus
2000	SRTM1	SRTM_53_07 SRTM_54_07	±30 m	DEM, voids filled with SRTM3 data
29.9.2001	Landsat 7 ETM+		±30 m	Terminus
7.2.2006	Landsat 5 TM		±30 m	Terminus
25.4.2010 27.4.2010	RapidEye	4452325_2010-04-25 4452325_2010-04-27	±5 m	Outline
5.2.2011	Landsat 5 TM		±30 m	Terminus

12