Supplement of

Reanalysis of the longest mass balance series in Himalaya using nonlinear model: Chhota Shigri Glacier (India)

Mohd. Farooq Azam et al.

Correspondence to: Mohd. Farooq Azam (farooqazam@iiti.ac.in; farooqaman@yahoo.co.in)

SUPPORTING MATERIAL

Table S1: Details of point mass balance data collection since 2002.

Year	Abl. PMBs	Acc. PMBs (east)	Acc. PMBs (west)	Acc. Point MBs	Total Point MBs	Date for measurements	Elevation of lowest/highest abl. PMBs	Elevation of lowest/highest acc. PMBs	Comment
2002	-	-	-	-	-	1-7 October 2002	4357/4932	-	1
2003	12	3	0	3	15	1-8 October 2003	4360/4886	5180/5500	2
2004	20	3	0	3	23	19-24 September 2004	4355/4976	5180/5500	2
2005	28	2	0	2	30	1-7 October 2005	4355/4884	5180/5500	2
2006	22	1	0	1	23	28 Sept -4 October 2006	4363/5090	5170	3
2007	16	1	0	1	17	27 Sept -5 October 2007	4363/4913	5180	3
2008	15	1	0	1	16	2-13 October 2008	4363/5090	5171	3
2009	10	5	2	7	17	3-14 October 2009	4423/4806	5090/5550	-
2010	25	3	2	5	30	2-13 October 2010	4365/4881	5160/5300	3
2011	25	4	2	6	31	5-13 October 2011	4390/4906	5160/5520	-
2012	15	3	2	5	20	7-15 October 2012	4496/4902	5160/5303	3
2013	22	3	2	5	27	27 Sept-07 Oct 2013	4351/4897	5158/5303	3
2014	21	3	0	3	24	2-8 October 2014	4394/4991	5180/5200	3
2015	13	0	2	2	15	4-12 October 2015	4382/4927	5150/5100	4
2016	16	2	1	3	19	2-7 October 2016	4426/4900	5150/5285	3
2017	16	4	2	6	22	4-8 October 2017	4326/4771	5161/5266	3
2018	15	0	0	0	15	12-16 September 2018	4276/4786	-	5
2019	14	3	2	5	19	15-19 September 2019	4276/4794	5170/5310	3
2020	2	0	0	0	2	06 October 2020	4739/4764	-	6
2021	0	0	0	0	0	-	-	-	7
2022	23	1	2	3	26	3-10 October 2022	4263/4893	5150/5215	3
2023	23	1	2	3	26	12-17 September 2023	4263/4893	5206/5300	3

1. A total of 14 stakes were installed in the ablation area to initiate the mass balance observations.
2. Accumulation in western tributary glacier was assumed to be similar as in the eastern side.
3. No accumulation measurement was done at 5500 and it was extrapolated from previous years.
4. No accumulation measurement was done in east part, and it was extrapolated from previous years.
5. No accumulation measurement was done, and it was extrapolated from previous years.
6. No accumulation measurement was done, and only two stakes were observed so mass balance could not be estimated.
6. No field measurements were done hence mass balance could not be estimated.

Geodetic mass balance over 2003-2020:

In the main manuscript, the geodetic mass balances (MBs) for Chhota Shigri Glacier have been estimated over two periods of 2003–2014 and 2014–2020 using satellite stereo images from ASTER (08/10/2003) and Pléiades (26/09/2014 and 12/09/2020). Here, the MB is also estimated over the full period of 2003–2020 using ASTER (08/10/2003) and Pléiades (12/09/2020) DEMs and used to calibrate MBs from nonlinear model and traditional glaciological method. The estimated geodetic MB over 2003–2020 is –0.45 ± 0.10 m w.e. a^{-1} (equivalent to a total mass wastage of –7.62 m w.e.), slightly different from the weighted average MB of –0.43 m w.e. a^{-1} (equivalent to a total mass wastage of –7.33 m w.e.) of 2003–2014 and 2014–2020 periods. Figure S1 shows the calibration results using geodetic MB estimates over two periods (2003–2014 and 2014–2020) and one single period (2003–2020).

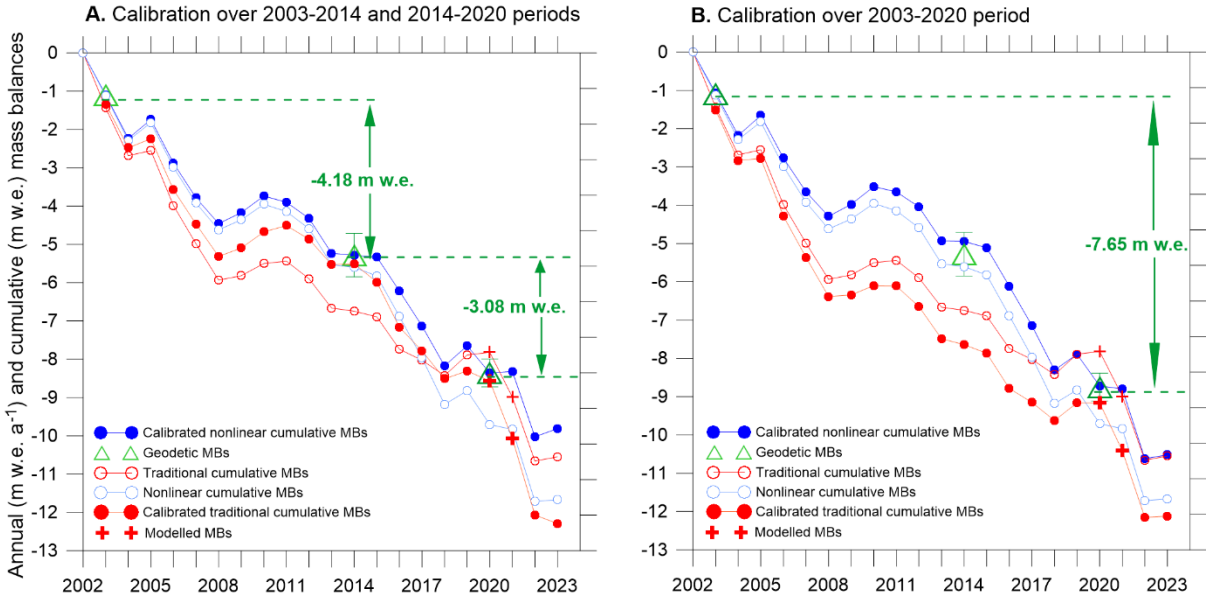

Figure S1: The calibration of homogenized glacier-wide MBs from traditional and nonlinear model using geodetic MBs over two periods over 2003-2014 and 2014-2020 (A) and one period (B) 2003-2020.