

Proceedings of the EU Science for Preparedness Conference

4-6 November 2025

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Contact information

Name: Giuliana Urso

Email: giuliana.urso@ec.europa.eu

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Abstract

This report summarizes the scope, the discussion and main outcomes of the EU Science for Preparedness Conference, held in Turin on the 4-6 November 2025. Organised by the Joint Research Centre's [Copernicus Emergency Management Service](#) and the [Disaster Risk Management Knowledge Centre](#), this conference provided opportunities for exchanging knowledge, testing new tools, and connecting with others committed to advancing science-based crisis preparedness and response.

EU Science for Preparedness Conference

Conference Overview

- 4-6 November 2025, Turin IT
- Disaster Risk Management Knowledge Centre (DRMKC) Annual Seminar
- Copernicus Emergency Management Service (CEMS) Annual Gathering
- 400 In-Person Participants
- 400 Online Attendees
- 17 EU-Funded Projects showcased

Core Messages

- A **user-centric approach** is vital for preparedness, where solutions are co-designed with policymakers, first responders, and local communities.
- **Trust** is the foundation for effective information sharing and knowledge exchange. Science communication plays a key role in building credibility.
- **EU tools and EU partnered / global initiatives** such as CEMS, Global Disaster Alert and Coordination System (GDACS), Risk Data Hub (RDH) and INFORM complement Member State systems, bridging the gap between science and service.

Scientific Priorities

for future action

HARNESSING DIGITAL TRANSFORMATION

Leverage digital technologies and artificial intelligence for disaster management. Establish robust, ethical frameworks for AI use



GUARANTEEING UPTAKE

Ensure innovation translates into practice through capacity building across sectors and governance levels. Address the "last mile" gap where research often stalls before operational use



SHIFTING FROM LISTS OF RISKS TO INTERCONNECTED SYSTEMS

Move toward an EU-wide, all-hazards assessment that integrates foresight and evidence. Promote interdisciplinary collaboration



STANDARDISATION, INTEROPERABILITY, AND COMMON LANGUAGE

Develop and implement EU-wide standards and protocols for data sharing, risk assessment, and emergency response, ensuring interoperability across different systems. Promote consistent terminology



1. Introduction

1.1. Aim

The EU Science for Preparedness Conference – held in Turin from 4 to 6 November 2025 – demonstrated **how scientific innovation is an essential cornerstone for strengthening the Preparedness Union (PUS)**, a strategic framework designed to enhance Europe’s resilience against emerging and future threats. The event was organised by the JRC, DG ECHO and DG DEFIS and, for the first time, merged the annual conferences of the Copernicus Emergency Management Service (CEMS) and the EU Disaster Risk Management Knowledge Centre (DRMKC), which celebrated its 10-year anniversary this year.

The conference’s **first objective** was achieved by gathering six scientific communities, with roughly 400 in-person participants (and another 400 online), together with policymakers at European and national levels, first-responders, EU-funded projects and international organisations (such as UNDRR, WMO, GEO, UN-Habitat, OECD, WB, IFRC...).

The **overarching purpose** was to bring scientific communities together in order to identify scientific priorities and gaps from the (enlarged) user community. The ambition was not purely academic; the event was deliberately built to generate actionable outcomes that could be fed into EU wide policy cycles and disaster risk management (DRM) strategies.

To strengthen the EU’s capacity to anticipate, prevent, and respond to today complex and interconnected threats, the Commission has introduced the Preparedness Union Strategy. This strategy seeks to improve both civilian and military readiness across the Union, ensuring that all stakeholders are well equipped to act swiftly and efficiently when crises arise.

The conference highlighted the **foundational role of science** in at least four¹ out of seven key areas of the Preparedness Union Strategy’s implementation plan, with the remaining three areas primarily focusing on operational coordination tasks that fall under the mandate of other EU actors, such as DG ECHO.

1.2. Programme

The programme was organised into three blocks. On the **first day**, the event opened with two plenary sessions that discussed the scientific and innovation agenda for the Preparedness Union. The first plenary took stock of a decade of knowledge-management work at the Disaster Risk Management Knowledge Centre (DRMKC) and of the operational experience from the Copernicus Emergency Management Service (CEMS), mapping how the European risk landscape has evolved and pinpointing the most urgent scientific challenges for civil protection. The second plenary then turned to the “last

¹ Resilience through external partnership, Foresight and anticipation, Resilience of vital societal functions, Population Preparedness.

mile” of innovation, examining how rapid advances in Earth observation, Earth-system modelling and artificial intelligence are opening new opportunities for emergency and risk management.

On the **second day**, parallel sessions covered concrete, innovative and practical scientific solutions to support the PUS. They ranged from reducing hazard impacts and multi-hazard early warning systems (MHEWS) to comprehensive risk and threat assessment, capacity building and uptake of CEMS at regional and international levels, and the use of artificial intelligence for disaster risk management.

On the **third day** of the event, dedicated CEMS user meetings were held. These sessions brought together national authorities, civil-protection agencies and other end-users to review recent operational experiences, share best-practice case studies and discuss forthcoming service enhancements.

Finally, the programme benefitted from the presence of 17 EU-funded projects² in the exhibition area, which directly echoed and enriched the conference’s themes of science, innovation and emergency management advancements with their solutions.



