

Supplementary Materials: Elevation Change Rates of Glaciers in the Lahaul-Spiti (Western Himalaya, India) during 2000–2012 and 2012–2013

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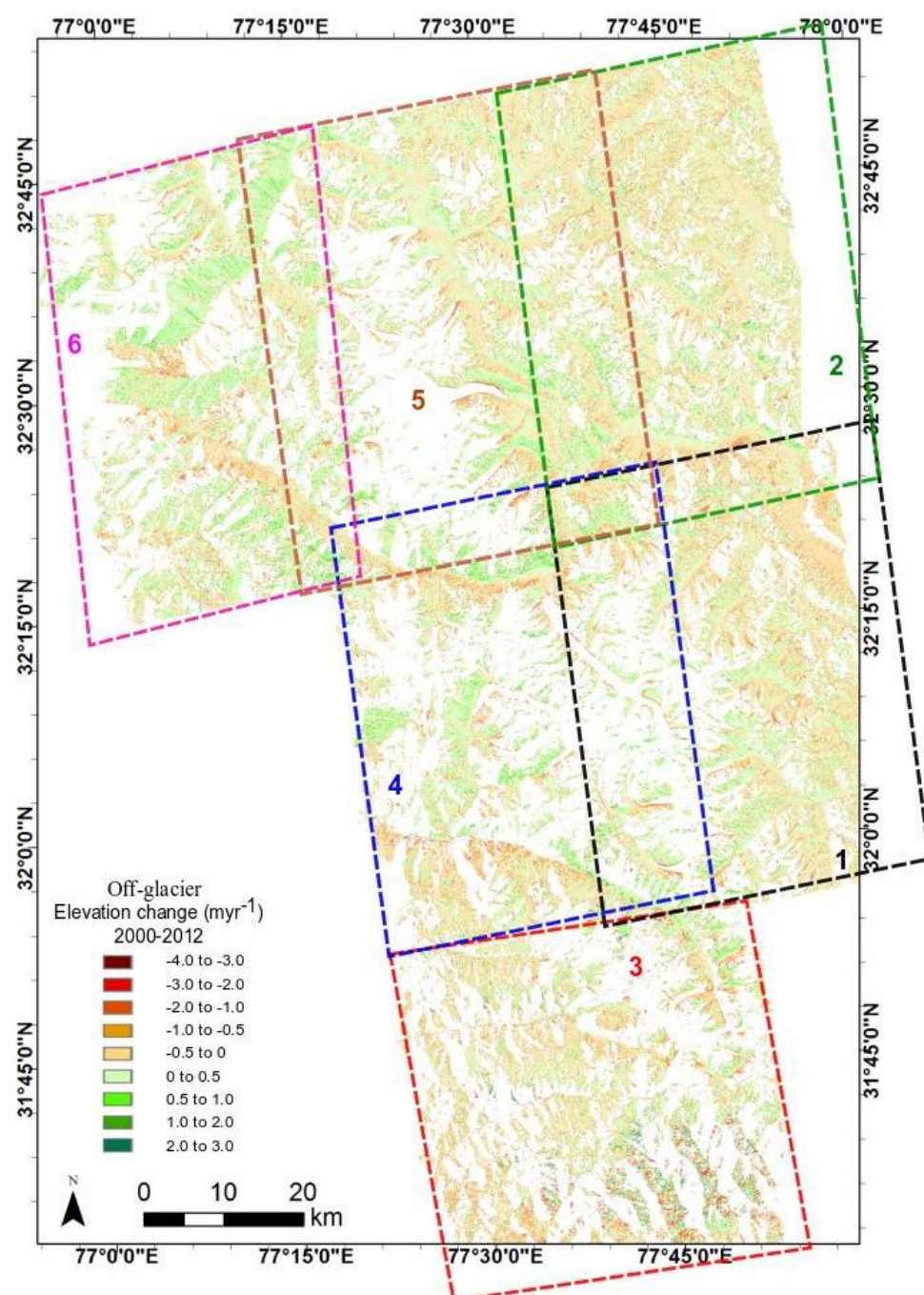


Figure S1. Map of off-glacier elevation changes in Lahaul-Spiti region between February 2000 and January-February 2012. The colored dashed rectangles represent the 6 TanDEM-X scenes of 2012 used in the study. The number marked in the rectangles correspond to the S.No. of the TanDEM-X scenes, as noted in Table 1.

