IAG Webinar W. Europe & British Isles

Tuesday 2nd March 2021 14:00-18:30 CET

Coordinators: Susan Conway & Mauro Soldati

INTERNATIONAL GEOMORPHOLOGY WEEK 2021

14:00 - 14:20

High mountain landforms evolution along recently deglaciated areas of Turkey

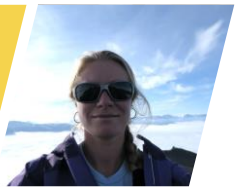
Proglacial systems are one of the most dynamic landscapes on Earth and are sensitive to climate change. The effects of climatic forcing are especially intense at mid-low latitude mountain ranges, such as those in the circum-Mediterranean region. We focus on recently deglaciated areas of Turkey with fast evolution of landforms tuned by their specific structural and climatic settings. We considered two areas with different structural, lithological and climatic settings: the Mount Ararat/Agri Dagi and the Cilo mountain range. The overprint of local factors on climate-driven surface evolution can explain the different trajectories of landform evolution since the Little Ice Age.

Roberto Sergio Azzoni
Dipartimento di Scienze della Terra "A. Desio", Università degli Studi Di Milano, Milan, Italy.

Recent advances in rock wall permafrost modelling to understand bedrock failure

A recent increase in the rate of failure in periglacial rock walls has been attributed to permafrost degradation. To validate this hypothesis we applied a simple transient thermal model to hundreds of observed rockfalls in the Mont Blanc massif and determined the statistical relationship between rock wall temperature dynamics and failure occurrence. This is a first step towards prediction of rockfall probability. To improve our understanding of the processes leading to failure, we made a first attempt to couple thermal and hydrological models. The role of water flowing through bedrock fractures enhances the rate of permafrost degradation and affects the pressure field distribution.

14:20 – 14:40



Florence Magnin
EDYTEM LaB. (CNRS, Université Savoie Mont Blanc), France

14:40 – 15:00

Understanding the resistance of UK salt marsh substrates to erosion

Salt marshes provide habitats and are able to attenuate waves. However, in many locations worldwide, salt marshes are retreating from their seaward edge. This talk combines measurements of substrate composition (particle size, organic content) with those of substrate shear strength (Cohesive strength meter, shear vanes). These are then compared, and linked to, measurements of change in the marsh edge position. In doing so, this talk sheds light on how grain-by-grain erosion and shear failure processes are affected to different extents by various aspects of marsh substrate composition, and thus how marsh substrate composition affects erosion processes and retreat rates.

Helen Brooks
Department of Geography, Trinity College Dublin, Eire

Landslide susceptibility modelling and mapping: applications to hurricane-driven scenarios in caldera slopes (Caldera Ilopango, El Salvador)

Landslide susceptibility is the probability of a landslide in a specific area based on its local characteristics and assumes that the past is the key to the future. Climate change weakens this latter assumption and studying how landslide susceptibility models are affected is a major challenge. This issue is explored by exploiting rain-induced landslide archives in El Salvador (C.A.). In the Caldera Ilopango area, the consequence of seasonal versus hurricane rainfall for the same area was investigated. Then, the effect of the same intensity rainfall trigger (Hurricane Ida, 2009) was exploited to predict landslides for the five main volcanoes of El Salvador.

15:00 – 15:20

Chiara Martinello
University of Palermo, Department of Earth and Marine Sciences, Italy

15:20 – 15:40

Studies of "cliff erosion" and "coastal flooding" hazards (France, Greece, Canada)

I will summarise my research focusing on coastal hazards using : i) a multidisciplinary approach through the concept of systemic vulnerability and through multi-parameter cliff instrumentation to better understand the mechanisms of cliff fatigue and cliff failure; ii) remote sensing with a combination of tools (terrestrial photogrammetry, multi-angular spatial imagery...) to monitor the best cliff erosion proxy: the cliff face (from the foot to the top), allowing to observe all changes; and iii) combined training/research/citizen science approach with the implementation, within the framework of a training project, of a citizen science application for monitoring coastal hazards in Brittany.

Pauline Letortu
LETG-Brest, Université de Bretagne Occidentale, France

Effect of impact inheritance on subsequent rock breakdown

Impact cratering is one of the most common geologic processes shaping all the terrestrial planetary bodies and moons in our solar system. The formation of impact craters has a catastrophic effect on target lithology, producing a range of heterogeneities and deformation features in rocks. Recognising how these heterogeneities and deformations affect rock breakdown mechanisms and kinetics provides a framework for understanding impact inheritance in subsequent landform degradation and modification. This talk will focus on how the inheritance from low impact shock (<10GPa) deformations and heterogeneities affect subsequent rock breakdown with a case study on Meteor Crater in Arizona.

