

THIRD SUMMER SCHOOL OF THE INTERNATIONAL ASSOCIATION FOR ENGINEERING GEOLGY AND THE ENVIRONMENT

Resumé of the 4th IAEG Summer School: *The role of geological models for geo-hazards management and infrastructure design*

Aosta (Italy), 7 – 15 July 2025

The fourth edition of the IAEG international summer school was held in Aosta and hosted in the new building of the University of the Valle d'Aosta.

This year, the *fil rouge* of the school pertained to the role of the geological model for geo-hazard management and infrastructure design.

There was no shortage of lectures on the physical processes involving landslides, cryospheric instabilities, floods, wildfires and earthquakes, as well as lectures on multi-hazard and countermeasures against natural hazards. More than two days were dedicated to workshops on various themes.

Finally, two field trips were conducted to visit the Mount Blanc area, where various instability processes are present, and the Beauregard Dam, which was partially demolished after completion due to the presence of a deep-seated gravitational slope deformation that was not known at the beginning of the works. Again, it was an excellent example of an operative measure against geo-hydrological hazards.

The summer school received more than **150 applications** from six continents, and, in the end, 27 students attended the school from 11 countries (Figure 1). The participants' gender was well balanced, with 15 males and 12 females.

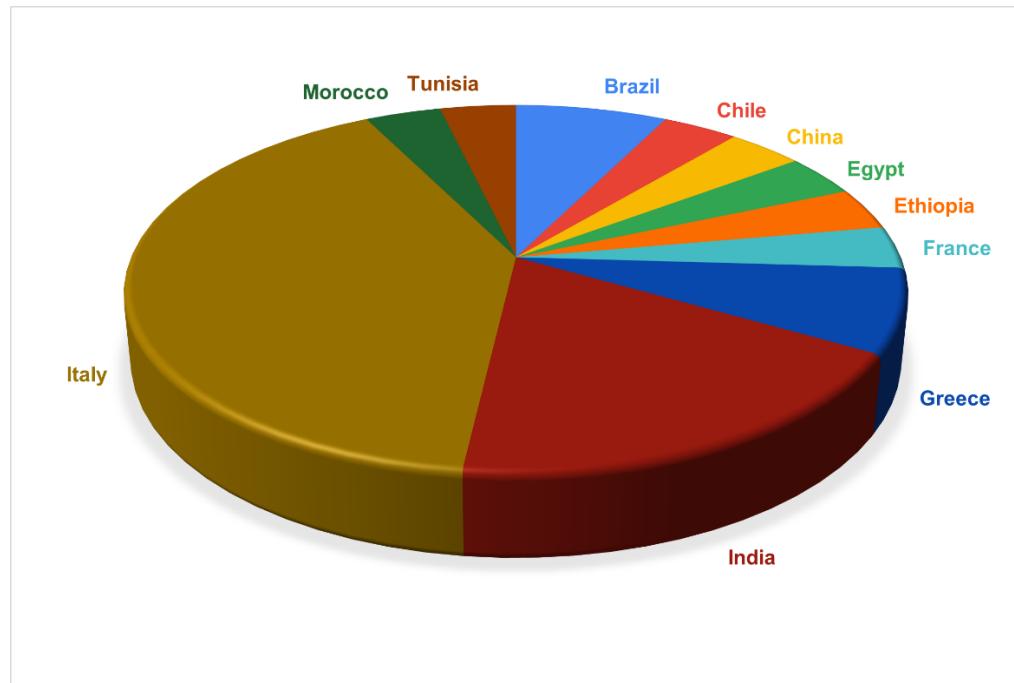


Figure 1. Nationalities of the summer school students.

