Summary of the response to the four reviewers' comments

We thank the scientific editor and the four reviewers for their detailed reviews of our article submitted to The Cryosphere. The main improvements in the manuscript are:

- As suggested by reviewer 3, we processed additional data in order to improve the discussion section about the debris cover anomaly (section 6.3). The discussion section 6.3 has been substantially modified (see below and see the detailed responses to each of the reviewers' comments), in particular we are now more careful about the generalization of our findings. However, we added a figure (fig. 10) showing the minimum glacier elevation as a function of the debris cover percentage (based on the data of Kraaijenbrink et al., 2017). The minimum glacier elevation decreases with the percentage of debris cover. We interpret this relationship as an indirect hint that debris-covered tongues are larger than debris-free tongues and that the ablation is reduced on these debris-covered tongues, because they can exist at lower elevation than the debris-free tongues.

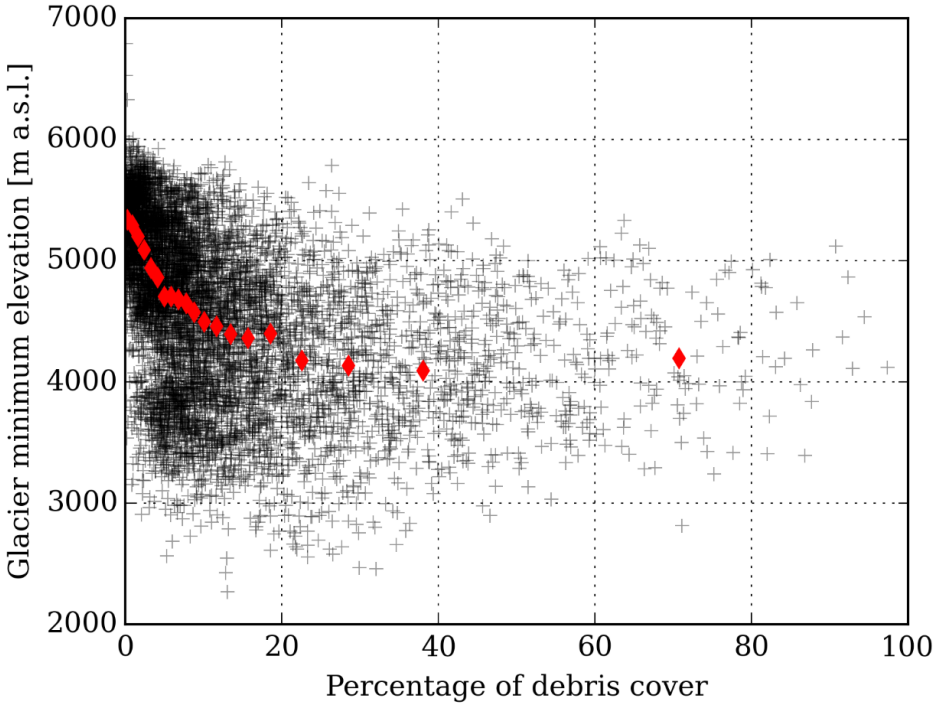

Figure 10: Glacier minimum elevation as a function of the percentage of debris cover for the glaciers larger than 2 km² in High Mountain Asia. The black crosses represent individual glaciers and the red diamonds shows the mean of the glacier minimum elevation. For instance, the first diamond represent the mean of the glacier minimum elevation for glaciers with a percentage of debris cover between 0 and 0.51% (5th percentile).

- We added a supplementary figure S5, illustrating some specific aspects of our new methodological developments

