IAG Webinar Northern Europe

3 March 2023 at 14:00–17:00 CET

Coordinators: Dr. Katja Laute and Dr. Achim A. Beylich
Geomorphological Field Laboratory (GFL), Selbustrand, Norway

INTERNATIONAL GEOMORPHOLOGY WEEK 2023

14:05–14:30

What do caves tell us about the ancient relief? The case of Aspfjordgrotta in Arctic Norway.

Dr. Christos Pennos, Rannveig Ø. Skoglund, Stein-Erik Lauritzen and Magnus Thorvik*
**Department of Geography, University of Bergen, Norway*

Solutional caves are used extensively as proxies to decode landscape evolution through time and to understand different drivers that affected the geomorphology of a given area. Here we present preliminary results of our work on Aspfjordgrotta in Northern Norway. We studied the cave morphology to decode the speleogenetic processes and to define past positions of the ancient water table. We further use the sediment accumulations inside the cave to understand the hydrological regime that enabled the sediment deposition during different glacial cycles. Our findings suggest a conceptual speoleogenetic model for the cave and provide insights of the glacial forcing.

14:30–14:55

Irish mountain glacier fluctuations during the last glacial termination and implications for deglacial climate

Dr. Margaret Jackson, School of Natural Sciences, Trinity College Dublin, Ireland

Recent investigations of near-shore glacial sediments in the North Atlantic provide vital insight into the dynamics, and demise, of the ice sheet that covered Britain and Ireland during the last ice age. However, ground-truthed chronologic information on the terrestrial pattern of ice sheet and later mountain glacier retreat remains relatively sparse, limiting our ability to reconstruct past cryospheric response to Quaternary climate changes. New collaborative work to map, date, and model the mountain glaciers that once occupied Ireland's highlands offers new perspective on the response of the Irish cryosphere to past climate change and provides discrete terrestrial targets for glacial modelers.

14:55–15:20

What can glacial geomorphology tell us about the Greenlandic Vikings during the Little Ice Age?

Dr. Danni M. Pearce, Norwegian University of the Environment and Life Sciences, Norway

Tidewater glaciers (TWGs) exert a major control on the short- and long-term mass balance of the Greenland Ice Sheet (GrIS) and have experienced widespread retreat over the last century. However, in many cases inferences on their dynamics, prior to this, are poorly constrained due to a lack of observations and paucity of mapped or mappable deglacial geomorphology. Especially lacking is evidence associated with TWG advance during the Little Ice Age (LIA, AD c. 1300 to 1850). Here I show the millennial-scale reconstruction of glacier dynamics and subsequent inferences regarding the Greenlandic Vikings during this period.

15:40–16:05

Geomorphologic reconstruction of Holocene jökulhlaups in southwestern Iceland

Dr. Greta Wells, Institute of Earth Sciences, University of Iceland, Iceland

Glacial outburst floods (jökulhlaups) have been a significant driver of landscape evolution and environmental change in Iceland throughout the Quaternary. Most contemporary floods are triggered by subglacial volcanism; however, abundant evidence exists in southwestern Iceland for jökulhlaups that drained from an ice-dammed lake during early Holocene deglaciation. This talk interprets flood geomorphology, reconstructs jökulhlaup routing, hydrology, and chronology, and discusses implications for ice sheet dynamics. It also examines these events as an analogue for glacier and hydrologic response to past, present, and future climate warming in Iceland and other Arctic and alpine regions.

16:05–16:30

Mapping and spatial modeling of periglacial phenomena in a sub-Arctic mountain environment in Northern Norway

Dr. Olli Karjalainen, Geography Research Unit, University of Oulu, Finland

The movement of soil materials and moisture in sub-Arctic landscapes is strongly influenced by periglacial processes. Frost processes (solifluction and cryoturbation) account for centimeter-scale ground displacements annually. Moreover, a suite of erosional and depositional processes at snow accumulation hollows (nivation) slowly affects the topographical development of slopes. We mapped periglacial processes across a 150-km^2 area in Finnmark, Northern Norway, both in the field and using remote sensing data. We found that radar remote sensing-based ground displacements were closely connected to periglacial process activity and could be spatially modeled with high-resolution geospatial data on environmental conditions.

16:30–16:55

Scratching beneath the surface: combining geomorphology and geophysics in paleo glacial settings. An applied case study from the southern margin of the Fennoscandian Ice sheet.

Dr. Bartosz Kurjanski, Dept. of Geology and Geophysics, School of Geosciences, University of Aberdeen, Scotland

Geomorphological studies of glacial landforms are a very powerful tool to understand palaeo ice dynamics and the distribution of resulting sediments. This understanding is often key for infrastructural projects onshore but also offshore where the distribution of landforms can be used to understand the ground conditions in the subsurface. However not everything can be predicted solely from the geomorphic expression. Here, a case study will be discussed where the geomorphological analysis of ice marginal deposits Finland (Salpausselkä I and II) was supplemented by a suit of near surface geophysical techniques to allow for a more thorough understanding of landforms and sediments beneath. The results of this study were used to improve the understanding of ground conditions at an offshore wind site located in the former ice marginal zone of the Fennoscandian ice sheet in the Southern Baltic where 2D ultra-high resolution seismic data was the primary source of subsurface information.