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# Advancing Disaster Resilience: From Lava Flows to Floods and Wildfires

In recent months, the UNICORN Project has achieved significant progress in developing innovative solutions for natural hazard management, strengthening the connection between technology, science, and end users.

Three key workshops have marked important milestones in the evolution of platforms dedicated to managing **lava flows, floods, and wildfires**.

These collaborative sessions brought together scientific partners, technical experts, and local authorities to validate early prototypes, gather operational feedback, and guide future developments toward increasingly effective and user-centered solutions.

From modeling the impacts of volcanic eruptions, to enhancing flood forecasting systems through the integration of Copernicus Programme data, and leveraging artificial intelligence for wildfire monitoring, these advancements represent a concrete step toward faster, more accurate, and more accessible decision-support tools for emergency responders and decision-makers.

In this newsletter, we explore the key outcomes of these three workshops and their contribution to building more resilient communities.

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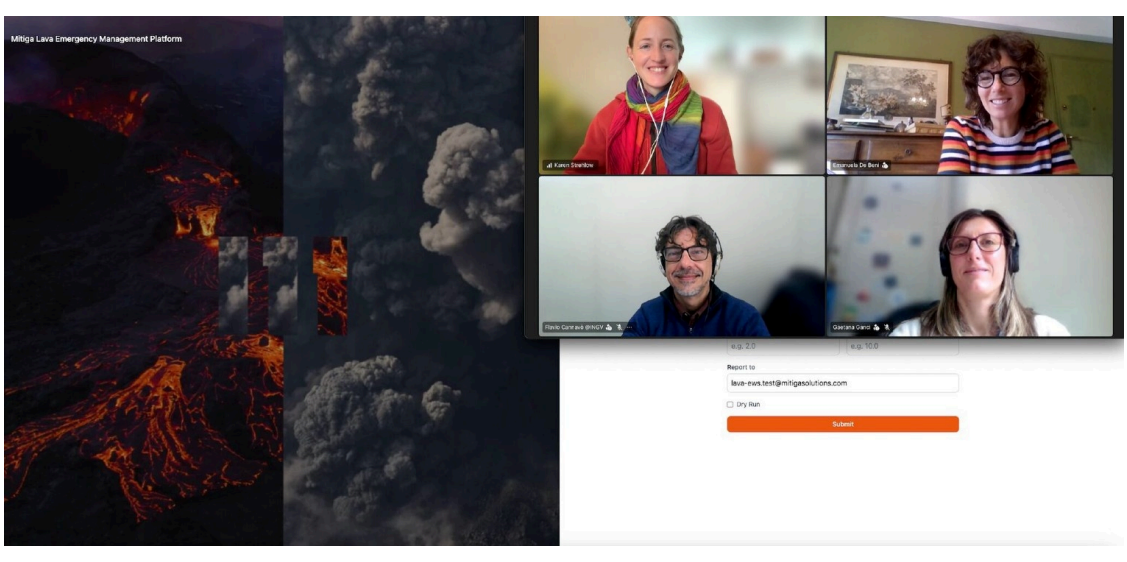
## WORKSHOP 1 | LAVA FLOWS
### Enhancing Emergency Response for Lava Flow Hazards




Lava flows are among the most destructive volcanic hazards, requiring fast and reliable information to support timely decision-making during eruptions.
Within the UNICORN Project, an important milestone was recently achieved with the first workshop dedicated to the Lava Flow Emergency Management Platform, led by Mitiga Solutions.

During the session, the team presented the methodology behind the initial prototype, demonstrated the platform's capabilities, and outlined future development plans.

Valuable feedback was provided by Istituto Nazionale di Geofisica e Vulcanologia (INGV), both from a scientific and end-user perspective. In particular, insights on user interface usability, hazard mapping, and impact forecasting—delivered through operational reports—will play a key role in refining the next iterations of the platform.

The workshop fostered an open and collaborative exchange, ensuring that the solution evolves in line with the real needs of emergency responders and stakeholders.

