

Ref.#: GI\_25

eleanor.bash@gmail.com

## ABSTRACT

### **Comparison of UAV-derived and Lidar DEMs for application in glaciological modelling**

Eleanor Bash<sup>1</sup> Brian Moorman<sup>1</sup>

<sup>1</sup>*University of Calgary, Department of Geography, Canada,*

Glaciological mass balance modelling plays an important role in understanding current and future responses of glaciers to climate change, as well as the effects of those changes on water resources around the world. The predictive capacity of these models are limited by data availability in both time and space by the difficulty and cost of collecting data in mountainous and remote areas. Recent technological advances are opening doors for the use of unmanned aerial vehicles (UAVs) to collect high-resolution data more frequently and at a lower cost than other available methods. This has led to several studies using UAVs in glaciological studies. It is important, however, to understand the capabilities of UAVs in order to apply the technology appropriately. In April, 2015, visible spectrum aerial imagery was collected at Haig Glacier, Canada, using a six propeller, battery operated MikroKopter concurrent with Lidar acquisition from a manned flight. The imagery covers 0.5 km<sup>2</sup> of the glacier tongue. At the same time 66 targets were surveyed in with dGPS to provide verification of the two remotely sensed data sets. Using "structure for motion" software the aerial imagery was used to produce a detailed digital elevation model (DEM) of the snow covered glacier surface. A DEM was also produced from the Lidar returns. This study compares the accuracy of the DEMs produced from both datasets, as well as the spatial and elevation bias of the datasets. We also examine the pros and cons of the UAV system itself and its utility in alpine glacier environments.