**Supplementary materials for**

**Stagnation of the Pensilungpa glacier, western Himalaya, India: causes and implications**

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**Fig. S1.** Time series snowline altitude (SLA) of the Pensilungpa glacier, western Himalaya for the period of 1993-2016. Due to the unavailability of suitable (peak ablation season, minimum seasonal snow and cloud cover) satellite images for the years 1995, 1996, 2001, 2002, 2003, 2005-2007, we could not extract SLA for the said years. Notice a fluctuating nature of the SLA. A clear increasing trend is also apparent in the figure during the study period.

**Table S1.** Details of satellite remote sensing data used for annual mapping of snowline altitude (SLA) of the Pensilungpa glacier, western Himalaya.

|  |  |  |
| --- | --- | --- |
| **Sensors/ Date of acquisition** | **Scene Id/ Product number** | **Remarks on quality** |
| Landsat TM/ 24 Aug 1993 | LT51480371993236ISP00 | Peak ablation, cloud free |
| Landsat TM/ 26 July 1994 | LT51480361994207ISP00 |
| Landsat TM/ 18 July 1997 | LT51480361997199ISP00 |
| Landsat TM/ 22 Aug 1998 | LT51480361998234BIK00 |
| Landsat ETM+/ 17 Aug1999 | LE71480361999229AGS00 |
| Landsat ETM+/ 4 Sep 2000 | LE71480362000248SGS00 |
| IRS-1D LISS III/ 12 Aug 2004 | 182984400501 |
| Landsat TM/ 1 Aug 2008 | LT51480372008214KHC01 |
| Landsat TM/ 20 Aug 2009 | LE71480362009240SGS00 |
| Landsat ETM+/ 31 Aug 2010 | LT51480362010235KHC00 |
| IRS-P6 AWiFS/ 25 Aug 2011 | 182984341 |
| IRS-R2 AWiFS / 21 Aug 2012 | 1829844151 |
| IRS-R2 AWiFS / 26 Aug 2013 | 1829844161 |
| IRS-R2 AWiFS / 11 Aug 2014 | 182984331 |
| Landsat ETM+/ 29 Aug 2015 | LE71480362015241NPA00 |
| Landsat OLI/ 8 Sep 2016 | LC81480362016252LGN01 |

**Table S2.** Location of the ablation stakes installed in the Pensilungpa glacier, western Himalaya during 3 September 2016 and 17 September 2017.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Date | Stakes | Longitude  (Decimal degrees) | Latitude  (Decimal degrees) | Altitude  (m asl) | Supra-  glacial debris thickness (cm) | Remark |
| 03 September 2016 | Stake 1 | 76.31462 | 33.84765 | 4684 | 34 | Recovered in 2017 |
| Stake 2 | 76.31368 | 33.84774 | 4689 | 40 | Recovered in 2017 |
| Stake 3 | 76.31348 | 33.84744 | 4700 | 0 | Not recovered in 2018 |
| Stake 4 | 76.31277 | 33.84535 | 4709 | 22 | Recovered in 2017 |
| Stake 5 | 76.31146 | 33.84564 | 4743 | 8 | Recovered in 2017 |
| Stake 6 | 76.31103 | 33.84589 | 4724 | 38 | Recovered in 2017 |
| Stake 7 | 76.30816 | 33.84337 | 4769 | 21 | Recovered in 2017 |
| Stake 8 | 76.30757 | 33.84215 | 4776 | 26 | Recovered in 2017 |
| Stake 9 | 76.30654 | 33.84247 | 4764 | 13 | Recovered in 2017 |
| Stake 10 | 76.30796 | 33.84377 | 4751 | 15 | Recovered in 2017 |
| 17 September 2017 | Stake 1 | 76.31348 | 33.84740 | 4678 | 30 | Recovered in 2018 |
| Stake 2 | 76.31462 | 33.84765 | 4684 | 34 | Recovered in 2018 |
| Stake 3 | 76.31368 | 33.84774 | 4689 | 40 | Not recovered in 2018 |
| Stake 4 | 76.31348 | 33.84744 | 4700 | 23 | Not recovered in 2018 |
| Stake 5 | 76.31277 | 33.84535 | 4709 | 22 | Recovered in 2018 |
| Stake 6 | 76.31103 | 33.84589 | 4724 | 38 | Recovered in 2018 |
| Stake 7 | 76.31146 | 33.84564 | 4743 | 8 | Not recovered in 2018 |
| Stake 8 | 76.30796 | 33.84377 | 4751 | 15 | Not recovered in 2018 |
| Stake 9 | 76.30654 | 33.84247 | 4764 | 13 | Recovered in 2018 |
| Stake 10 | 76.30816 | 33.84337 | 4769 | 21 | Recovered in 2018 |
| Stake 11 | 76.30757 | 33.84215 | 4776 | 26 | Not recovered in 2018 |
| Stake 12 | 76.30449 | 33.83920 | 4798 | 12 | Recovered in 2018 |
| Stake 13 | 76.30165 | 33.83455 | 4827 | 0 | Not recovered in 2018 |
| Stake 14 | 76.30250 | 33.83706 | 4830 | 5 | Recovered in 2018 |
| Stake 15 | 76.30037 | 33.83372 | 4843 | 10 | Not recovered in 2018 |
| Stake 16 | 76.30075 | 33.83552 | 4845 | 6 | Recovered in 2018 |
| Stake 17 | 76.29959 | 33.83455 | 4857 | 4 | Recovered in 2018 |
| Stake 18 | 76.29488 | 33.83115 | 4903 | 0 | Recovered in 2018 |