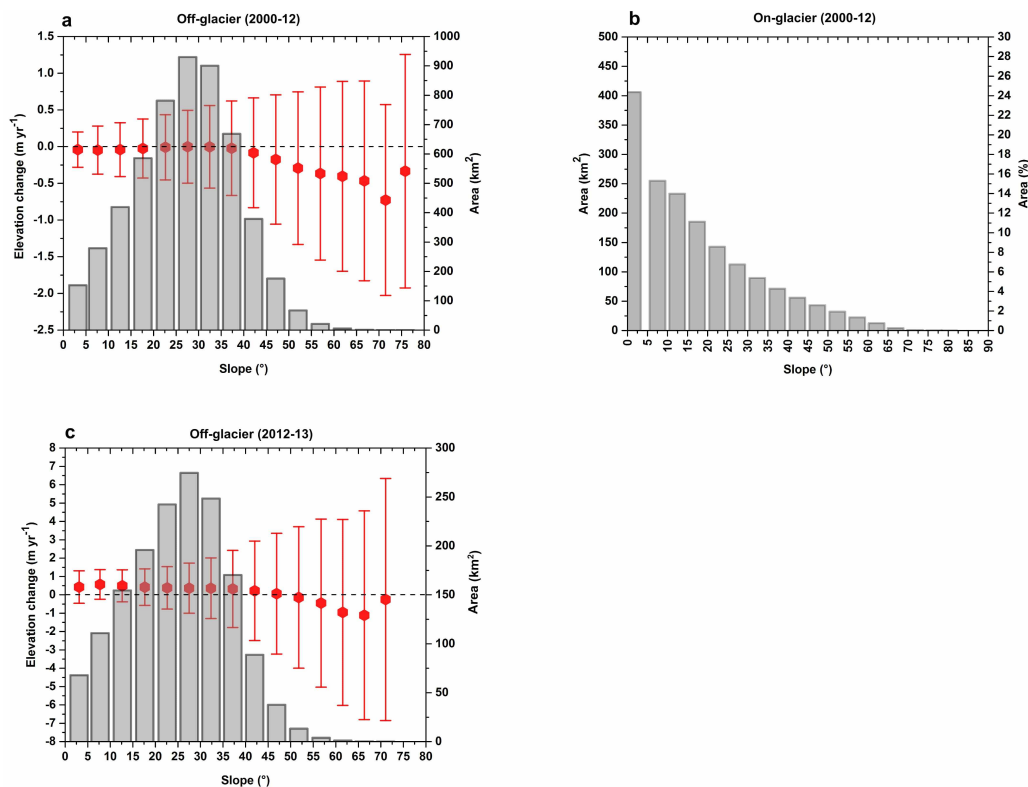


Figure S2. Plot (a) displays off-glacier median (red dots) and $\pm$ NMAD (red bars) of elevation change measurements during 2000–2012. Gray bars show the area in corresponding slope bins. Plot (b) indicates on-glacier area (km^2) and % of the total observed on-glacier area in the corresponding bins. Plot (c) shows off-glacier median (red dots) and $\pm$ NMAD (red bars) of elevation change measurements during 2012–2013.

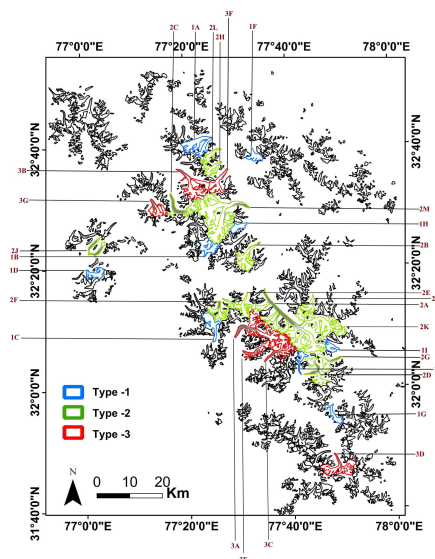


Figure S3. The black polygons indicate the glacier catchment and the gray color shows the supraglacial debris coverage. Map also shows the type of 29 selected glaciers (>8 km^2) which have been classified as type-1, -2, and -3 based on their elevation change patterns. These glaciers are also marked as a unique number based on their type. For example, 1A is the first (A) type-1 glacier, plotted at the first position (A) in Figure S4.

