IAG Webinar Central & Western Europe

1st March, 15:00 – 17:00 CET

Coordinator: Emmanuel Reynard (UNIL, Switzerland)

Registration: http://www.geomorph.org/international-geomorphology-week-2021/

INTERNATIONAL GEOMORPHOLOGY WEEK 2021

Elizabeth Dietze
Alfred-Wegener-Institute Helmholtz Centre for Polar and Marine Research, Polar Environmental Systems, Potsdam, Germany

15:00 – 15:20

Fire shapes the Earth surface

Fire is a component of the Earth surface since the Silurian, when land plants have emerged. Across the globe, fire is shaping vegetation-covered land surfaces in two ways in dependence of the prevailing fire regime: either as an agent that prevents erosional processes by stabilizing the land cover and biome configuration, or as a destabilizing agent. However, it is uncertain under which conditions external changes driven by climate and/or humans will lead to substantial changes in these roles and the impacts of fire. I will discuss this question with examples from the boreal forests and the Central European lowlands.

The impact of old abandoned weirs on sediment longitudinal connectivity

There is a lack of knowledge concerning the effects of weirs on sediment longitudinal connectivity. This issue is addressed through the multi-scale analysis of the impact of old abandoned weirs on bedload transport. Based on volume estimates of sediment trapped in reservoirs, grain size analyses and measurements of bedload transport, this study demonstrates that weirs act as leaky barriers that allow bedload to pass through, although the individual geomorphic setting plays a primary role in determining the local sediment continuity. These results suggest that river connectivity is less impacted than initially thought and is likely to increase over time as old weirs gradually fall into disrepair.

15:20 – 15:40

Alexandre Peeters
Hydrography and Fluvial Geomorphology Research Centre, University of Liège, Belgium

Julie Wee
Department of Geosciences, University of Fribourg, Switzerland

15:40 – 16:00

Post-glacial dynamics and ground ice evolution in alpine Little Ice Age glacier forefields (western Swiss Alps)

In permafrost environments, mountain glaciers and frozen-debris landforms have coexisted and interacted throughout the Holocene. The Little Ice (LIA) characterized the apogee of the last interaction phase and contributed to the present-day geomorphology and dynamical behavior of glacier forefields. Processes driving the last multidecennial morphodynamical evolution of the latter were unraveled based on field-based and remote sensing techniques. Results observed in the Swiss Alps reveal shrinkage of glaciers, isolation of buried glacier ice, gravity-driven adjustments of frozen-debris masses, permafrost degradation, and generalized ice melt-induced subsidence.

On slope stability and sediment transfers in a high alpine environment using close-range remote sensing

Recent research has demonstrated that climate-change induced changes in the cryosphere will cause more rock and slope instabilities and alter sediment transfers in high alpine environments. Monitoring topographic changes is fundamental for studying these sediment dynamics, but data collection is often challenging. By using multi-temporal high resolution topographic data from terrestrial laser scanning and uncrewed aerial vehicles, geomorphic processes, such as rock fall, can be detected. Our data from the Swiss Alps show that the integration of multi-year datasets give insights into the geomorphic dynamics of the area and the driving environmental factors behind these sediment transfers.

16:00 – 16:20

Hanne Hendrickx
Department of Geography, Ghent University, Belgium

Jacques Mourey
Interdisciplinary Centre for Mountain Research CIRM, University of Lausanne, Switzerland

16:20 – 16:40

Climate change effects on mountaineering: geomorphological evolution of the routes in the Mont Blanc massif

High mountain environments in the Alps are particularly sensitive to climate change, which leads to glacial shrinkage and permafrost warming. As a result, mountaineering routes and their climbing parameters (difficulty, dangerousness and seasonality) are subject to significant changes. In this talk, the comparison of 95 routes between the 1980s and the current period will be presented. This study led to the identification of 25 geomorphic and cryospheric changes related to climate change that are affecting mountaineering routes and modifying their climbing parameters. The case of the classic route up to Mont Blanc (4809 m a.s.l.), subject of an interdisciplinary study since 2016, will be more particularly developed.

Anticipating the rock wall response to degrading permafrost

Predicting and modelling the future development of unstable permafrost bedrock is a key requirement to anticipate magnitudes and frequency of rock slope failures in a changing climate but also to forecast the stability of high-alpine infrastructure throughout its lifetime. High-alpine rock faces witness the past and present mechanical limit equilibrium. All significant changes in rock and ice-mechanical mechanical properties or significant changes in state of stress will evoke rock instability which often occurs with response times of years to 1000 years. This talk shows benchmark approaches to develop mechanical models based on a rock-ice mechanical model for degrading permafrost rock slopes on an infrastructure time scale (100 years) but also on a geomorphological Lateglacial and Holocene valley evolution time scale (10 000 years).

16:40 – 17:00

Michael Krautblatter
Technical University of Munich, Chair of Landslide Research, Faculty of Civil, Geo and Environmental Engineering, Germany