

Greenland 2015 Research Grant Report

Dr Joseph Cook

Geosciences, College of Life and Natural Sciences, University of Derby, Derby, DE22 1GB
j.cook1@derby.ac.uk

Project Outline

The primary objective of the trip was to study microbe-ice interactions on the Greenland Ice Sheet, specifically the influence of mesoscale topography on biogeochemistry in microbial habitats called 'cryoconite holes'. We achieved this by undertaking quadrat surveys at a field site ca. 3 km from the ice margin, recording meta-data such as slope, aspect and ice type along with the dimensions of each cryoconite hole, its position and orientation, the characteristics of the sediment within and establishing biogeochemical microcosms. We also used a drone to gather repeat imagery of a 30 m transect, which we ground truthed daily. These data will allow us to examine the relationships between hole shape, biogeochemistry and mesoscale topography and write up manuscripts for publication. Furthermore, we gathered drone and handheld footage and imagery to support outreach and public engagement materials.

The BSG Research Grant was crucial in facilitating this work. It was a major contribution to the overall costs of the trip and was also one of the first grants obtained, undoubtedly having a pump-priming effect on further grant capture. The support of the BSG therefore underpinned this whole venture.



Report

We departed the UK for Greenland on 2nd July. After establishing a camp and choosing an appropriate field site we made our first set of field observations on 5th July. We then intensively sampled that site every day until the 19th July. On 20th July we made a reconnaissance visit to two further field sites to obtain basal ice samples and map subglacial outflow. On 21st July a vehicle collision forced us to change our plans and we decamped to Kangerlussuaq. From there we flew home on 25th July.

Although our data is yet to be fully analysed, we are confident that a clear relationship between mesoscale ice surface morphology and cryoconite biogeochemistry has been documented for the first time. This is an important finding that emphasises the need to better understand ice-microbe interactions in order to accurately predict macroscale ice dynamics and biogeochemical cycling.

For a detailed, day by day break down of our activities please see <http://tothepoles.wordpress.com>.