² From the following funding programmes: Horizon 2020, Horizon Europe, Interreg, KAPP/UCPM.
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2. What science can do (DAY 1)

While articulating the “whole-of-society, whole-of-government, all-hazards” policy narrative, the conference identified concrete **building blocks** that serve as the basis for achieving the PUS objectives:

- **Trust** – crucial because preparedness must be a continuous, society-wide process; it can only be sustained when the public is kept informed and confident in the actions and tools provided. This underscores the importance of effective public communication and social vulnerability.
- **Subsidiarity** – a guiding principle in operations and a cornerstone of crisis management. While full recognition of national ownership is required, its effectiveness depends on a strong institutional commitment to building the capacity of local actors, enabling them to respond effectively to crises.
- **Openness** – necessary for learning from one another’s language for bridging disciplinary gaps.

The plenary sessions stressed **the importance of moving science beyond theory** to deliver concrete, user-centric tools that fit the everyday realities of policymakers, first-responders and local communities, and that can be embedded across the entire disaster-risk-management (DRM) cycle. A central bottleneck identified was the “last-mile” gap, where promising research often stalls in the development or pre-operational status. *“We need to better comprehend the all-hazard approach, get out of the silos and connect our thinking to better bridge the gap between science and operations,”* said Anna Samsel, Directorate-General for European Civil Protection and Humanitarian Aid Operations.

Bringing successful solutions from the staging/pre-operational status to full operational use requires a dedicated and adequate financial framework. Investment is needed not only for development but, critically, for scaling, maintenance, and integration into existing emergency management systems,

ensuring new tools transition from pilot projects to sustainable industrialised services within the real-world operations. Legislative alignment and clear governance structures are also important; pre operational testing and regulatory compatibility are required to embed new tools into national DRM systems.

Concrete examples were provided by the Disaster Risk Management Knowledge Centre (**DRMKC**), launched in September 2015, became a building block of the Union Civil protection Knowledge Network in 2021 and now celebrates the 10th anniversary. Its Community of Practice, which sees the participation of 15 European Commission Directorate Generals, the DRMKC works toward breaking silos, central for the whole-of-society approach. The strands of analysis related to all-hazards approach led to a series of concrete outcomes such as: the creation of the central hub for multi-hazard, risk and damage and loss data (Risk Data Hub), the concerted effort to understand risk by analysing current and future risks in Europe and take stock of historical and recent developments in DRM, the systemic integration of conflict-related risks (GCRI), threats and natural hazards for crisis anticipation (INFORM), the support to and contact with Member States with the Recommendations for National Risk Assessment for DRM and the continuous collaboration with DG ECHO, particularly the UCP Knowledge Network and the Disaster Prevention & Risk Management Commission Expert Group (DPEG).

Moreover, the Copernicus Emergency Management Service (**CEMS**) showcased a record-breaking operational performance, confirming its role as the EU’s premier early-warning and impact-mapping provider. In the 2025, CEMS supported roughly 30 fire activations (including 16 in Greece), delivered

more than 200 fire-related products and expanded to new sensors such as METEOSAT-3rd-Generation and commercial constellations for higher-resolution burn-area mapping. For droughts and floods the service introduced AI-enhanced detection, integrated Sentinel-1C/D data, and rolled out next-generation flash-flood now-casting with urban-area depth modelling. To assess the impact of events, the GHLS team produces built-up surface in square meters and classification of building.

The plenaries outlined the **operating environment** required to turn these ambitions into practice. Robust cyber protection and resilient digital infrastructure are essential to safeguard tools against interference and disinformation, while sustainable physical infrastructure underpins early-warning and monitoring systems. Experimentation through “what-if” scenarios and digital-twin platforms – such as the European Commission Destination Earth initiative – provides a safe sandbox for testing solutions before full rollout, ensuring that innovations are both trustworthy and fit-for-purpose.



3. Transversal topics (DAY 2)

While each session addressed a distinct set of challenges, some cross cutting and interconnected topics resurfaced throughout, highlighting the key research and implementation topics and priorities.

3.1. User-centric, multi-hazard, cross-sectoral approach crucial

Central messages were that effective solutions must be codesigned with end-users – policymakers, first responders and communities – because ownership by those users is the key to adoption. Also from the perspective of early warning actions, people-centred, locally led approaches are enabling effective early action. Early warning systems (EWS) should empower citizens to react quickly, a challenge that is especially acute in fragile and conflict affected countries. “*EWS should empower people, professionals, and citizens to stay safe and take action*” (Cyrille Honoré, Director Disaster Risk Reduction and public Services, WMO).

Three practical steps can embed user-centricity:

- Early involvement of target users in the research design phase.
- Rigorous testing in pre-operational environments to identify legislative, organisational or technical barriers in context specific cases.
- Education and training programmes that build competence and trust, especially for new technologies such as AI driven tools.

The following actionable strategies were highlighted to put in practice effective multi-hazard and cross-sectoral approaches:

- leverage multihazard monitoring good practices by focusing efforts on the scale up and transferability of local/regional successful approaches, working out limitations and complexities still standing
- working on legislative, organisational, semantic and technical interoperability to effectively bridge different working cultures and connect thematic communities of practice, with the respective systems and services
- tackling compound and cascading events through collective expertise by bringing all the actors on the same labour without the need for overall complexity modelling setups and with aim of providing people with understandable impact-based information to take action.

Establishing a culture of preparedness as a permanent, all-of society effort, built on trust, requires robust societal engagement, clear communication, and effective public outreach, particularly during crises when timely, actionable, and unambiguous information is essential.

