

Research Experience Placement (REP) Scheme

Project Title:

Quantifying the frequency and causes of extreme wet and dry periods across the Nepal Himalaya using lake sediments

Project Supervisors:

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Host Organization and Department (if applicable):

British Antarctic Survey (BAS)

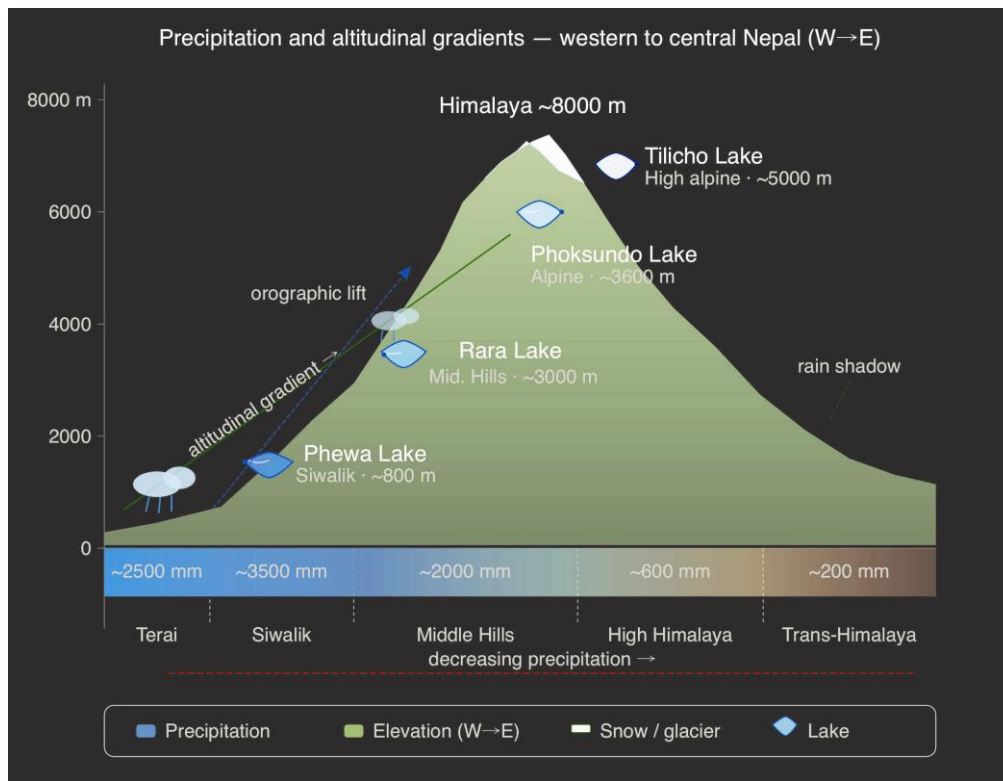
Project Description:

How the world's high mountain regions store winter snow and release meltwater is poorly understood but highly vulnerable to climate change. Water stored at high-altitude in the Himalayas eventually feeds into the shared drainage divides of the Brahmaputra, Indus and Ganges (BIG), which more than 250 million people downstream rely on for drinking water, irrigation, agriculture, and industrial purposes. Our 'BIG Thaw Nepal' project is quantifying snowfall and its impact on the water storage potential of lakes across the high-altitude Himalaya from NW to Central Nepal.

The aim of this REP project is to develop a better understanding of the frequency, magnitude and causes of past extreme wet and dry periods across the Nepalese Himalaya over the last few centuries to several thousand years.

The REP student will focus on CHNS and/or grain size data collection, analysis and interpretation from lake sediment cores already taken from the Mugu region of NW Nepal. By combining these datasets with existing chronological information and other core data, they will constrain periods of increased meltwater input. After initial training, the REP student will be encouraged to use their own initiative in the laboratory and while analysing/interpreting the core data.

Data outputs and reports that the REP student produces, and the interpretations that they make, will contribute to planned publications and comparisons coupled atmosphere-ocean climate models to see if these models are able to accurately reproduce past hydrological extremes. While most of this aspect will be undertaken after completion of the REP project by other project team members, the student will be a co-author on any publications that use data they collected or findings/interpretations they make during the REP project.



Skills and Career-Development Opportunities:

Full training in CHNS and grain size laboratory analysis, data interpretation, including training in analysing palaeo-data in R and report writing will be provided.

The student will develop the following skills:

- Data collection – primarily sediment core sampling
- Data handling and interpretation of large datasets
- Laboratory report and other writing skills, contributing to scientific papers
- Training in R – specifically, the use of Tidyverse, Tidypaleo, ggplot2 etc. packages to analyse and present sediment core data

This REP project will appeal to undergraduate students interested in developing a career in any aspect of environmental science and, more specifically in the application of palaeoenvironmental research to real-world societal issues.

Wider context of research:

As part of the BAS-led Big Thaw Nepal project (<https://www.bas.ac.uk/project/the-big-thaw/>), we have collected sediment cores from a number of high-elevation lakes in the north-western and central parts of Nepal. Working with colleagues from the Tribhuvan University and the Nepal Mountain Academy (Nepal), Université Libre de Bruxelles (Belgium), GFZ Helmholtz Centre for Geosciences (Germany) and the Utrecht University (Netherlands), we have extracted sediment cores from lakes along a precipitation and altitudinal gradient across western to central Nepal. The REP project focuses on collecting primary CHNS and/or grain size data from lake sediments extracted from one basin from NW Nepal. It contributes to the overall aims of the Big Thaw Nepal project, and involves core sampling, data collection, analysis and interpretation – and potentially some age-depth data modelling. The REP student will work primarily in the BAS Polar Sediment Core Facility laboratory, with members of the BAS Palaeoenvironments, Ice Sheets and Climate Change (PICC) group and will join in with science group and project meetings, and BAS Student group activities and other networking opportunities.

Project Timeframe:

The project duration is 6 weeks and can be undertaken anytime June to September