Project acronym: ZAKSCAN

Project title: Geomorphological characterization and activity analysis in the Zackenberg region

Project leader: Jeffrey Evans, Loughborough University, UK

Discipline: Earth Sciences & Environment

Station(s): Zackenberg Research Station (Greenland)

Understanding contemporary sediment fluxes is fundamental to predicting likely rapid effects of future climatic changes on Arctic geomorphology and landscape development. Characterisation of proglacial geomorphology and changing geomorphological dynamics in NE-Greenland are non-existent resulting in neither the measurement nor quantification of within-catchment and fjord sediment sources, sinks and fluxes, particularly associated with glacier and climate change. Focus has been on defining sedimentation styles within deglaciating E/NE-Greenland fjords but an understanding of where (and how) this sediment is coming from at present has lacked attention.

ZAKSCAN will focus on Skillegletscher forefield, Clavering Island, around Zackenberg station (NE Greenland) and adjacent fjord. We will characterise the landscape geomorphology by mapping and direct topographic surveying using Terrestrial Laser Scanning and Structure from Motion to create catchment-wide high-resolution, high-precision digital elevation models. GIS methods will be applied to ice-free landscapes of E/NE Greenland to characterise region-wide geomorphology and test the output against field-acquired landscape maps. We will examine regional sediment sources, storages and fluxes and ascribe sediment flux rates to each of the catchment geomorphological components. Fjord-based work will characterise sediment fluxes, exclusively via sediment-laden meltwater plumes, from catchment(s) to the fjord. Suspended sediment concentrations of glacier-fed rivers and fjord meltwater plumes will be sampled, and plume spectral reflectance will be simultaneously measured. This data will help quantify sediment concentrations of meltwater plumes in MODIS imagery for non-fieldwork periods. Catchment and fjord sediment yields during fieldwork and longer term and modelled in our GIS, will be compared with that reported from other polar/alpine catchments.