3.2. Digital innovation

Innovative technologies, particularly artificial intelligence (AI) and digital twins, emerged as game-changing tools for DRM. Speakers argued that AI can support decision-making and deployment (example French PYROAI), improve data accuracy and completeness (such as for impact records), fuse heterogeneous data streams (satellite, sensor, social media) and generate predictive risk picture. Digital twins were showcased as the experimental tool for testing scenarios, experimental solutions and complex systemic analysis. These new tools could be also employed to meet the identified need for new performance benchmarks for the timeliness of EWS in responding to emerging threats, such as air strikes incidents.

Digital innovation must be harnessed to broaden participation across all countries, especially low-income, least-developed and small-island states, in order to prevent deepening the digital divide. Regional partners and specialised centres were identified as essential hubs for transferring expertise, coordinating support and ensuring that they benefit of new technologies. This approach not only accelerates the global rollout of innovative solutions but also safeguards equitable access, guaranteeing that digital advances strengthen resilience everywhere rather than widening existing gaps.

Consensus was achieved on the fact that technology and AI become valuable only if they respect the principles of **transparency, accountability and ethics**. Enhancing trust in AI requires explainable and interpretable models, integration of domain-knowledge, and active users' engagement. *"Human-AI teaming (HAT) is vital to resilience in flood evacuation response, but without careful coordination with humans, this teaming paradigm may fail to achieve the necessary scope and scale, and adversely impact at-risk populations."* Samadi, Stephens, Hughes et al., 2024 (Environmental Modelling & Software).

3.3. Role of CEMS

Tools like the Global Disaster Alert and Coordination System (GDACS) and the EU's Copernicus Emergency Management Service (CEMS) were highlighted as vital scientific assets providing timely, reliable and harmonised data to guide decisions and save lives.

Data accessibility and user engagement were recurring themes. As cornerstone of Europe's operational early-warning ecosystem, it was detected a growing need was



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identified to make services even more accessible and responsive, especially as climate risks intensify and more countries look to strengthen their early warning capacities. The success of CEMS's **open-data policy**, which provides free access to data such as the harmonized exposure mapping produced through tools like the Global Human Settlement Layer (GHLS), underscored the importance of making scientific findings available for policymakers and responders. CEMS outputs are therefore crucial not only for disaster prevention but also for accessing the EU solidarity funds and health prevention measures.

A recurring refrain throughout the event was that **innovation without proper uptake remains incomplete**. In the CEMS context, training programs and capacity-building initiatives were highlighted as essential for bridging the gap between scientific innovation and operational readiness, ensuring that first responders and local authorities have the skills to use these tools effectively. The National

Collaboration Programme (NCP) was identified as a vehicle to move CEMS from a technological service into an operational asset that is understood and utilised by national and local authorities on the ground. The SUNSHINE project was presented as a promising starting point for developing training material. The Joint Research Centre' European Crisis Management Laboratory (ECML) is being used as ideal playground where to safely test innovative solutions in a pre-operational environment and in full alignment with the requirements and operational ecosystem of the Emergency Response Coordination Centre (ERCC).

3.4. Horizontal and Vertical Partnership

Preparedness is a collective endeavour that transcends borders. The EU, with tools such as CEMS and GDACS and with mechanisms such as the Union Civil Protection Mechanism, act as a reliable global partner for strengthening societal resilience, supporting other countries in risk reduction and improving disaster response. A key message was that subsidiarity role of global and regional early warning systems, which should complement national systems wherever gaps exist, while being specifically tailored to serve the international humanitarian civil protection (HA/CP) community for cross border events.

Collaboration takes shape both globally (between States and regions) and vertically (among different levels of government). National legislation, institutional reform, and strategic planning are essential to ensure, for example, that EWS are coordinated, trusted, and sustainable.

This dual focus on technology transfer and local empowerment - as also highlighted for the digital divide - embodies the overarching principle of **subsidiarity**. The term was repeatedly invoked during the conference, for example by Luigi D'Angelo, Director of the Emergency Management Office Civil Protection Italy, who warned that capacity building with local actors is essential for effective implementation. Achieving such global ambitions also requires that Europe align its funding instruments, institutional capacity and data standards.

Scientific and technical collaboration among national, regional, global networks of analysts on respective methodologies and approaches is crucial for efficiency, for avoiding confusion and for tackling the challenges posed by the evolving risk landscape. Such connection relies on human capability: *'[we] need human brains and expertise to build bridges across networks, without relying solely on technology/AI for this'* (Marzia Santini, GDACS chair, European Crisis Management Lab at DG JRC of the EC).

3.5. Common (scientific) language

A central theme was the **evidence-based** approach that science provides for risk assessment, early warning systems, and disaster management. Experts presented advanced risk modelling frameworks that go beyond static hazard lists, analysing systemic interconnections between climate change, security threats, vital societal functions and cascading risks.

Learning from past events to better inform future planning and prediction was deemed essential – including information from loss and damage records - yet important to be combined with expert judgement to explore plausible futures. An EU-wide assessment should therefore prioritise cascading risks and strategic foresight, employ multiple scenarios (including worst cases), and make the cost of inaction visible, for example through insurance and economic loss evidence.

Participants praised the open data policy, but stressed the importance of standards and interoperability. National practice can lead the way in scientific developments for DRM: Finland’s model of vital societal functions and Germany’s NIKE climate–security work illustrate how national assessments can be built upon, while common taxonomies can improve comparability and enable more standardised methods across Member States.