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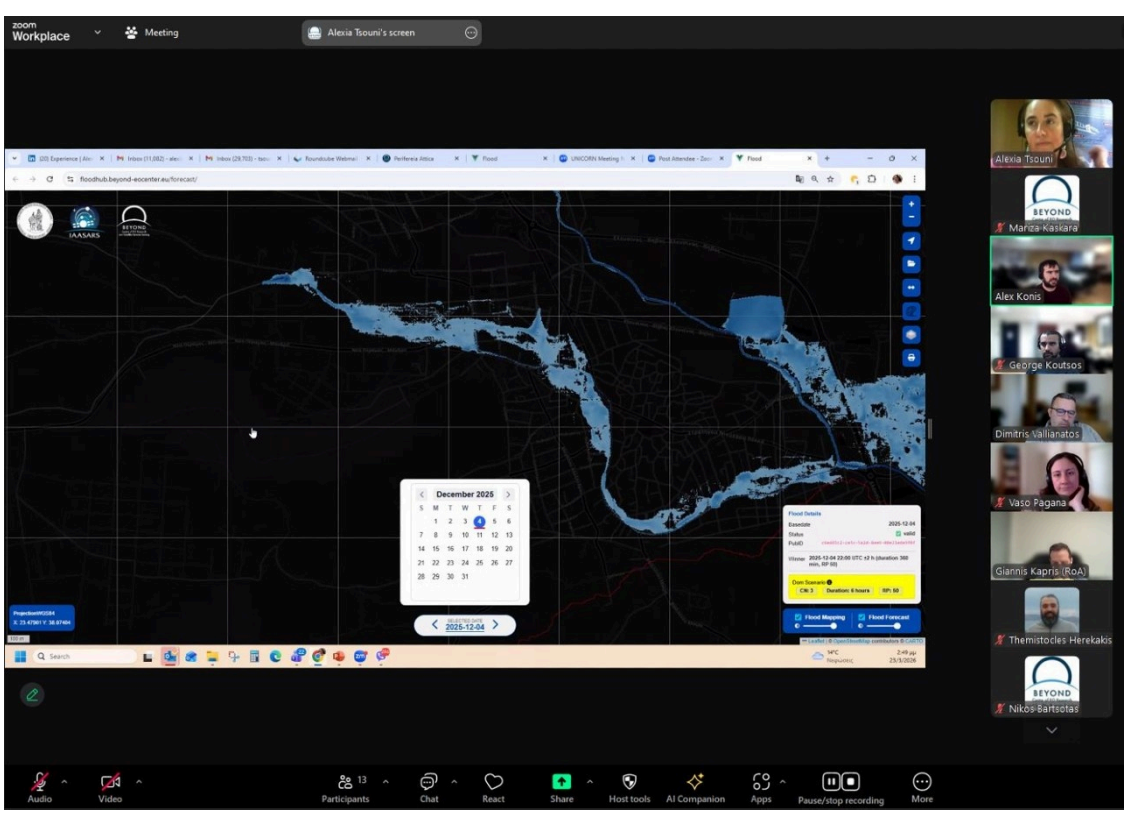
## WORKSHOP 2 | FLOOD FORECASTING
### Advancing Flood Forecasting for Rapid Decision-Making




Flood events in urban and peri-urban areas pose significant risks to lives, infrastructure, and economic stability, particularly in flash flood-prone regions such as Mandra, in Attica (Greece), which experienced a devastating flood in 2017.

Accurate flood forecasting is therefore essential to support effective emergency response and disaster risk reduction.

Within the UNICORN Project, BEYOND Centre of Excellence and EDGE in Earth Observation Sciences hosted the first workshop on flood forecasting in the Mandra river basin, integrating Copernicus Programme data with weather forecast information.

During the webinar, the teams presented the methodology behind the initial prototype, demonstrated the operational flood forecasting and mapping web platform, and shared ideas for future developments.

Valuable feedback was provided by the Region of Attica, particularly regarding platform visualisation and the potential implementation of alert systems. These insights will directly contribute to improving future versions of the platform.

The workshop fostered an engaging and interactive exchange, helping to shape a solution that responds to the real needs of decision-makers and emergency responders.

The system is designed to deliver flood extent and depth mapping for the following two days without requiring real-time hydrological and hydraulic simulations. By matching pre-run scenarios, it enables rapid, data-driven decision-making during flood events.

By combining Copernicus Programme Earth Observation data, real-time hydro-meteorological measurements, and advanced computing, the platform enhances flood prediction accuracy and supports early warning, infrastructure protection, and emergency response in high-risk areas.

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## WORKSHOP 3 | WILDFIRES
### Integrating AI and Data for Smarter Wildfire Management

Within the UNICORN Project, Fondazione LINKS and Riscognition organised the first workshop focused on wildfire management.

During the session, Fondazione LINKS presented progress on an advanced wildfire management system that integrates multiple satellite data sources to enable early fire detection, detailed burned area mapping, and short-term fire spread forecasting.

By combining diverse data streams with artificial intelligence techniques, the system significantly improves the speed and accuracy of wildfire monitoring, supporting more timely and informed decision-making.

Riscognition introduced the UNICORN Knowledge Graph service concept, designed to enhance decision support and situational awareness during wildfire events. This approach connects heterogeneous datasets—including hazard information, critical infrastructure, environmental conditions, and socio-economic data—transforming them into actionable insights.

The overall goal is to provide interactive operational support tools that help users effectively manage wildfire emergencies and better understand their potential impacts.

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**Consortium partners:** SIS 2B - Service d'Incendie et de Secours de la Haute-Corse | EDGE in Earth Observation Sciences | Riscognition | | ALPHA Consult | BEYOND Centre IAASARS/ NOA | Mitiga Solutions | Fondazione LINKS – Leading Innovation & Knowledge for Society | EUSPA - EU Agency for the Space Programme

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