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Heterogeneous glacier thinning patterns over the last 40 years in Langtang Himal, Nepal

Silvan Ragettli et al.

Correspondence to: Silvan Ragettli (ragettli@ifu.baug.ethz.ch)

Supplementary Figures and Tables

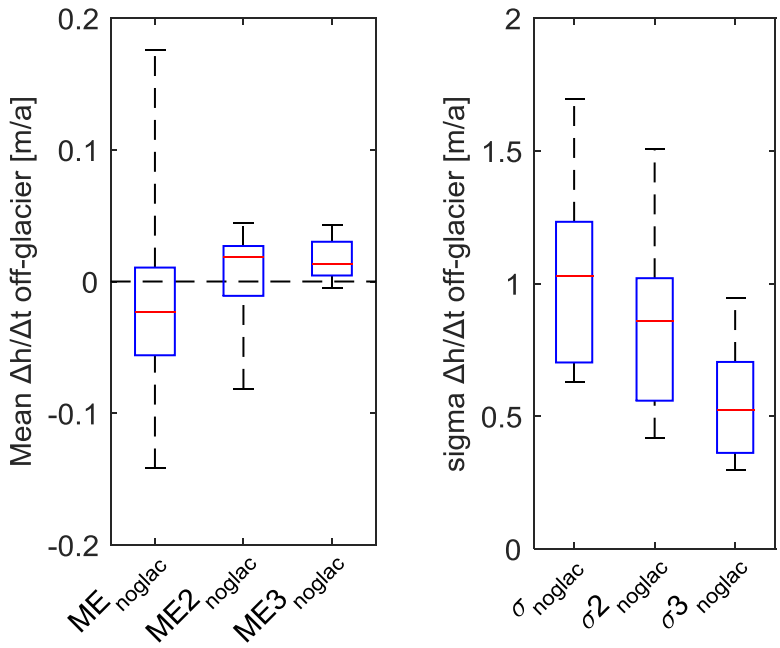

Figure S1. Off-glacier mean elevation differences and b) standard deviations (σ). On each box, the central mark is the median and the edges of the box are the 25th and 75th percentiles of the ensemble (six maps of Δh/Δt). The whiskers extend to the most extreme data points. ME_{noglac} and σ_{noglac} are calculated excluding the steepest slopes (slope<45°). For $ME2_{noglac}$ and $\sigma2_{noglac}$ areas with a monsoon snow-cover frequency higher than 20% (Figure 1) are masked out (slope<45°, sc≤20%). For $ME3_{noglac}$ and $\sigma3_{noglac}$ the threshold slope is defined as the 95th percentile of debris-covered glacier slope (slope<18°, sc≤20%).