15:40 – 16:00

Ankit Verma
Insight SFI Research Centre for Data Analytics, Dublin City University, Ireland.

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Kim Génuite
UMR 6266 IDEES, University of Rouen Normandy / CNRS, Mont St-Aignan, France

16:30 – 16:50

Reconstructing the quaternary evolution of the Ardèche river through karst-river relationships and multi-method dating

he Ardèche river gorges (Ardèche, France), is famous for its deep ingrown meanders and represent one of the most touristic assets of the area. It is also a central place for Middle and Upper Palaeolithic frequentations with numerous caves containing some of the most ancient and impressive rock art ever discovered like in the Chauvet cave (36000 years cal BP). Multi method datings (U-Th and ESR on quartz) was performed inside and outside cave systems and combined with 3D survey on the entire Ardèche gorges. It provided a new model for the middle to late quaternary karst-river evolution as well as temporal and paleogeographic constraints for paleolithic settlements around in the Ardèche river.

How long could a runoff episode last during early Mars?

Surface modification features on Mars attest to a climate that was radically different in the past. However, climate models have difficulty sustaining a liquid hydrosphere at the surface, suggesting discrete cycles of runoff generation may have characterized the ancient climate. Using coupled lake morphologies and existing global climate model data we show that runoff episodes were relatively short and could not have persisted for much longer after breaching. Episode duration was 10^2-10^5 yr and spatially variable. Our estimates provide key constraints that must be satisfied by an oscillating climate during early Mars.

16:50 – 17:10

Gaia Stucky de Quay
Jackson School of Geosciences
The University of Texas at Austin, USA

Mariacristina Prampolini
CNR-ISMAR, Italy

17:10 – 17:30

Integrating terrestrial and marine geo-environmental datasets: geomorphological applications and technological advances

Integrating terrestrial and marine spatial datasets has proved to be fundamental to reach a holistic view on the processes occurring on the coastal, near-shore and shallow water areas. Despite the challenge of providing a homogeneous and continuum representation of the Earth's surface from the land down to the deep seafloor, different areas of geomorphological research can benefit from this approach, ranging from geomorphological mapping and palaeo-landscapes reconstruction, to geohazard assessment, habitat mapping and spatial planning. Case studies including integrated land-sea geomorphological mapping will be presented.

Seismic geomorphology and history of the northwest Greenland Ice Sheet

Trough mouth fans are a common sedimentary feature on glaciated margins and contain a record of ice sheet advance and retreat across the continental shelf. This work uses 2D and 3D seismic reflection data across the Melville Bugt Trough Mouth Fan, offshore northwest Greenland, to document the stratigraphic architecture and geomorphology of the fan. These results document glacial landforms buried in the subsurface and provide new details on large-scale glacigenic and marine depositional processes during the repeated fluctuations of the northwest Greenland Ice Sheet into Melville Bugt since ~2.7 Ma.

17:30 – 17:50

Andrew Newton
Queen's University Belfast, Northern Ireland

Ciro Cerrone
University of Naples Federico II, DiSTAR, Italy

17:50 – 18:10

Tectonic implications of raised Late-Quaternary paleo-shorelines along the Tyrrhenian coast of Southern Apennines, Italy

An impressive flight of marine terraces occurs along the Tyrrhenian coastal area of southern Italy, from Campania to Calabria. In these regions, the uppermost marine terraces are up to hundreds of metres above sea level and testify to the long-term Quaternary uplift of the southern Apennines mountain belt. This presentation aims to illustrate the state of the art based on new geomorphological and Quaternary stratigraphical analyses on raised marine terraces in some key spots of the Tyrrhenian side of the chain. The age of the marine terraces have been constrained with the U-series method.

Quantifying rates of ice-cored landform evolution in the high-Arctic

Ice-cored moraines are commonly found at the margins of receding high-Arctic glaciers. Advances in our ability to detect and monitor surface change using high-resolution multi-temporal digital elevation models provides an opportunity to investigate rates and patterns of landform change. This talk will give an overview of research investigating landform evolution at deglaciating sites in the high-Arctic, linking raster-based surface change detection to geophysical datasets of moraine internal structure. This research highlights that spatially variable rates of change are controlled by both landform and site-specific characteristics.

18:10 – 18:30

Toby N. Tonkin
Environmental Sustainability Research Centre, University of Derby, UK