Type-1

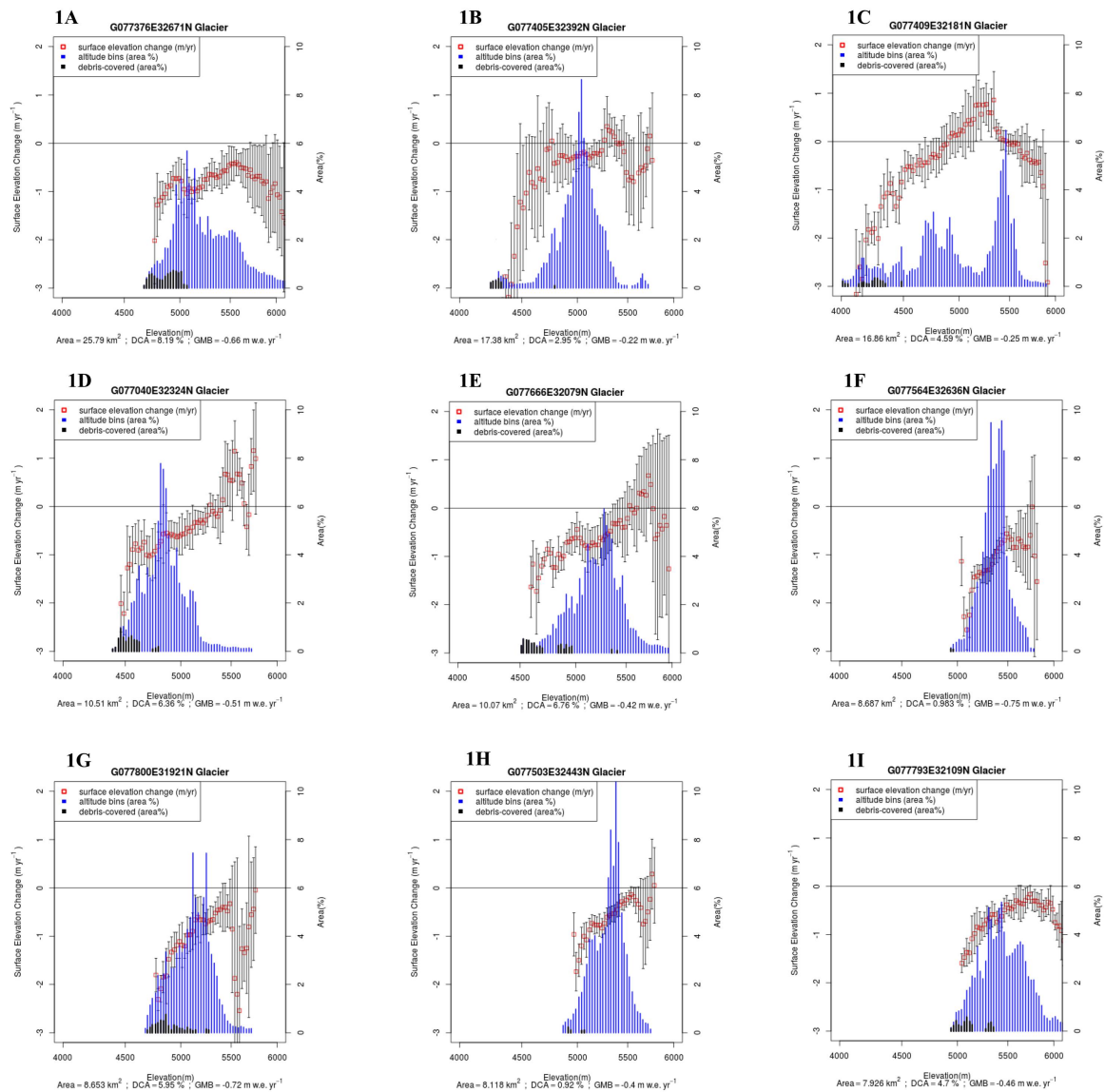


Figure S4. Hypsometric plots of elevation changes of type-1 glaciers during 2000–2012 using 25 m elevation bins. Blue and black bars indicate the fraction of total glaciated area and debris covered area in the corresponding bins. The red dots mark the median elevation change (2000–2012) and the gray bars depict the $\pm$ NMAD range of scatter within the respective bin. Every panel shows the glacier type and number (e.g., 1A), GLIMS ID, glacier area, debris-covered area (DCA in %) and geodetic mass balance (GMB) using Case B density assumptions (Table 2).

