



SECOND SUMMER SCHOOL OF THE INTERNATIONAL ASSOCIATION FOR ENGINEERING GEOLOGY AND THE ENVIRONMENT

CLIMATE CHANGE: IMPROVING KNOWLEDGE TO HELP REDUCING GEO-HYDROLOGICAL RISKS OF EXTREME EVENTS

Aosta (Italy) 3 – 11 July 2023

The impacts of climate change are manifested and expressed through an increased frequency and magnitude of extreme events. Floods, windstorms, intense rainfall and drought are all expressions of this ongoing change that can significantly impact infrastructure and human activities. In this context, characterised by substantial variability, an understanding of these extreme processes and their impacts is fundamental for understanding which adaptation and mitigation strategies can be developed in the immediate future. The hazard assessment methods need to consider the variations in the natural environmental and anthropogenic systems, which lead to imbalances in the estimation of the return periods and the realisation of scenarios. Only through a better definition of the possible scenarios and impacts of these extreme events will it be possible to increase resilience and develop new and more effective mitigation strategies. The aim of the IAEG 2023 summer school is to focused on characterising extreme events with significant geo-hydrological impacts and mitigating their effects with the implementation of new approaches and techniques.

Monday - July 3 2023 - Introductions and background to school and fundamental principals/concepts

8.00 – 9.30 Summer school registration

9.30 – 10.00 Introduction to the IAEG Summer School and presentation of IAEG activities

10.00 – 10.30 Welcome to the Aosta Valley Region *Raffaele Rocco – Sara Ratto* (Aosta Valley region Authority)

10.30 – 11.00 Coffee break

11.00 – 12.00 Introduction to climatic characteristics of the Aosta Valley Region and local climate change effects *Edoardo Cremonese* (ARPA VDA)

12.00 - 13.00 The management of geo-hydrological processes and effects in by the Centro Funzionale of Aosta Valley region *Sara Ratto* (Aosta Valley region Authority)

13.00 – 14.30 Lunch

14.30 – 16.15 Climate change and its amplified effects in the mountains *Elisa Palazzi* (UNITO)

16.15 – 18.00 Students' presentations

18.00 – 19.00 Ice-break cocktail

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Tuesday July 4 2023 - *Hydro-metrological Hazards*

9.00-10.45 Hydrology in a climate change - *Bruno Majone (UNITN)*

10.45 – 11.15 Coffee break

11.15-13.00 Extreme rainfall events: dynamic and critical points - *Antonio Parodi (CIMA)*

13.00-14.30 Lunch

14.30-16.15 Impacts of climate changes to related processes in high mountains - *Marten Geertsema (UNBC)*

16.30 – 18.00 Impacts of extreme rainfall on slope stability – *Jonathan W Godt (USGS)*

Wednesday - Field trip July 5 2023

Goillet Dam dam and power plant (Grand Sometta rock glacier and Cime Bianche DSGSD) vist

Thursday – workshop July 6 2023 - *Remote sensing techniques to aid mapping*

9.00-10.45 workshop (Digital image correlation)

10.45-11.15 Coffee break

11.15-13.00 workshop (Digital image correlation)

13.00-14.30 Lunch

14.30-16.15 workshop (remote sensing applications for flood and landslide mapping)

16.15-18.00 workshop (remote sensing applications for flood and landslide mapping)

Friday July 7 2023 - *Cascading hazards*

9.00-10.45 Windstorms: impacts on slope instabilities and restoration procedures- *Emanuele Lingua (UNIPD)*

10.45-11.15 Coffee break

11.15-13.00 Snow avalanches and cascading mass movements Michael Kyburz (SLF)

13.00-14.30 Lunch

14.30-16.15 Debris Flow: dynamic and risk assessment - *Marco Cavalli (CNR IRPI)*

16.15-18.00 Monitoring snowpack dynamics and related water resources with Earth Observation data *Claudia Notarnicola (EURAC)*

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Saturday - Field trip July 8 2023

Brenva Rockslide, Planpincieux Glacier, Mont de La Saxe Rockslide (Giordan, Crosta, Bertolo, Zucca, Troilo)

SUNDAY July 9 2023

Free tour of Aosta

Monday July 10 2023 - *Management of climate change and hazard impacts*

9.00-10.45 Management of the impact of climate change in high mountain regions - *Wilfried Haerberli* (UZH)

10.45-11.15 Coffee break

11.15-13.00 Water management and drought: mitigation and adaptation strategies – *Maria Cristina Rulli* (POLIMI)

13.00-14.30 Lunch

14.30-16.15 The role of groundwater in adaptation to climate change impacts - *Tibor Stigter* (IHE Delft)

16.15-18.00 Climate changes, economy and adaptation (UNIVDA)

Tuesday –July 11 2023 – *Risk management of geo-hydrological processes and correct communication procedures*

9.00-10.45 Management of geo-hydrological processes at the regional scale *Centro funzionale Aosta Valley Region*

10.45-11.15 Coffee break

11.15-13.00 Risk management and communication (UNIVDA)

13.00-14.30 Lunch

14.30-16.15 Communication of risks in high mountain regions - *Jean Pierre Fosson* (FMS)

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