

**Project title: Water and sediment routing through glaciers in West Greenland**  
**(Ref: OP2222)**

**Keywords: Glaciers, Cryosphere, Geophysics, Geology, Sedimentology, Ice Penetrating Radar, Carbon Feedbacks, Meltwater**

**One Planet Research Theme:**

*Tick relevant boxes (MUST include one of either C&CC or A, and one other to be acceptable for One Planet DTP)*

Climate & Climate Change  | Earth System Processes  | Anthropocene  | Environmental Informatics

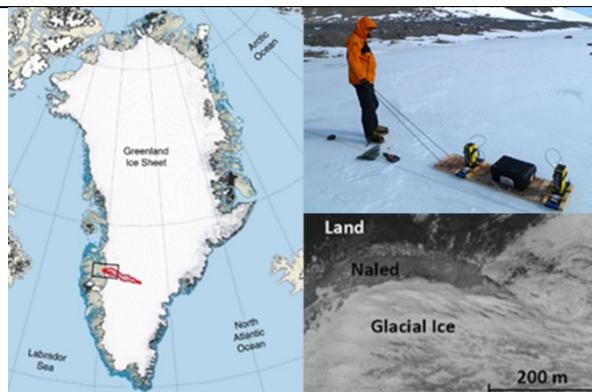
**Lead Supervisor:**

Dr Kate Winter, Northumbria University

**Key Research Gaps and Questions:**

This project will use ice penetrating radar to explore water and sediment transport pathways in West Greenland.

1. How efficient are glacier drainage systems in summer and winter?
2. How are sediments transported through the glacial system?
3. How might a changing climate alter water and sediment routing? What impact will this have on downstream systems?



**Project Description:**

The Greenland Ice Sheet is a major exporter of water and sediment, transporting fresh water and biologically important elements like silica and iron to the world's oceans. These inputs can initiate and regulate oceanic circulation patterns and drive primary production/carbon feedback loops, which are important for local and global climate.

Most of our knowledge of water and sediment export in Greenland comes from summer meltwater sampling at glacial termini. This is unlikely to represent water flow conditions and sediment transport routes in the interior of the ice sheet, where meltwater may be more widespread but distributed and where sediments may be periodically frozen to the glacier bed. This project will use ice penetrating radar to peer beneath the surface of glaciers like Isunnguate Sermia, Russell Glacier and Leverett Glacier in West Greenland before and after the summer melt season to assess hydrological and sediment transport networks, helping us to understand how systems change over time and space. Radar data, aerial imagery and sediment analysis will be fed into computer simulations to reveal the impact changing meltwater and sediment conditions could have on downstream biological and carbon storage systems as well as climate feedback loops.

The PhD project offers excellent opportunities for research training in geophysical analysis, remote sensing, sediment analysis and numerical modelling. It is anticipated that the student will undertake fieldwork in Greenland alongside an international (NSF and NERC funded) team exploring chemical and biological conditions at glacial termini.

**Prerequisites:**

A strong background in geophysics, geoscience or glaciology is essential. Experience of scientific computing, GIS, ice penetrating radar, sediment analysis and field work are desirable.

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