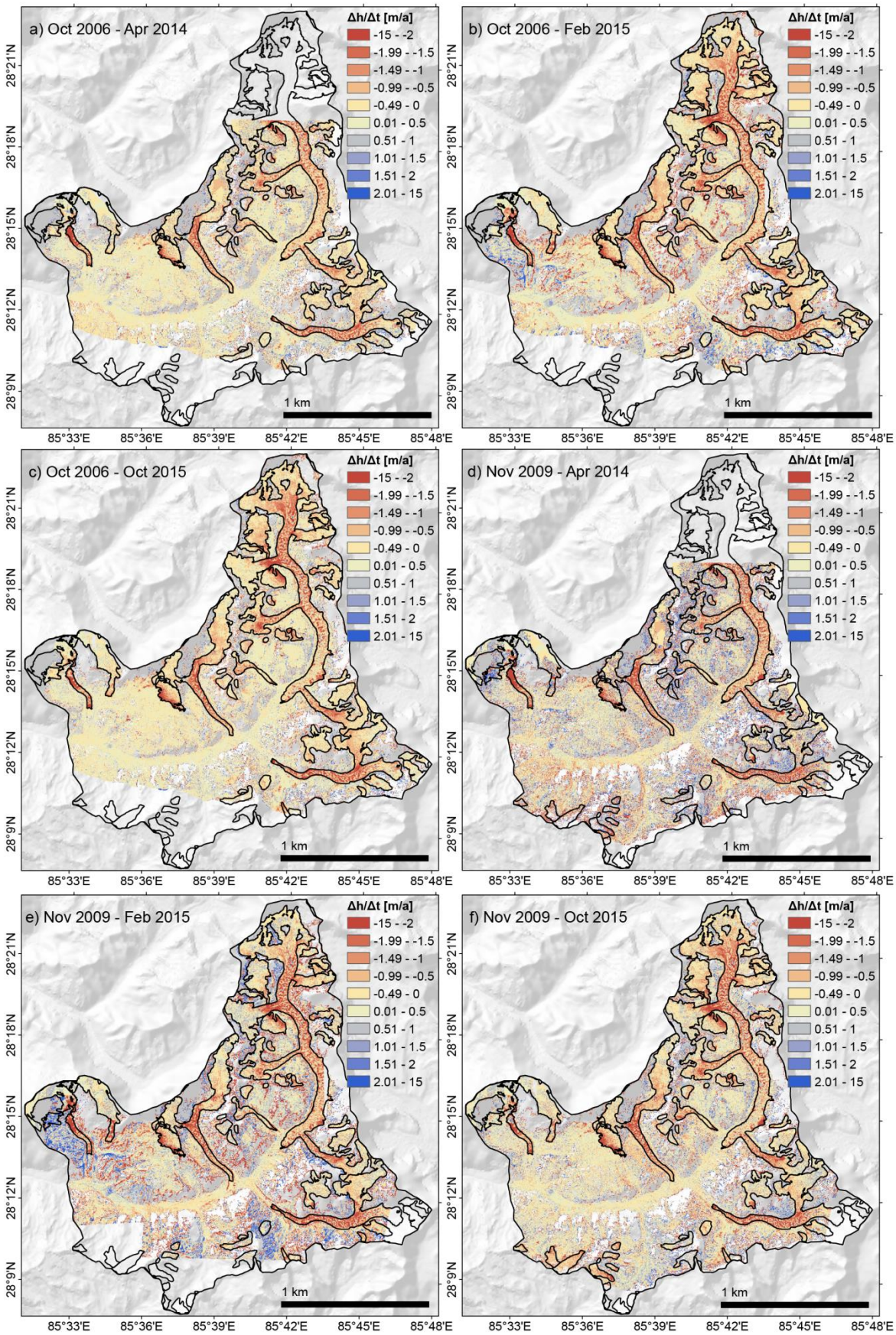

Figure S2. 2006-2015 ensemble of elevation change rates (Δh/Δt).

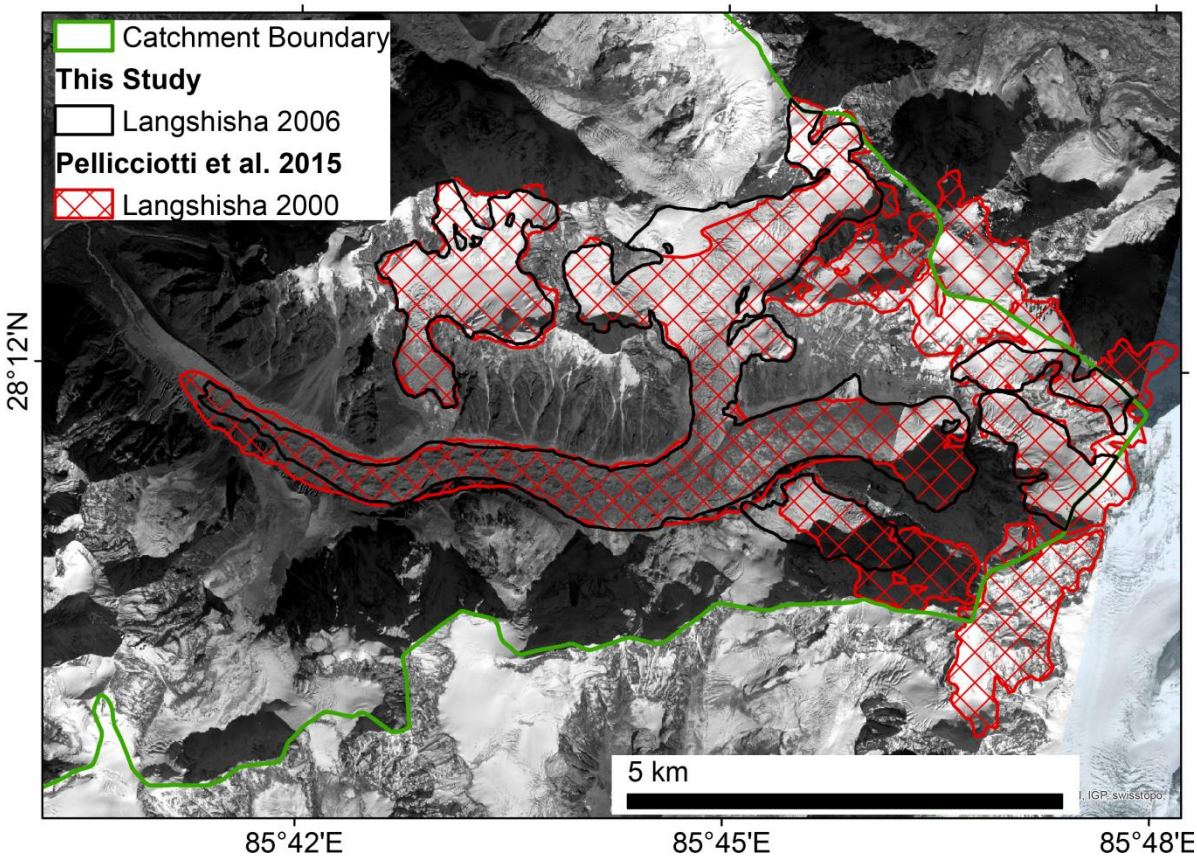

Figure S3. Comparison of glacier outlines for Langshisha Glacier used by the present study and by Pellicciotti et al. (2015).

