

An Integrated Approach to Geohazards, Climate Change, and Resilience

Aosta (Italy) June 29 - July 7, 2026

The impacts of climate change are increasingly evident through the growing frequency and intensity of extreme events. Geohazards, such as floods, landslides, and slope instabilities, clearly illustrate these ongoing transformations, which can significantly affect both infrastructure and human activities. In a context characterized by pronounced variability and uncertainty, understanding these processes and their cascading effects is essential to designing effective adaptation and mitigation strategies for the near future.

To achieve this, hazard assessment approaches must evolve to incorporate changes in both natural systems and human environments, as these factors can alter the balance of risk analyses, the estimation of return periods, and the development of realistic future scenarios. Only through a deeper and more integrated understanding of these dynamics will it be possible to enhance resilience and design innovative mitigation measures that can address emerging challenges.

The **IAEG 2026 Summer School – “An Integrated Approach to Geohazards, Climate Change, and Resilience”** aims to explore the complex interactions between climate change and geohazards. By promoting innovative tools and methodologies, the program will focus on characterizing ongoing environmental changes and defining forward-looking adaptation strategies to strengthen the resilience of societies and infrastructures.

The International Association for Engineering Geology and the Environment (IAEG) was founded in 1964 and is affiliated with the International Union of Geological Sciences (IUGS). IAEG is a worldwide scientific society that promotes and encourages the advancement of Engineering Geology through technological activities and research, improves teaching and training in Engineering Geology, and collects, evaluates, and disseminates the results of engineering geological activities worldwide.

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

PROGRAM

Monday – June 29, 2026

Introductions and background to the school and fundamental concepts

8.00 – 8.30 Summer school registration

8.30 – 9.00 Introduction to the IAEG Summer School *Daniele Giordan*, and Welcome to the Aosta Valley Region *Sara Ratto* (Aosta Valley Region Authority)

9.00 – 10.45 Fundamental physics of climate change and its observable impacts *Elisa Palazzi* - University of Torino

10.45 – 11.15 Coffee break

11.15 – 13.00 Drought Risk and Water Scarcity in a Changing Climate: Processes, Impacts, and Risk Implications *Edoardo Cremonese* - CIMA Foundation

13.00 – 14.30 Lunch

14.30 – 16.15 Hydrological digital twins and their use for predictions of future evolution *Riccardo Rigon* - University of Trento

16.15 – 18.00 Students' presentations

18.00 – 19.00 Ice-break cocktail

Tuesday – June 30, 2026

AI and Climate Data

9.00-10.45 Climate Tipping Points: What the Past Reveals About Our Future *Massimo Frezzotti* - University of ROMA3

10.45 – 11.15 Coffee break

11.15-13.00 Deep learning for pattern recognition in geoscientific datasets. *Valentin Terzius Bickel* - University of Berna

13.00-14.30 Lunch

14.30-16.15 Large-Scale Landslide Forecasting Models with Uncertainty Quantification. *Alessandro Mondini* - CNR IMATI

16.30 – 18.00 Working groups

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Wednesday - July 1, 2026 - Field trip

Dangerous natural processes and mitigation solutions in Courmayeur

Thursday - July 2, 2026

Advanced monitoring solutions

9.00-10.45 LiDAR and photogrammetry for high-resolution topographic analysis *Marco Piras* - Politecnico of Torino

10.45-11.15 Coffee break

11.15-13.00 Satellite InSAR for ground deformation monitoring *Alessandro Ferretti* - TRE ALTAMIRA

13.00-14.30 Lunch

14.30-16.15 Workshop Hands-on with Drones: Capturing High-Resolution Data for Geohazard Mapping and Change Detection. Creating a high-resolution orthomosaic and Digital Surface Model (DSM) of a simulated landslide area *Marco Piras & Vicenzo Di Pietra* - Politecnico of Torino

16.15-18.00 Workshop Hands-on with Drones: Capturing High-Resolution Data for Geohazard Mapping and Change Detection. Creating a high-resolution orthomosaic and Digital Surface Model (DSM) of a simulated landslide area *Marco Piras & Vicenzo Di Pietra* – Politecnico of Torino

Friday - July 3, 2026

Advanced monitoring solutions

9.00-10.45 ground-based InSAR development and perspectives. *Davide Leva* - Lisalab

10.45-11.15 Coffee break

11.15-13.00 Monitoring solution in high mountains *Fabrizio Troilo* - FMS

13.00-14.30 Lunch

14.30-16.15 workshop - Climate Data Challenge: Analyzing Global Datasets with AI to Identify Regional Geohazard Hotspots. Use of a well-known dataset *Marco Zanchi* - University of Milano Bicocca

16.15-18.00 workshop - Climate Data Challenge: Analyzing Global Datasets with AI to Identify Regional Geohazard Hotspots. Use of a well-known dataset *Marco Zanchi* - University of Milano Bicocca

Saturday - July 4, 2026 - Field trip

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

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Sunday - July 5, 2026

Free tour of Aosta and surroundings!!

Monday - July 6, 2026

Modeling Geohazards

9.00-10.45 physics-based models (physical equations to simulate mass movements) J A Fernandez Merodo - Instituto Geológico y Minero de España

10.45-11.15 Coffee break

11.15-13.00 data-driven models (statistical or machine learning approaches) Filippo Catani - UNIPD

13.00-14.30 Lunch

14.30-16.15 Python for Geoscientists: An Introduction to Geohazard Modeling with Open-Source Tools
Martin Mergili - University of Graz

16.15-18.00 Working groups

Tuesday - July 7, 2024

Focus on Landslides and Avalanches

9.00-10.45 Anticipation of landslides and their impacts *Fausto Guzzetti* – CNR IMATI & Durham University, IHRR

10.45-11.15 Coffee break

11.15-13.00 Monitoring, predictive modeling and early warning systems for landslides. *Giovanni Crosta* - University of Milano Bicocca

13.00-14.30 Lunch

14.30-16.15 Vulnerability and risk assessment of cultural heritage exposed to climate-induced extreme events: tools and solutions for preventive conservation *Alessandra Bonazza* – CNR ISAC

16.15-18.00 Working group results presentation

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