IAG Webinar Northern Europe

Date: 3 March 2021 at 13:00 – 17:00 CET

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

INTERNATIONAL GEOMORPHOLOGY WEEK 2021

Dr. Ívar Örn Benediktsson
Institute of Earth Sciences, University of Iceland, Iceland

13:05 – 13:40

Geomorphic evidence for palaeo-ice streams in NE-Iceland

Palaeo-ice streams in Iceland have been previously proposed on the basis of the configuration of fjords and valleys, striations, glaciotectonics and streamlined landforms, as well as modelling. Based on the new ArcticDEM and satellite and aerial imagery, geomorphological mapping and spatial analysis of transverse and streamlined glacial bedforms is conducted in order to reconstruct the configuration and dynamics of past ice streams in northeastern Iceland. The data shows considerable variation in density and elongation ratio of streamlined bedforms between different areas, tentatively suggesting cross-cutting ice streams that may have fluctuated and migrated over time during the last deglaciation in Iceland.

Bedrock weathering in formerly glaciated landscapes

Norway is riddled with hard bedrock surfaces with limited soil development, and frequent preservation of slight glacial indentations such as striae and chatter marks. This shows that bedrock weathering rates were often negligible during the ~10 ka since the last remains of the Scandinavian ice sheet vanished. Weathered landforms existing within the same regions are therefore often considered to have survived beneath cold-based ice. Using cosmogenic nuclide chronometry to assess the recent erosional history of weathered bedrock sites along the Norwegian coast, we find that weathering rates can be locally significant in cold, temperate to subarctic climates.

13:40 – 14:15

Dr. Jane Lund Andersen
Department of Geoscience, Aarhus University, Denmark

Dr. Paula Hilger
Department of Environmental Sciences, Western Norway University of Applied Sciences, Norway

14:15 – 14:50

What can surface-exposure dating tell us about rock-slope failure activity in Norway?

Norway's characteristic landscape of deeply incised valleys and fjords is impacted by actively deforming rock slopes and catastrophic slope failures. Activity peaked shortly after the last Ice Age, continued throughout the Holocene, and is still ongoing. The temporal variability in failure activity can be constrained by surface-exposure dating and seems to be related to climatic alterations. By taking the exposure-dating approach into the vertical, we can reconstruct the sliding history of active rockslides and correlate the data to recent sliding rates and potential driving factors. This innovative approach identified recent acceleration in unstable rock slopes, which are likely affected by degrading permafrost.

Coastal barrier-chain response to Holocene environmental change

Global climate changes and sea-level rise are among the great societal challenges in the 21st centuries with consequences for more than half of the world's population living in the coastal zone. Holocene coastal barriers contain complex record of long-term environmental fluctuations such as changes in sea level, sediment supply and storminess. In this talk, the results of a study deciphering the evolution of the Danish Wadden Sea barrier chain is presented. It is shown how sea-level rise, abrupt changes in sediment supply, a catastrophic storm along with large-scale topography of the coastline controlled the evolution of the barrier chain.

15:05 – 15:40

Dr. Mikkel Fruergaard
Department of Geosciences and Natural Resource Management, University of Copenhagen, Denmark

Dr. Eliisa Lotsari
Department of Geographical and Historical Studies, University of Eastern Finland, Finland

15:40 – 16:15

Impacts of frozen season and its possible future changes on the hydro- and morphodynamics of northern rivers

There is a knowledge gap concerning how the frozen season at present and its possible future changes affect the northern rivers. Thus, the impacts of varying fluvial (incl. river ice) processes on seasonal hydro-morhodynamics have been detected using high-accuracy data and modelling approaches. Preliminary results show that river ice can have a significant role in transport of coarse sediment, and river ice cover may cause the vertical and lateral flow distribution to be opposite to the open channel situation. Along with future shortening frozen period, velocity distribution, transport mechanisms, and timing and magnitude of river bed and bank erosion may change.

To Mars, via Svalbard and Antarctica

On Mars, ample evidence exists for young landforms with a presumably periglacial or glacial origin. If this is correct, they reflect climate conditions that favour cyclical freezing and thawing, accumulation and preservation of ice and glacial activity. The study of these landforms would therefore allow conclusions on the climate history and landscape evolution on Mars. By taking a cross-disciplinary approach, combining analog fieldwork (Svalbard and Antarctica) and remote sensing of two planetary surfaces will aid us in making more firm interpretations of martian environments that harbour signals of past climate conditions, valuable resources for future manned missions, and targets for astrobiological investigations.

16:15 – 16:50

Dr. Andreas Johnsson
Department of Earth Sciences, University of Gothenburg, Sweden