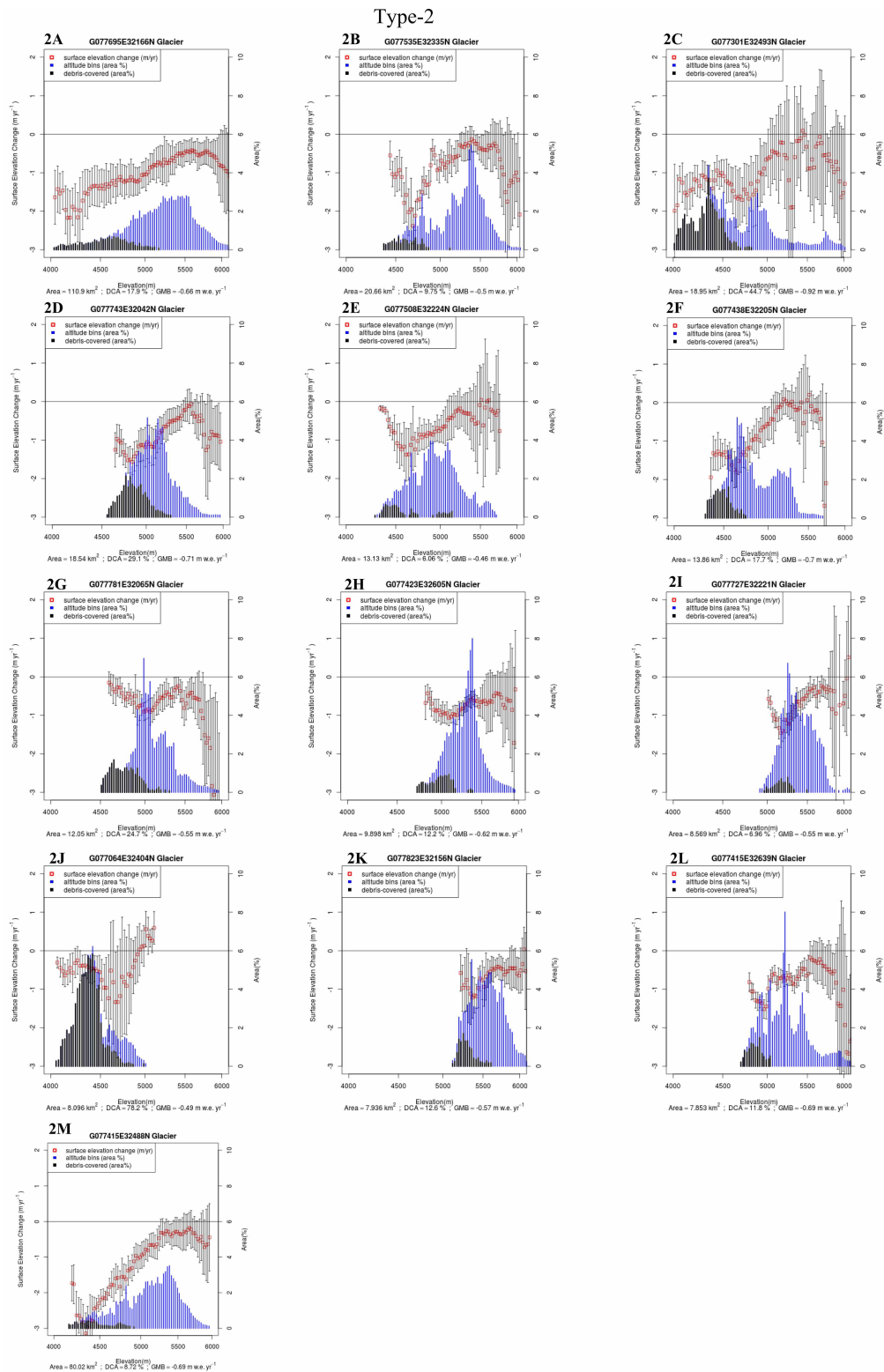


Figure S5. Hypsometric plots of elevation changes of type-2 glaciers during 2000–2012 using 25 m elevation bins. Blue and black bars indicate the fraction of total glaciated area and debris covered area in the corresponding bins. The red dots mark the median elevation change (2000–2012) and the gray bars depict the $\pm$ NMAD range of scatter within the respective bin. Every panel shows the glacier type and number (e.g., 1A), GLIMS ID, glacier area, debris-covered area (DCA in %) and geodetic mass balance (GMB) using Case B density assumptions (Table 2).

