IAG Webinar Northern Europe

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INTERNATIONAL GEOMORPHOLOGY WEEK 2024

14:05–14:30

Glacial geomorphology and dynamics of palaeo-ice streams in northeast Iceland

Nína Aradóttir, Institute of Earth Sciences, University of Iceland, Iceland

The geomorphology of ice stream beds is critical for understanding the behaviour of ice streams. Ice streams within the Iceland Ice Sheet (IIS) had been previously proposed, but limited studies existed on their geomorphology. This talk describes the geomorphological imprint, configuration, and dynamics of palaeo-ice streams and their development during and following the Last Glacial Maximum in northeast Iceland. The distribution and orientation of streamlined bedforms reveal four flow-sets of cross-cutting palaeo-ice streams that shifted in time and space, along with ice divides. The variance in landform morphology and distribution is further used to reconstruct the configuration and dynamics of the ice streams.

14:30–14:55

Water flow beneath ancient ice sheets: Analogues for the Polar Regions in a warming world?

James Kirkham, British Antarctic Survey, UK

Water released from melting ice is an iconic indicator of climate change, and plays a key role in regulating how ice sheets contribute to sea level rise. An important question, therefore, is how will meltwater affect the fate of the Earth's ice sheets as both warming and melting continue? Whilst satellite observations of the Earth's Polar Regions are a fantastic resource, they presently only span a few decades so cannot tell us how ice sheets will respond to sustained meltwater production due to global warming over the rest of this century and beyond. We use the geological record to understand how ice sheets have decayed in past ice ages, and apply these lessons to provide analogues for how today's ice sheets may change in a future warmer world. Specifically, high resolution 3D seismic data is used to examine the geomorphology of giant channels carved by ice sheet melting, now preserved beneath the North Sea, with implications for ice-sheet dynamics, sedimentary processes and hazards to the installation of renewable energy infrastructure in the North Sea.

14:55–15:20

Terrestrial analogues for aeolian systems on Mars: a case study from Iceland

E. Martin Lund, Department of Geosciences, University of Oslo, Norway

Aeolian landscapes are present throughout the solar system. They have been observed on Venus, Mars, Titan, and other planetary bodies. The presence of familiar landscapes over such diverse planetary bodies implies similarities of processes, but also challenges our understanding of said processes due to the vast differences in gravity, atmospheric density, sediment composition et cetera. The volcaniclastic aeolian systems on Earth have received relatively little attention but are ideal analogues for martian and venusian aeolian systems. In 2022, we visited an active aeolian system in Iceland to better understand sedimentological processes on Mars.

15:35–16:00

Diversity of high latitude river systems: combining top-down and bottom-up geomorphological approaches to track changes in fluvial ecosystems

Mikel Calle Navarro, University of Turku, Finland

The variety of landforms, sediments, bedrock, or geomorphic processes are often the ones supporting biodiversity at a regional scale. Systematic and objective identification of river landscape diversity based on geomorphological aspects (landforms and processes), here defined as Fluviodiversity, not only provides valuable information about the biodiversity potential of a river system, but also delivers meaningful tools to guide river management, assess human impacts, or evaluate hydro-morphological quality of river channels. But what are the challenges to obtain regionally and locally meaningful process-based classifications of river diversity in high latitudes?

16:00–16:25

Identification of past, ongoing and incipient landslides from space

Benedetta Dini, School of Geography, Earth and Environmental Sciences, University of Birmingham, UK

Recent advancements in remote sensing, especially in Synthetic Aperture Radar differential interferometry, have substantially improved our ability to detect slope instabilities with greater accuracy and detail. Careful combination of current techniques can identify previously unknown instabilities, whilst providing insights into driving processes. This includes using large-scale InSAR processing to assess sites for large engineering projects, like studying the interaction between a hydropower dam and a deep-seated landslide. However, existing challenges related to time series generation can lead to misinterpretation. A case study of the Achoma landslide, Peru, is used to highlight the importance to integrate various parameters of the interferometric data to improve early detection of gravitational morphological features.