



CFU 5

Organized by:

University of Pavia – Department of Earth and Environmental Sciences

EURAC Research – Institute for Earth Observation, Bolzano

University of Innsbruck – Department of Geology

Autonomous Province of Bolzano - Office for Geology and Building Materials Testing

CNR - Institute for Geo-Hydrological Protection Research

Organizing committee:

Roberto Seppi, Francesco Zucca and Aldo Bertone (University of Pavia)

Mattia Callegari, Giovanni Cuzzo and Claudia Notarnicola (EURAC Research)

Karl Krainer (University of Innsbruck)

Volkmar Mair (Autonomous Province of Bolzano)

With the support of:

- Italian Association of Physical Geography and Geomorphology (AIGEO)
- Italian Glaciological Committee (CGI)

Permafrost is a key element of the terrestrial cryosphere that is strongly affected by a warming climate. With widespread permafrost degradation likely to occur in the next future, remote sensing is seeking to reveal the processes and causal connections governing this development, from the monitoring of the permafrost state to the mapping of the impacts and potential natural hazards.

Permafrost landforms and surface features, such as rock glaciers, can be identified by image classification techniques in a variety of remote sensing products. Permafrost-related surface deformations can be detected by radar interferometry. However, field-based techniques, such as terrestrial laser scanner, GPS and ground-based SAR, are essential for integrating and validating the remote sensing products.

In this context, the ALPSMOTION project (ALPine Slow slope MOVement moniTorIng and detectiON with remote and proximal sensing), coordinated by EURAC Research and funded by the Autonomous Province of Bolzano, aims at improving the monitoring of permafrost deformation, in particular of rock glaciers, exploiting satellite-based SAR data. Within the project this kind of data have been exploited at regional and local scale. In the latter case, an integration with in-situ measurements acquired with different techniques, i.e. GPS, ground-based SAR and UAV, has been performed. Methodology and expertise developed have been also tested to a landslide deformation case.

The purpose of the Summer School is to offer an overview on modern remote- and field-based approaches currently used to investigate the dynamics of alpine slopes affected by permafrost, with particular attention to the combined use of different types of data.

The school is mainly addressed to PhD students working on the topic, but master degree students, post-docs and early career scientists are also welcomed.

Planned activities:

- Classroom lectures and practical exercises on data analyses (3 days @Eurac Research, Bolzano)
- Field excursion in Val Senales, South Tyrol (1 day)

Dates:

16 – 19 July 2019

Lecturers:

Annett Bartsch – b.geos GmbH and Austrian Polar Research Institute, Vienna

Roland Psenner – EURAC Research, Bolzano

Karl Krainer, Christine Fey - University of Innsbruck – Department of Geology

Volkmar Mair – Autonomous Province of Bolzano, Office for Geology and Building Materials Testing

Francesco Zucca, Aldo Bertone - University of Pavia – Department of Earth and Environmental Sciences

Mattia Callegari, Giovanni Cuzzo, Stephan Steger, Carlo Marin – EURAC Research – Institute for Earth Observation, Bolzano

Niccolò Dematteis – CNR IRPI, Torino & University of Pavia – Department of Earth and Environmental Sciences

Alessandro Mondini – CNR IRPI, Perugia

Venue

EURAC Research (www.eurac.edu)

Viale Druso, 1 / Drususallee 1 - 39100 Bolzano / Bozen – Italy

Coordinates: 46.4945° N, 11.3473° E

Google maps link: <https://goo.gl/maps/cnFnrGEajvq>

Accommodation

Participants will spend all the nights in Bolzano; they should book an accommodation on their own

For a list of Hostels in Bolzano, check this [link](#)

For a list of Hotels in Bolzano, check this [link](#)

!!!!!! Please, book your accommodation in advance, Bolzano is crowded with tourists in July !!!!!!!