The program of the summer school included 1-2 hours of frontal lectures, two field trips in the high alpine environment, and three workshops, organized as follows:



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

Monday - July 7, 2025

Introductions and background to school and fundamental concepts

8.00 – 8.30 Summer school registration

8.30 – 9.00 Introduction to the IAEG Summer School (*Vassilis Marinos, President of IAEG, Claudio Margottini, president of IAEG Italian NG*) and Welcome to the Aosta Valley Region *Raffaele Rocco/Sara Ratto (Aosta Valley Region Authority)*

9.00 – 10.45 The role of Engineering Geological Models in Geohazard Assessments. *Steve Parry - IAEG C25*

10.45– 11.15 Coffee break

11.15 - 13.00 Large infrastructures and geological settings, case studies and lessons learnt. *Vassilis Marinos - NTUA*

13.00 – 14.30 Lunch

14.30 – 16.15 The use of geological modelling in large infrastructures in Italy from theories to practice *Gianluca Benedetti - ITALFER*

16.15 – 18.00 Students' presentations

18.00 – 19.00 Ice-break cocktail

Tuesday - July 8, 2025

Natural geo-hazards - Processes and modelling

9.00-10.45 From the geological to the numerical model of slopes. *Giovanni Crosta - UNIMIB*

10.45 – 11.15 Coffee break

11.15-13.00 Engineering geology and rock mechanics in practice. *Steve Hencher - LEEDS*

13.00-14.30 Lunch

14.30-16.15 Countermeasures design for slope instabilities, Active and Passive mitigation, land-planning, *Davide Bertolo - Aosta Valley Region Authority*

16.30 – 18.00 Working groups

Wednesday - July 9, 2025 - Field trip

Dangerous natural processes and mitigation solutions in Courmayeur

Thursday - July 10, 2025

Put theories into practice

9.00-10.45 workshop - The use of digital outcrop models for the identification of discontinuities and critical orientations *Niccolò Menegoni – UNIPV*

10.45-11.15 Coffee break

11.15-13.00 workshop - The use of digital outcrop models for the identification of discontinuities and critical orientations *Niccolò Menegoni – UNIPV*

13.00-14.30 Lunch



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

14.30-16.15 The relevance of best practices in the engineering maintenance of large infrastructures *Marco Cauduro - CVA*

16.15-18.00 Impact of Glaciers and permafrost-related instabilities on structures and settlements. *Fabrizio Troilo - FMS*

Friday - July 11, 2025

Evaluation of impacts and possible solutions

9.00-10.45 Catastrophic long-range process cascades from de-glaciating high mountains *Wilfried Haeberli - UZH*

10.45-11.15 Coffee break

11.15-13.00 MultiHazard and Multirisk analyses. *Cees Van Westen - UTWENTE*

13.00-14.30 Lunch

14.30-16.15 “Navigating nature challenges”: Exploring risk perception, behavioural responses, and effective communication strategies in the face of natural hazards. *Simona Sacchi - UNIMIB*

16.15-18.00 Risk based decision making in the management of landslide hazards on hydroelectric reservoirs in British Columbia, Canada *Tom Stewart – BC HYDRO*

Saturday - July 12, 2025 - Field trip

Impact of large slope instability on large dam: the case study of Beauregard dam

Sunday - July 13, 2025

Free tour of Aosta and surroundings!!

Monday - July 14, 2025

Evaluation of impacts and possible solutions

9.00-10.45 Understanding earthquakes and their interaction with the environment: an introduction to engineering seismology *Chiara Smerzini – POLIMI*

10.45-11.15 Coffee break

11.15-13.00 Seismic micro zonation mapping – *Lucia Luzi - INGV*

13.00-14.30 Lunch

14.30-16.15 Debris flow dynamic and modelling *Francesco Comiti - UNIPD*

16.15-18.00 Working groups

Tuesday - July 15, 2025

Put theories into practice

9.00-10.45 Workshop - Rockfall modelling. *Giovanni Crosta, Paolo Frattini - UNIMIB*

10.45-11.15 Coffee break

11.15-13.00 Workshop - Rockfall modelling. *Giovanni Crosta, Paolo Frattini - UNIMIB*

13.00-14.30 Lunch

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

14.30-16.15 Debris flow risk reduction strategies *Valerio Segor* - Aosta Valley Region Authority

16.15-18.00 Working group results presentation

PHOTO GALLERY



Figure 2. Students and lecturers in front of the new University of the Aosta Valley



Figure 3. Students during a lecture

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



Figure 4. Mt de La Saxe rockslide deep drainage system



Figure 5. The summer school group in front of the Brevna Glacier (Mt. Blanc)



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



Figure 6. The summer school group at the Beauregard Dam



Figure 7. The new Aosta Valley University