Project acronym: HeBoG

Project title: Reconstructing the late Holocene extent and behaviour of glaciers in north-west Greenland

Project leader: Michael Grimes, University of Leeds, United Kingdom

Discipline: Earth Sciences & Environment: Global change & Climate observation

Station(s): The DMI Geophysical Observatory Qaanaaq (DK)

HeBoG aims to provide the first quantification of late Holocene glacier extent, thickness and behaviour in north-west Greenland. We specifically target the Qaanaaq ice cap for field investigation due to its ideal location within our region of interest and relative accessibility from the DMI Geophysical observatory. From this station we are able to access several outlet glacier termini of varying continentality, topographic setting and profile with impressive suites of moraines and glacial geomorphology. HeBoG will combine widespread mapping of glaciers in north-west Greenland with detailed and intricate field measurements of landforms geomorphology and internal sedimentology as well as topographic survey utilising Structure from Motion (SfM) from captured imagery. We will utilize aerial imagery from 1978 and literature review of dates and previous post-LIA glacier advances to relatively attribute moraine ridges and drift to cold-periods and glacier advances. Once the location of late Holocene/LIA maximum extent moraines is defined around Qaanaaq, these criteria may be applied to glaciers across the region. This will then allow us to accurately reconstruct late Holocene ice surfaces and use 3D glacier geometry reconstructions to quantify rates of volume loss in north-west Greenland. Such information is vital for calibration of sea-level rise models and is currently lacking. There is therefore a pressing need to quantify the past extent and behaviour of high Arctic glaciers during the late Holocene. HeBoG will fill a glaring hole in our current understanding of north-west Greenland glaciers late Holocene retreat dynamics and geometry changes, crucial for accurate estimation of future behaviour and melt water fluxes.