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4. Scientific inputs for future developments

The conference has underscored the importance of a comprehensive approach to building a Preparedness Union, founded on trust, innovation, and cooperation among communities. Scientific analyses, like the “Analysis of Risks Europe is facing” [report](#), contributes to fostering mutual understanding. This comprehensive approach requires a user-centric mindset, where effective solutions are co-designed with end-users, including policymakers, first responders, and local communities.

Building trust among communities is a prerequisite for sharing information and knowledge – crucial because preparedness must be a continuous, society-wide process among experts. The establishment of trust in public communication and information sharing has been identified as a crucial element, with science communication playing a key role in building credibility during crises. The recognition of **EU tools as complementary to Member State tools** is essential in this regard. The continuous investment in operational systems, such as Copernicus, GDACS, and GSS, is important and appreciated to bridge the gap between science and service, thereby supporting the Emergency Response Coordination Centre and Member States.

The key takeaways from the conference inform the following priorities for future action:

- **Harnessing digital transformation:** Leveraging the full potential of digital transformation while establishing robust, ethical frameworks for the use of AI in disaster management. Experimenting and testing is an important part for users to balance the opportunities with the risks.
- **Guaranteeing uptake of scientific advancements:** innovation without uptake is incomplete. Horizontal and vertical capacity building is necessary to ensure the uptake of solutions across sectors and government levels. This also means addressing the "last mile" gap in disaster risk management, where promising research often stalls in the development or pre-operational stage.
- **Standardisation and interoperability:** Striving towards standardisation and interoperability, as well as an EU wide common risk assessment that respects the diversity of national approaches while converging on a final, standardised and interoperable output
- **Strengthening global partnerships:** Sharing tools and expertise with international partners to enhance Europe's ability to build global resilience.
- **Supporting innovation and research:** it is essential to establish a dedicated and adequate financial framework that also support user-centric solutions and the development of new technologies, such as artificial intelligence and digital twins.
- **Shifting from lists of risks and threats to interconnected systems:** an EU-wide, all-hazards assessment that fuses foresight with evidence and drives preparedness at every level: we need to work through an interdisciplinary approach involving science, civil protection, finance, intelligence communities, and a focus on “general-purpose resilience mechanisms” that keep vital functions operating whatever combination of crises hits. Overall, the EU wide Risks and Threats Assessment should be an instrument that aligns national efforts and shifts Europe from response to a shared preparedness agenda.
- **Need for a common scientific language:** Clarifying the concepts of threats, risks and hazards for different stakeholders (scientists, policy makers and practitioners) and promoting the use of consistent definitions and terminology to facilitate the implementation of the EU

Preparedness approach on the ground. By integrating these evidence-based priorities into the policy architecture, the Preparedness Union will be able to translate scientific breakthroughs into operational resilience, thereby ensuring that Europe is prepared to address both current and future challenges.

Annexes

Annex 1. Parallel sessions (DAY 2)

The following infographics present the key information and output of each of the parallel sessions.
Credit to the graphic designer Fabio Bortolamei.

Q What are the main operational and regulatory barriers to integrating new science and technology into DRM solutions? What contributions do the academic and policy sectors respectively need to make to facilitate better integration and uptake?

A Strengthen financial preparedness related to natural hazards, by planning ahead where funds come from and how they will be implemented. Adequate financial framework is also needed for bringing successful solutions to full operational use


A User-centric design is critical, effective solutions must be co-designed with end-users (policymakers, first responders, and local communities) and participatory approach promoted

 **Synergies** EU-funded project
Uptake efforts of Key Exploitable Results from previous EU-funded projects on DRM
<https://synergiesproject.eu/>

Q What are the most relevant emerging scientific and technological developments for reducing the impacts of disasters?


A The creation of artificial intelligence applications for Civil Protection
Example: [AI]RGOS, French tool for compliance with accessibility and safety rules against fire and panic risks

A Leveraging Historical Data enables learning from past events
Example: [IFRC](#) Montandon, [Paratus](#) Disaster Risk Stakeholder Hub

 **Empower Citizens** EU-funded project
Collection of methods for local authorities to elicit citizen knowledge
<https://civil-protection-knowledge-network.europa.eu/projects/empower-citizens>

Q How can science and local knowledge be combined to ensure both innovation and cultural appropriateness in hazard risk reduction?

A Learn from experience on the ground
Example: IFRC operational learning platform

 **Collaris 2** EU-funded project
Making use of UAV/UAS such as drones in DRM and set of training material to support their use on the ground
<https://civil-protection-knowledge-network.europa.eu/projects/collaris2>

Moderator

Maria Martin de Almagro, Directorate-General for European Civil Protection and Humanitarian Aid Operations

Objectives

To showcase innovative and practical solutions to reduce the impacts of natural hazards. Focus on solutions that are already operational or demonstrate strong potential for operationalisation, and that contribute to improve any phase of disaster risk management (prevention, preparedness, response, or recovery)

Speakers

- *Beulah Chelva, World Bank*
- *Luke Caley, International Federation of Red Cross and Red Crescent Societies*
- *Cosmina Albulescu, Center for Risk Studies, University of Bucharest*
- *Wilfried Stéfic, French National Fire Officers Academy*

Q What are the latest and next scientific innovation, and how could we leverage on them to support the dissemination and implementation of MHEWS worldwide?


