

EGU General Assembly 2017 Conference Attendance Grant

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Summary

A BSG conference attendance grant (£500) enabled me to attend the EGU General Assembly in Vienna, which was my first international conference. Here, I was presenting a poster on an upcoming paper, which used 3D point cloud differencing to calculate the retreat rates of ice cliffs on Khumbu Glacier in Nepal, and investigate the spatio-temporal controls on ice cliff persistence. I was also a co-convenor for session CR4.3 Debris-covered glaciers and had the opportunity to chair this session. EGU was a brilliant networking opportunity and BSG support was greatly appreciated.

Project

My poster presented the results of three field campaigns on Khumbu Glacier in Nepal, where I photogrammetrically surveyed nine ice cliffs and generated 3D point clouds using Structure from Motion (SfM) with Multi-View Stereo (MVS). These point clouds were differenced using the M3C2 algorithm to reveal the magnitude and spatial variation of ice cliff retreat (Figure. 1). Thick debris on debris-covered glaciers insulates the ice beneath, whereas ice cliffs (exposures of glacier ice) appear as 'hot-spots' of melt in DEMs of difference. However, cliffs are not explicitly considered in models of glacier evolution and have positive feedback interactions with supraglacial ponds, which enables rapid cliff retreat and pond expansion.

The 3D differencing revealed spatial trends in ice cliff retreat, and key factors promoting cliff persistence or degradation. Cliffs with an adjacent supraglacial pond or with a shallow back-slope persisted over the study, since undercutting by the pond and a large volume of ice for the cliff to retreat into allowed the cliff angle to be maintained. In contrast, the absence of a pond or a steep back-slope were associated with the cliff angle becoming shallower during retreat, and becoming buried with debris and disappearing.

BSG Grant

Support from the BSG was essential to attend the conference, since no other funding remained within my PhD budget. The grant contributed towards conference registration, flights, and accommodation. The BSG also supported the field campaigns in Nepal, which led to this study.

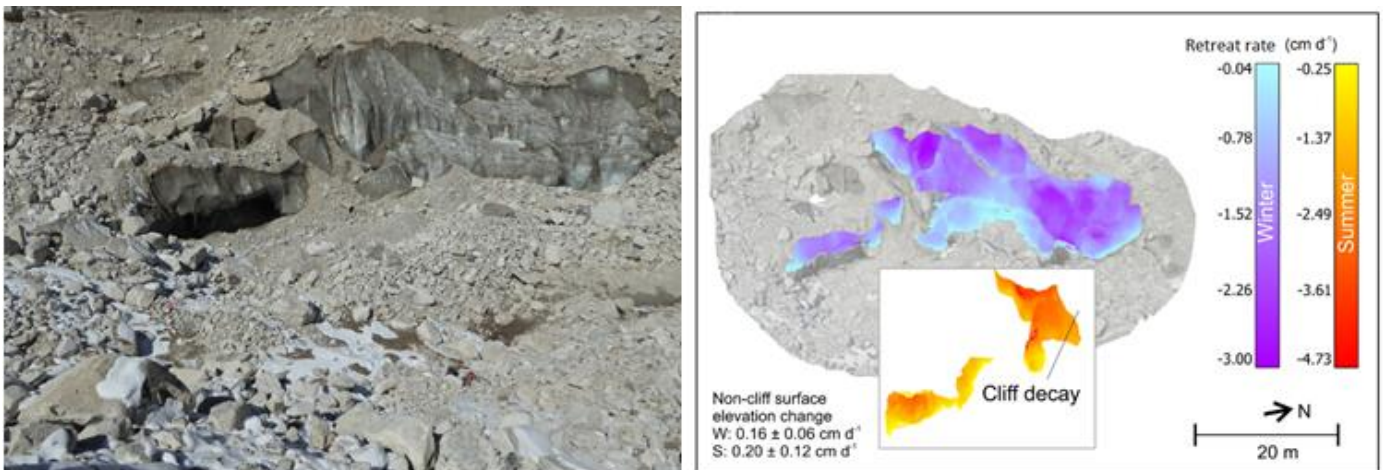


Figure 1. Example retreat rates of an ice cliff on Khumbu Glacier, Nepal. Winter and summer melt were calculated using 3D point cloud differencing using the Multiscale Model to Model Cloud Comparison (M3C2) algorithm.