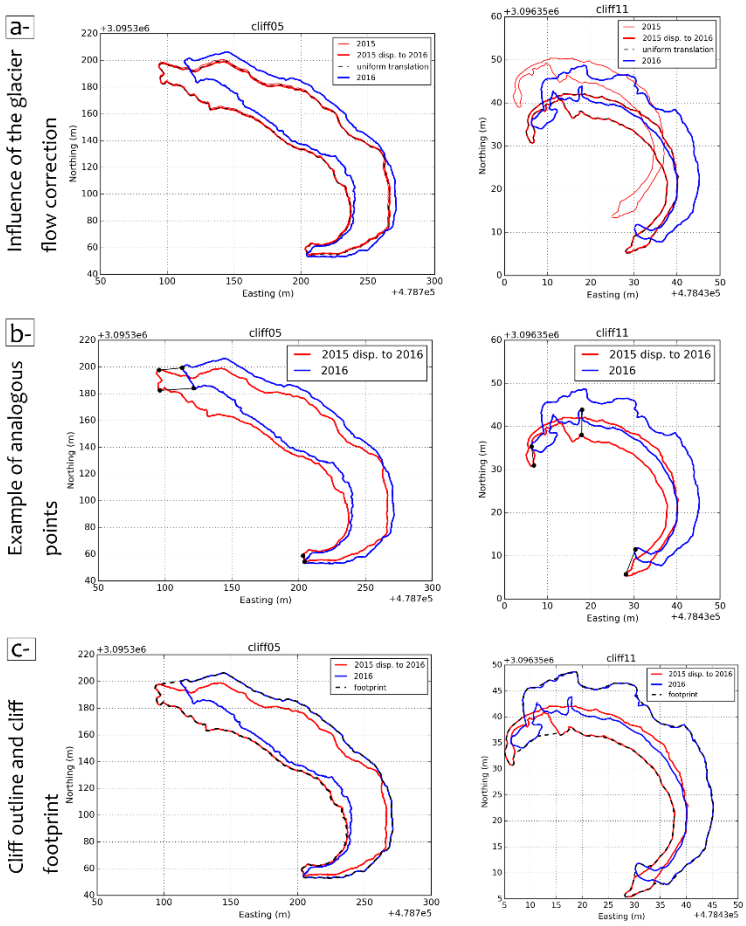

Figure S5 - Examples of the methodological processing for cliff 05, located on a slow flowing area (left panels) and cliff 11, located in a fast flowing area (right panels). For all the panels the cliff outlines are represented in UTM45/WGS84. a- influence of the glacier flow correction, and comparison with a uniform translation. B- example of analogous points needed for the triangulation regularization. c- difference between the individual cliff outlines and the cliff footprint needed to calculate the cliff contribution for gridded data (DEMs).

- We added a supplementary table S2, showing the changes in area between Nov. 2015 and Nov. 2016 for the twelve cliffs surveyed with the terrestrial photogrammetry

Tab. S2 – 3D area changes of the twelve field monitored cliffs

Cliff ID	3D area 2015 [m²]	3D area 2016 [m²]	Relative area change (%)
Cliff 01	6126	8961	46
Cliff 02	1135	1496	32
Cliff 03	3650	2415	-34
Cliff 04	1915	1788	-7
Cliff 05	11323	11265	-1
Cliff 06	4099	6435	57
Cliff 07	749	756	1
Cliff 08	1286	1278	-1
Cliff 09	2897	1918	-34
Cliff 10	2659	2192	-18
Cliff 11	466	707	52
Cliff 12	818	732	-11
Total	**37124**	**39942**	**8**

- The cliff ablation enhancement factor, named *p* in our original submission is now named f_c to avoid any confusion with the "p-value" as suggested by reviewer 3. Following, the suggestion of reviewer 1 and 4, we added the definition and computation of the f_C^* factor, which compares the cliff and non cliff ablation (instead of the cliff and whole glacier tongue).
- We changed the structure of parts of the data and method sections. Section 3.4.2 is now entitled "Ground penetrating radar data", and the method section is now separated into three main subsections: 4.1-Emergence velocity; 4.2-Ice cliff backwasting calculation; 4.3-Sources of uncertainty on the ice cliff backwasting.
- In order to better balance the focus of the paper (comments from reviewers 1, 2 and 4), we extended the section 6.1 with a description of the cliff evolution and compared backwasting rates with published values. We extended Table 1 with values of mean elevation and backwasting rates for individual cliffs.
- Reviewers 1, 3 and 4 legitimately criticized the extrapolation we made based on a single glacier. We substantially modified section 6.3 ("Ice cliff ablation and the debris-cover anomaly"), in order to modify our previous statements, which were probably too strong with regards to the small sample studied here (n=1, as pointed out by reviewer 3). We changed the title of the paper, which is now "Ice cliff contribution to the tongue-wide ablation of Changri Nup Glacier, Nepal, Central Himalaya". Moreover, we backed up some of our theoretical arguments, based on a compilation of data from Kraaijenbrink et al. (2017) shown in figure 10.

Additional changes:

- The family name of Dibas Shrestha was misspelled (missing "h") in the original submission

- Silvan Raggetli brought to our attention that the “debris-cover anomaly” was never observed in the Langtang catchment, due to insufficient hypsometric overlap between debris-free and debris-covered ice. We modified the text accordingly.
- The signs greater than and smaller than were inverted in equation 5. It is corrected in the revised version.