A Need to establish new performance benchmarks for the timeliness of EWS in responding to emerging threats, such as air strikes

A Technologies, including AI, to be shared globally to avoid deepening the digital divide
Opportunity provided by digital twins to work on scenarios, experimental solutions and perform complex systemic analysis

A Successfully integrating research outputs into the operational environment necessitates rigorous testing in a pre-operational setting to allow for the identification and solution of potential challenges (e.g. on legislation, governance, acceptance, organizational, technical levels)

A **GDACS** provides real-time access to web-based disaster information systems and related coordination tools. Copernicus Emergency Management Services are fully integrated
Scientific challenges are master event identification, event closure, semantics, inter-operability

 **EDERA/Inline** **EU-funded project**
Real time flood nowcasting and improvement of flood impact forecasts
<https://edera-project.eu/>

 **CENTAUR** **EU-funded project**
Flood Early Warning Index, Drought Conflict Prediction Index & Drought Displacement Prediction Index
<https://centaur-horizon.eu/>

Q What national and international efforts could support the establishment of effective MHEWS?


A National legislation, institutional reform, EWS governance and strategic planning are needed to ensure that EWS are coordinated, trusted, and sustainable
Example: the **Early Warnings** for all dashboard aims at track-ing progress on coverage of Early Warning Systems

A Leverage regional partners and specialized centers to provide assistance to countries, with full recognition of national ownership
Global/regional systems are intended to complement national early warning system where gaps exist

 **MedEWSa** **EU-funded project**
Develops innovative methods for multi-hazard forecasting and provides societal support at the Europe-Mediterranean Africa, country and regional levels by employing AI to assess and prioritize communication channels, translating complex forecasts into actionable knowledge for communities
<https://www.medewsa.eu/>

Q What are the social considerations relevant for public warning systems?

A Forecast need to be people-centred to be actionable. EWS must be traceable and trusted to be effective while an all-of-society approach ensures inclusive implementation
Supporting people in fragile and conflict affected countries is a priority

 **CHEESE2** **EU-funded project**
Scientific advice to social agents in real-word emergency drills, providing urgent computing services and integrated multi-hazard simulations - including earthquakes, tsunamis, and volcanic events
<https://cheese2.eu/>

Moderator

Anna Samsel, Directorate-General for European Civil Protection and Humanitarian Aid Operations

Objectives

To provide a comprehensive reflection on the key challenges of implementing end-to-end Multi-Hazard Early Warning Systems (MHEWS), drawing on concrete examples and featuring forward-looking discussions on the topic

Speakers

- Cyrille Honoré, World Meteorological Organization
- Marzia Santini, European Commission's Joint Research Centre
- Adrian Bucalowksi, National Headquarters of the State Fire Service of Poland
- Jürg Luterbacher, Justus Liebig University Gießen
- Andreas Schaffhauser, GeoSphere Austria

Q What are the existing practices and policy strategies underpinning risk assessment at global, regional, national level and how to reconcile the sectoral risk assessments and the different scales of analysis?

A Build on national assessments while improving comparability through common taxonomies and more standardised methods across Member States
Example: [UN Global Risk Report](#)

A Frame risk governance as a continuous translation from uncertain evidence to decisions, insisting that risks must be linked to what societies value most (freedom, security, well-being)
Examples: [OECD](#) work on emerging risks frameworks

A Importance to treating risks at planetary scale and extending the idea of tipping points from climate to socioeconomic and political systems. Focus on “general-purpose” resilience mechanisms and systemic risk management standards rather than planning for every possible risk combination
Examples: [ASRA](#) – Accelerator for Systemic Risk Assessment Systemic Tool to Explore and Evaluate Risks (STEER)

 **Paratus** EU-funded project
Participatory approach to multi-hazards, with the concept of impact chain conceptual model
<https://www.paratus-project.eu/>


 **Myriad** EU-funded project
Disaster Risk Gateway publicly editable wiki for the discovery and sharing of multi-hazard risk approaches and resources
<https://www.myriadproject.eu>

Q What data are crucial for risk assessments and how to take into consideration systemic and critical emerging risks?

A Move from static hazard lists to a systemic, foresight-informed view of risk—linking climate, security and vital societal functions, and combining data with expert judgement to explore plausible futures

A An EU-wide assessment should prioritise cascading risks and strategic foresight, use multiple scenarios (including worst cases), and make the cost of inaction visible
Examples: Finland’s model of vital societal functions and Germany’s National Interdisciplinary Climate Risk Assessment (NIKE)

A The EU wide Comprehensive Risks and Threats Assessment should prioritise risks across time horizons, mitigation of the risk drivers, enhance output data comparability via platforms like the Risk Data Hub, and reinforce science-policy feedback loops
Examples:
[Analysis of Risks Europe is Facing](#), [Cross-border and emerging risks](#), [Risk Data Hub](#)

 **Rastool** EU-funded project
ADAtools for processing European Ground Motion Service (EGMS) data in accessible maps and indicators for exposure and impact analysis
<https://rastool.cttc.es/index.php>

 **ESPON Climate** EU-funded project
Data and indicators related to climate change exposure of Europe’s regions
<https://archive.espon.eu/climate>

Moderator

Bella Nestorova, Directorate-General for European Civil Protection and Humanitarian Aid Operations

Objectives

To integrate views from risk analysts, experts and operational actors. Discussion on practices and evidence from global, regional, and national risk assessments, scientific analysis and potential approaches to reconcile the sectoral risk assessments and the different scales of analysis

Speakers

- *Chris Earney, United Nations*
- *Kari Pelkonen, Secretariat of the Security Committee of Finland*
- *Philippe Maupai, German Federal Foreign Office*
- *Nestor Alfonso Santamaria, Organisation for Economic Co-operation and Development*
- *Ajay Gambhir, Accelerator for Systemic Risk Assessment*
- *Azzurra Lentini, European Commission’s Joint Research Centre*

Q What is the role of CEMS outside Europe?