Field excursion in Val Senales

Participants will be transported to Val Senales and back to Bolzano by private bus

Suggested personal equipment for the field excursion: light mountain boots; mountain jacket; pile, gloves; cap; sunglasses

No registration fee is required

Maximum number of participants is 25

Deadline for registration: 31 May 2019

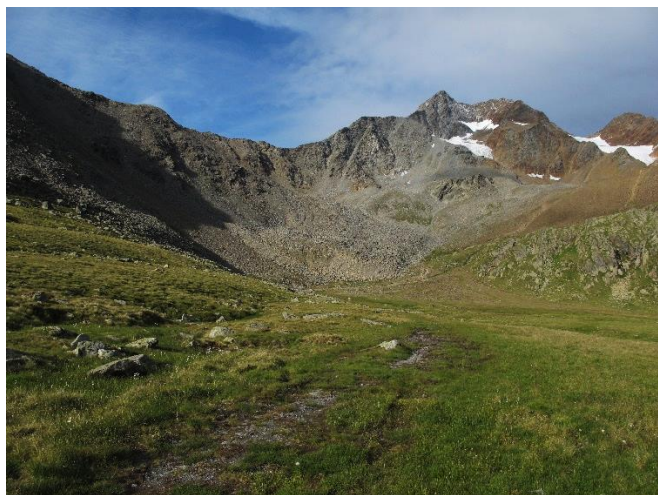
To register or to ask for further information please send an email to:

aldo.bertone01@universitadipavia.it

PROGRAM

16 July 2019	
<p>Morning Bolzano – EURAC 9.30 – 9.45 Welcome and introduction to the course 9.45 – 10.30 Short introduction by the participants 10.30 – 11.00 <u>Roland Psenner</u> <i>Permafrost thawing and metal contamination in alpine lakes</i> 11.00 – 11.30 Coffee Break 11.30 – 12.30 <u>Karl Krainer</u> <i>Permafrost and rock glacier dynamics in the Eastern Alps and Dolomites</i></p>	<p>Afternoon Bolzano – EURAC 14.00 – 15.15 <u>Volkmar Mair</u> <i>Studies on permafrost and rock glaciers in South Tyrol</i> 15.15 – 15.45 Coffee Break 15.45 – 17.00 <u>Annett Bartsch</u> <i>General approaches to monitoring permafrost from space</i> 17.00 – 18.00 Aperitive and possibly poster session by the participants</p>
17 July 2019	
<p>Morning Bolzano – EURAC Session on techniques 9.00 – 10.30 <u>Giovanni Cuzzo & Mattia Callegari</u> - <i>Introduction to SAR</i> - <i>SAR Interferometry</i> 10.30 – 11.00 - Coffee break 11.00 – 12.00 <u>Niccolò Dematteis</u> - <i>Ground-Based SAR</i> 12.00 – 13.00 <u>Christine Fey</u> <i>Use of UAV and GPS on rapidly moving slopes and rock glaciers</i></p>	<p>Afternoon Bolzano – EURAC 14.00 – 17.00 The ALPSMOTION project Presentation of the main results reached in the project.</p> <ul style="list-style-type: none"> • Giovanni Cuzzo – <i>Introduction</i> • Karl Krainer – <i>Studies on Lazaun rock glacier and GPS and UAV results</i> • Aldo Bertone – <i>SAR applications on South Tyrol rock glaciers and Lazaun area</i> • Francesco Zucca – <i>Movement of Lazaun rock glacier monitored by GB-SAR</i> • Alessandro Mondini – <i>Remote Sensing for landslide detection and mapping</i> • Stefan Steger & Giovanni Cuzzo – <i>Monitoring the Corvara Landslide</i>
17 July 2019 - h18:00 EURAC	
<p>Public conference Volkmar Mair <i>Permafrost, slope dynamics and related hazards in the Alps</i></p>	
18 July 2019	
<p>Field excursion in Val Senales - Lazaun area and Grawand Main topics: Periglacial geomorphology, permafrost and rock glacier dynamics, ground-based monitoring techniques; long-term permafrost temperature measurements in bedrock.</p>	
19 July 2019	
<p>Bolzano EURAC - Practical exercises 9.00 – 13.30 Exercises on SAR interferometry Teachers: Mattia Callegari, Carlo Marin, Aldo Bertone</p>	

Field excursion 18 July 2019



Lazaun area

- Observation of glacial and periglacial landforms
- Monitoring rock glacier activity and dynamics



Grawand summit

- Thermal state of permafrost in bedrock
- Rock wall dynamics

All the sites will be reached by chair lift and cable car, only a little walk will be required in Lazaun.