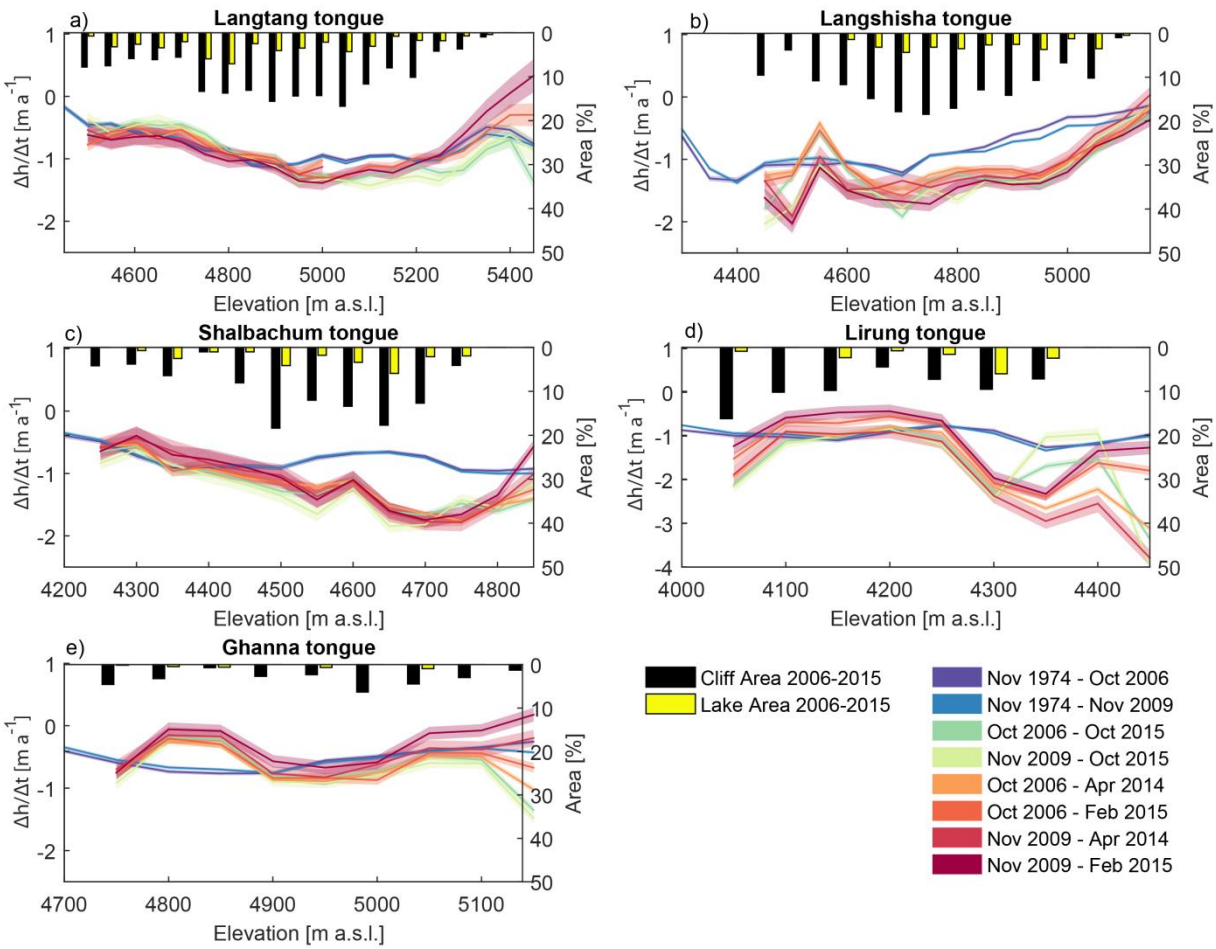

Figure S4. Altitudinal distribution of mean annual elevation changes (Δh/Δt) of debris-covered tongues (as in Figure 9) and altitudinal distribution of cliff and lake area fractions (as in Figure 11).