A CEMS helps the EU act as a reliable global partner for strengthening societal resilience, support other countries to reduce risks and deal more effectively when a disaster occurs
 Examples: Expert Group Forest Fires Latin America and the Caribbean, Amazonia+

A Timely, reliable, and harmonised data to guide critical decisions and contribute to scientific development and policy processes
 Examples: GHSL backbone for the Global Heat Resilience Service, Drought Observatories (EDO, GDO), Wildfire Information Systems (EFFIS, GWIS), GHLS and SDG 11

Q How to increase uptake of CEMS outside the EU?

A Need improvements in the awareness of Copernicus services and making services even more accessible and responsive, as climate risks intensify and as more countries look to strengthen their early warning capacities

A Partnership between science, policy, and users on the ground strengthens Early Warning Systems and use of Earth Observations

A CEMS Training programme, Handbooks
 Examples: Training on the Degree of Urbanisation, Handbook on the use of Risk Knowledge for MHEWS

Moderator

Cecilia Donati, Directorate-General for International Partnerships

Objectives

To discuss the international dimension of CEMS with examples from different Copernicus Emergency Management Service (CEMS) components

Speakers


- *Luca Rossi, United Nations Office for Disaster Risk Reduction*
- *Rui Kotani, Group on Earth Observations Secretariat*
- *Andrea Toreti, European Commission's Joint Research Centre*
- *Fernando Sedano, European Commission's Joint Research Centre*
- *Thomas Kemper, European Commission's Joint Research Centre*
- *Robert Stefanski, World Meteorological Organization*
- *Auriane Denis Loupot, Directorate-General for European Civil Protection and Humanitarian Aid Operations*
- *Dyfed Aubrey, UN-Habitat*

Q What are the opportunities and latest development of AI in DRM?


A AI and Digital Twins (DT) will offer unique opportunities to test real-world situations and conditions


Example: The Global Initiative on Resilience to natural hazards through AI solutions promotes global interoperability standards


A AI can be used in the DRM field for data fusion, detection, forecasting, impact assessment, communication, decision support

 **Crexdata** EU-funded project
Event extraction from social media, 3D representation of emergency situations, AI to assess the fatigue of rescuers
<https://crexdata.eu/>

 **DT GEO** EU-funded project
Prototype for a digital twin on geophysical extremes
<https://dtgeo.eu/>

 **Extract** EU-funded project
Focuses on evacuation strategy, including urban digital twin for evacuation
<https://extract-project.eu/>

 **OVERWATCH** EU-funded project
Integrated holographic management system for response, recovery and mitigation of emergencies and disasters
<https://overwatchproject.eu/en/>


 **CLINT** EU-funded project
Algorithms to generate fully data-driven forecasts of Extreme Events (EE), and to perform EE detection, causation, and attribution
<https://climateintelligence.eu/>

Q What are the obstacles and challenges of applying AI?

A Biases in training data, erroneous model choices can lead to unreliable and wrong output. AI models have limitations, e.g. in the prediction of (previously) unseen events
Need to have clear, transparent, and ethical workflow when developing, implementing, and using AI

A To enhance trust in AI, we need to work on explainability of models, integration of domain-knowledge, users' engagement, human-AI teaming (HAT)

A Accountability aspects still need reflections and a legal framework

 **Carmine** EU-funded project
DT for climate challenges and Stakeholder community hubs to support collaboration and stakeholder interactions
<https://carmine-project.eu/>

Moderator

Andrea Toreti, European Commission's Joint Research Centre

Objectives

To discover the latest news about developing, integrating, and using AI tools for Disaster Risk Management

Speakers

- Monique Kuglitsch, Fraunhofer HHI and Global Initiative on Resilience to Natural Hazards through AI Solutions
- Miguel-Ángel Fernández-Torres, Universidad Carlos III de Madrid
- Luke Claley, IFRC - Red Cross
- Claire Monteleoni, the French National Institute for Research in Digital Science and Technology
- Francisco Doblas-Reyes, Barcelona Supercomputing Center
- Arthur Hrast Esserfelder, European Commission's Joint Research Centre
- Amanda Lee Hughes, Brigham Young University

Q What are the hurdles to increase uptake?

A CEMS Open Data Policy is a strength, however it could be further improved by harmonising the outputs and making the data more accessible through open standards and protocols

A Scientific advancements often are not scaled-up further and remain at pre-operational status
 Examples: Positive integration of results of EU-funded projects into the ERCC and CEMS with the Edera/Inline project

Q How to ensure that innovative solutions within CEMS are integrated into practice?