Type-3

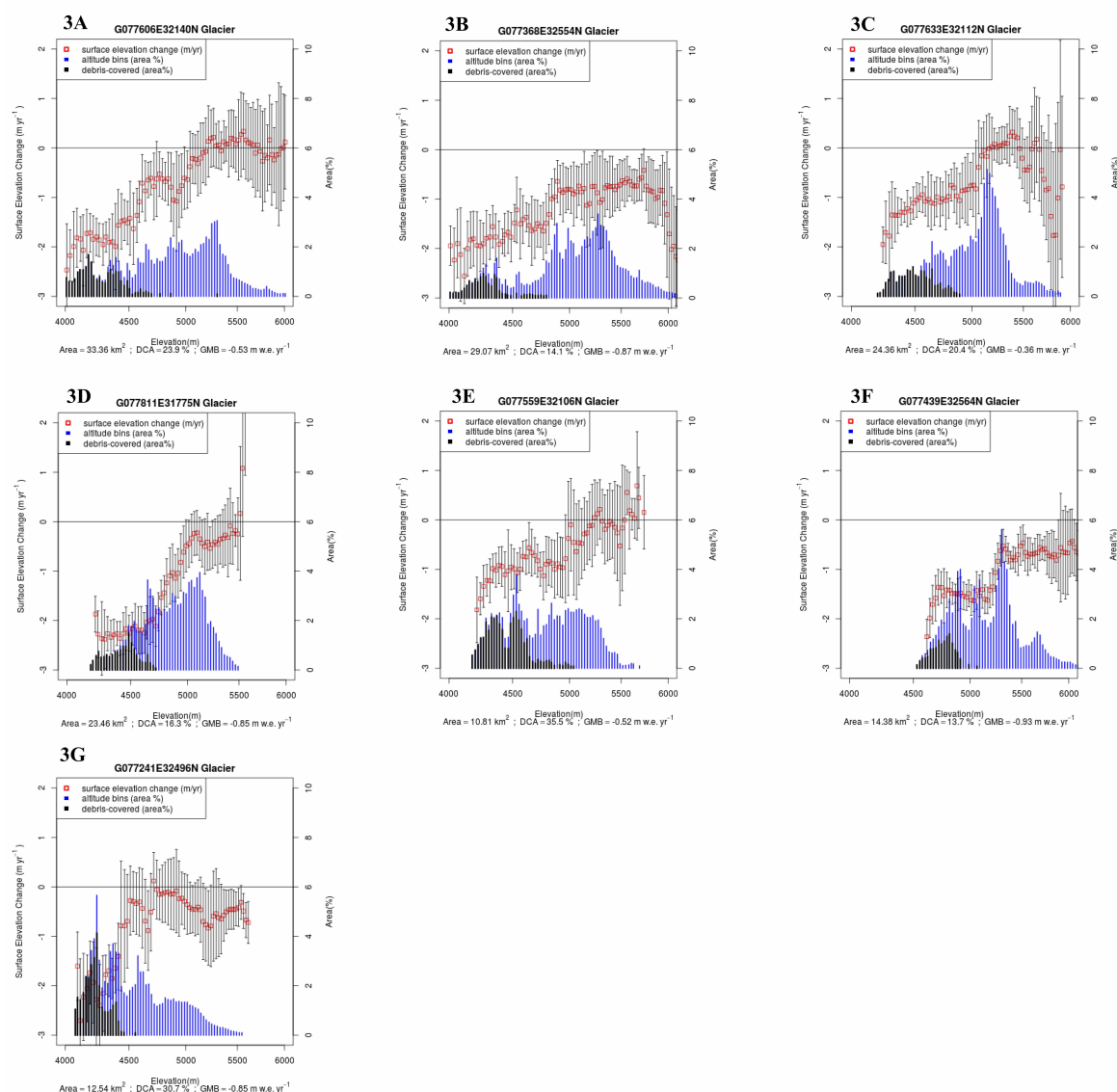


Figure S6. Hypsometric plots of elevation changes of type-3 glaciers during 2000–2012 using 25 m elevation bins. Blue and black bars indicate the fraction of total glaciated area and debris covered area in the corresponding bins. The red dots mark the median elevation change (2000–2012) and the gray bars depict the $\pm$ NMAD range of scatter within the respective bin. Every panel shows the glacier type and number (e.g., 1A), GLIMS ID, glacier area, debris-covered area (DCA in %) and geodetic mass balance (GMB) using Case B density assumptions (Table 2).