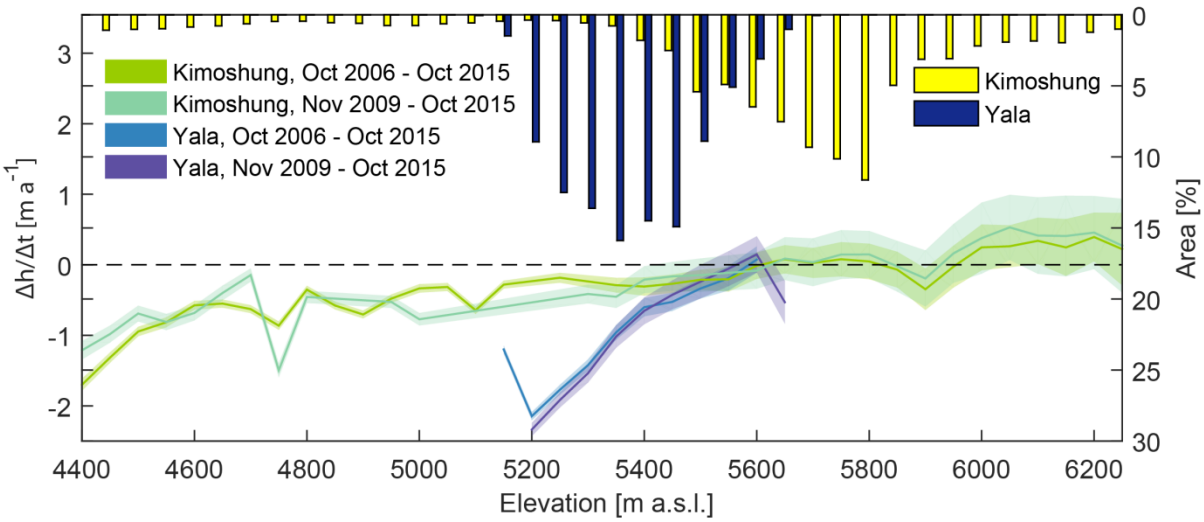

Figure S5. Altitudinal distribution of mean annual elevation changes (Δh/Δt) and altitudinal distribution of glacier area (%) of debris-free Yala and Kimoshung Glaciers. For better readability only the elevation changes corresponding to the two periods Oct 2006 – Oct 2015 and Oct 2009 – Oct 2015 are shown.

Table S1. Uncertainties associated to each elevation change map.

Δh map	**All glacier area**	**Debris-covered glacier area**
Nov 1974 - Oct 2006	0.08 m a^{-1}	0.03 m a^{-1}
Nov 1974 - Nov 2009	0.07 m a^{-1}	0.03 m a^{-1}
Nov 1974 - Dec 2010	0.09 m a^{-1}	0.04 m a^{-1}
Nov 1974 - Apr 2014	0.05 m a^{-1}	0.02 m a^{-1}
Nov 1974 - Feb 2015	0.07 m a^{-1}	0.03 m a^{-1}
Nov 1974 - May 2015	0.07 m a^{-1}	0.03 m a^{-1}
Nov 1974 - Oct 2015	0.06 m a^{-1}	0.02 m a^{-1}
Oct 2006 - Nov 2009	0.41 m a^{-1}	0.17 m a^{-1}
Oct 2006 - Dec 2010	0.46 m a^{-1}	0.20 m a^{-1}
Oct 2006 - Apr 2014	0.12 m a^{-1}	0.05 m a^{-1}
Oct 2006 - Feb 2015	0.21 m a^{-1}	0.08 m a^{-1}
Oct 2006 - May 2015	0.16 m a^{-1}	0.06 m a^{-1}
Oct 2006 - Oct 2015	0.15 m a^{-1}	0.06 m a^{-1}
Nov 2009 - Dec 2010	2.15 m	0.88 m
Nov 2009 - Apr 2014	0.36 m a^{-1}	0.14 m a^{-1}
Nov 2009 - Feb 2015	0.29 m a^{-1}	0.12 m a^{-1}
Nov 2009 - May 2015	0.26 m a^{-1}	0.10 m a^{-1}
Nov 2009 - Oct 2015	0.24 m a^{-1}	0.10 m a^{-1}
Dec 2010 - Apr 2014	0.62 m a^{-1}	0.27 m a^{-1}
Dec 2010 - Feb 2015	0.45 m a^{-1}	0.20 m a^{-1}
Dec 2010 - May 2015	0.51 m a^{-1}	0.21 m a^{-1}
Dec 2010 - Oct 2015	0.33 m a^{-1}	0.14 m a^{-1}
Apr 2014 - Feb 2015	1.27 m	0.53 m
Apr 2014 - May 2015	1.08 m	0.35 m
Apr 2014 - Oct 2015	0.52 m a^{-1}	0.19 m a^{-1}
Feb 2015 - May 2015	1.61 m	0.62 m
Feb 2015 - Oct 2015	1.69 m	0.71 m
May 2015 - Oct 2015	1.23 m	0.47 m