Westmorland Geological Society

Shear Genius: soft-sediments, shear zones and how glaciers move

Professor Emrys Phillips

20th March 2024

Refreshments 19.30, Lecture 20.00, Abbot Hall Social Centre, Kendal

This talk will focus on the deformation occurring within the soft-sediments (tills) lying beneath both modern and ancient glaciers and ice sheets. Several published scientific studies have suggested that much of the forward movement of a glacier (up to 80%) is accommodated by shearing of a thin layer of soft, deformable sediment located immediately below the base of the ice. This is process, known as the "deforming bed model", is responsible for the development of a "subglacial shear zone" which can contain a range of deformation structures typically found in highly deformed and metamorphosed rocks such as mylonites. Starting with an introduction to how glaciers move and the basic concepts of the deforming bed model, the talk with then go on to look at the range of structures (folds, faults, fabrics) found within subglacially deformed sediments. It will then take a detailed look at the microscale structures within tills and how these features shed light on the processes occurring hidden beneath the ice.

Biography

Emrys has worked at the British Geological Survey (BGS) in Edinburgh for 34 years and is a senior research scientist specialising in the deformation of geological materials (rocks and sediments). He joined BGS in 1990 as a member of the Mineralogy and Petrology Group and his role since that time has been to provide detailed specialist scientific input into BGS' multidisciplinary science programme. He has worked on a variety of research and commercial projects throughout the UK, Iceland, North America, Botswana, Egypt, Europe (Germany, Poland) and the Middle East (UAE, Oman, Saudi Arabia), as well as increasingly within the UK offshore (Irish Sea and North Sea – e.g. Dogger Bank, Dudgeon, Orkney).

Emrys' expertise is in the micro- and macroscale analysis of the soft-sediment deformation of glacial sediments and how it effects the stability and dynamics of modern and former glaciers and ice sheets.