A Strong capacity building and users' uptake roadmap and leveraging all the existing tools to reach all levels of the stakeholders (central, regional and local)
 Examples: National Collaboration Programme, EU-funded project SUNSHINE for training material

A Communicate properly on what CEMS can do and how its outputs can be used, enhancing the knowledge of CEMS services
 Examples: social media channels, publications, newsletters also with the national CP involvement

A Importance of strong cooperation among all actors involved in an emergency: CEMS – service provider – Civil Protection – regional technical officers

Moderator

Tobias Biemann, Directorate-General for Defence Industry and Space

Objectives

To discuss user uptake activities (trainings, capacity building, webinars) to ensure that innovative solutions for Disaster Risk Management are integrated into practice

Speakers

- *Juha-Pekka Japola, Directorate-General for European Civil Protection and Humanitarian Aid Operations*
- *Gabriel Lazazzara, SUNSHINE project*
- *Antonella Morgillo, Italian National Department of Civil Protection*
- *Ruben Pirooska, German Federal Office for Civil Protection and Disaster Relief*
- *Clara Eugenia Estrela Segrelles, Jucar River Basin Authority*

Annex 2. CEMS dedicated meeting (DAY 3)

Extract from the [article](#): “OBSERVER: EU Science for Preparedness conference reaffirms that science must drive disaster preparedness”

The third and last day of the conference was dedicated to the user meetings of the five CEMS component: on-demand mapping, early warning and monitoring (floods, wildfires, droughts) and exposure mapping.

On-demand mapping meeting

The on-demand mapping meeting brought together different stakeholders (EU Commission, ESA, Member States, Industry and International Users) to present recent and upcoming innovation, engage the users in active discussions on their operational needs and what the service can do to further support them. Several topics were touched: the service is moving in the right direction to further increase timeliness, the users highlighted the need to have a stronger uptake to bring them together more often and to provide trainings.

Floods: the 20th EFAS Annual Meeting

The floods user meeting gathered +100 representatives (~80 in person) of partner institutions of the European Flood Awareness System (EFAS). The event included open discussions about operational challenges and opportunities for improvement, recent updates, interactive workshops and recent use cases. Find here a summary of the [event](#).

The 51st meeting of the Expert Group of Forest Fire

The wildfires meeting gathered representatives of Member States, non-European Union countries and northern Africa and the Middle East. The meeting started with a tour the table in which each country (25 people attended in person and online) shared a summary of their fire seasons. Short presentations followed, starting with DG AGRI presenting the existing mechanisms to support fire prevention and DG ECHO providing a summary of the ERCC and UCPM activities during the 2025 fire season afterwards. DG ENV outlined upcoming activities related to wildfires that may require the input of the EGFF and the JRC presented an overview at European level of the 2025 fire season. Invited speakers - from FAO, AESAC, Mosaico project, and Firelog cluster of projects - filled the afternoon with presentations focusing on wildfire prevention.

Droughts: 3 networks in a single meeting

The drought session brought together the Integrated Drought Management Programme (IDMP), the Drought in the Anthropocene Network (DiTA), and European drought experts. The discussions covered the road to UNCCD COP17, the potential of AI, drought impact data and adaptation, and the economic and financial dimensions of drought risk. The IDMP meeting reviewed the outcomes from the Drought+10 Resilience conference and identified remaining gaps and next steps for shifting to proactive drought management. The meeting of European drought experts gathered feedback on the Copernicus Drought Component, explored future drought indices and indicators and discussed progress and opportunities in drought prediction and risk assessment.

Exposure mapping: the Global Human Settlement Layer

The meeting of the Exposure Mapping Component brought together a broad community from different application domains - including disaster risk reduction and crisis management, sustainable

development or regional and urban planning. Participants stressed the importance of the data and asked for a better characterisation of the population with a sex and age distribution and day/night-time population.

Annex 2. Agenda

4 November 2025, 14:00 - 17:30 (CET) – DAY 1

- **14:00-14:30**
Opening (Room 500)
 - Tom De Groeve, European Commission's Joint Research Centre
 - Anna Samsel, Directorate-General for European Civil Protection and Humanitarian Aid Operations
 - Francesco Tresso, Comune di Torino

- **14:30-15:30**
First plenary: Status of Science for the Preparedness Union and the user needs (Room 500)

Taking stock of 10 years of knowledge management in the Disaster Risk Management Knowledge Centre and more than a decade of an operational Copernicus Emergency Management Service, this session explores how the risk landscape is changing and what the most urgent scientific challenges are for European civil protection.

Moderator: Tom De Groeve, European Commission's Joint Research Centre

Panellists:

- Christina Corbane, European Commission's Joint Research Centre
- Anna Samsel, Directorate-General for European Civil Protection and Humanitarian Aid Operations
- Cyrille Honoré, World Meteorological Organization
- Dominique Orsini, Security and Defence Policy Directorate, European External Action Service
- Silvia Torresan, Euro-Mediterranean Center on Climate Change Foundation

- **15:30-16:30**
Coffee break

- **16:30-17:30**
Second plenary: Innovation: the last mile to operations (Room 500)

Rapid innovation in earth observation, earth system modelling and artificial intelligence present new opportunities for emergency and risk management. This session explores the innovation drivers and how these can be harnessed to improve the trusted services of the Copernicus Emergency Management Service and the Disaster Risk Knowledge Centre.

Moderator: Stéphane Ourevitch, ALSO Space

Panellists:

- Peter Salamon, European Commission's Joint Research Centre and Copernicus Emergency Management Service
- Luigi D'Angelo, Italian Civil Protection Department
- Rosa Mata Francés, Catalonia Civil Protection Directorate
- Adrian Bucalowksi, National Headquarters of the State Fire Service of Poland
- Grazyna Piesiewicz, Directorate-General for Communications Networks, Content and Technology

- **18:00-20:00**
Apéro

5 November 2025, 09:00 - 17:30 (CET) – Day 2

○ **9:00-10:30**

Session 1A: Solutions to reduce hazard impacts (Room 500)

This session aims to showcase innovative and practical solutions to reduce the impacts of natural hazards. The focus will be on solutions that are already operational or demonstrate strong potential for operationalisation, and that contribute to improve any phase of disaster risk management (prevention, preparedness, response, or recovery).

Moderator: Maria Martin de Almagro, Directorate-General for European Civil Protection and Humanitarian Aid Operations

Speakers and panellists:

- Beulah Chelva, World Bank
- Luke Caley, International Federation of Red Cross and Red Crescent Societies
- Cosmina Albulescu, Center for Risk Studies, University of Bucharest
- Wilfried Stéfic, French National Fire Officers Academy

Session 1B: Multi-hazard early warning systems: current status and future (Room Londra)

This session will provide a comprehensive reflection on the key challenges of implementing end-to-end Multi-Hazard Early Warning Systems (MHEWS), drawing on concrete examples and featuring forward-looking discussions on the topic.

Moderator: Anna Samsel, Directorate-General for European Civil Protection and Humanitarian Aid Operations

Speakers and panellists:

- Cyrille Honoré, World Meteorological Organization
- Marzia Santini, European Commission's Joint Research Centre,
- Adrian Bucalowksi, National Headquarters of the State Fire Service of Poland
- Jürg Luterbacher, Justus Liebig University Giessen
- Andreas Schaffhauser, GeoSphere Austria

○ **10:30-11:30**

Coffee break

○ **11:30-13:00**

Session 2A: Towards a Comprehensive EU Risk and Threat Assessment Framework (Room 500)

This session brings together scientific and policy strategies underpinning risk assessments—including emerging critical risks, systemic risk approaches, foresight, resilience of vital societal functions, population preparedness. It integrates views from risk analysts, experts and operational actors. Discussion draws on practices and evidence from global, regional, and national risk assessments, scientific analysis and potential approaches to reconcile the sectoral risk assessments and the different scales of analysis.

Moderator: Bella Nestorova, Directorate-General for European Civil Protection and Humanitarian Aid Operations

Speakers and panellists:

- Chris Earney, United Nations

- Kari Pelkonen, Secretariat of the Security Committee of Finland
- Philippe Maupai, German Federal Foreign Office
- Nestor Alfonso Santamaria, Organisation for Economic Co-operation and Development
- Ajay Gambhir, Accelerator for Systemic Risk Assessment
- Azzurra Lentini, European Commission's Joint Research Centre

Session 2B: The international dimension of the Copernicus Emergency Management Service (Room Londra)

In this session we will focus on the increase uptake of Copernicus Emergency Management Service (CEMS) outside the EU along with aligning funding instruments and needs to support uptake of CEMS. It will highlight the international dimension of CEMS with examples from different CEMS components.

Moderator: Cecilia Donati, Directorate-General for International Partnerships

Speakers and panellists:

- Luca Rossi, United Nations Office for Disaster Risk Reduction
- Rui Kotani, Group on Earth Observations Secretariat
- Andrea Toreti, European Commission's Joint Research Centre
- Fernando Sedano, European Commission's Joint Research Centre
- Thomas Kemper, European Commission's Joint Research Centre
- Robert Stefanski, World Meteorological Organization
- Auriane Denis Loupot, Directorate-General for European Civil Protection and Humanitarian Aid Operations
- Dyfed Aubrey, UN-Habitat

- **13:00-14:30**

Lunch

- **14:30-16:00**

Session 3A: Artificial Intelligence for disaster risk management (Room 500)

Let's discover the latest news about developing, integrating, and using AI tools for Disaster Risk Management, as well as opportunities and challenges.

Moderator: Andrea Toreti, European Commission's Joint Research Centre

Speakers and panellists:

- Monique Kuglitsch, Fraunhofer HHI and Global Initiative on Resilience to Natural Hazards through AI Solutions
- Miguel-Ángel Fernández-Torres, Universidad Carlos III de Madrid
- Luke Claley, IFRC - Red Cross
- Claire Monteleoni, the French National Institute for Research in Digital Science and Technology
- Francisco Doblas-Reyes, Barcelona Supercomputing Center
- Arthur Hrast Essenfelder, European Commission's Joint Research Centre
- Amanda Lee Hughes, Brigham Young University

Session 3B: Capacity building and uptake (Room Londra)

This session presents and discusses user uptake activities (trainings, capacity building, webinars) to ensure that innovative solutions for Disaster Risk Management are integrated into practice.

Moderator: Tobias Biermann, Directorate-General for Defence Industry and Space

Speakers and panellists:

- Juha-Pekka Japola, Directorate-General for European Civil Protection and Humanitarian Aid Operations
- Gabriel Lazazzara, SUNSHINE project
- Antonella Morgillo, Italian National Department of Civil Protection
- Ruben Pirooska, German Federal Office for Civil Protection and Disaster Relief
- Clara Eugenia Estrela Segrelles, Jucar River Basin Authority

- **16:00-16:30**
Coffee break
- **16:30-17:30 (Room 500)**
Closing

6 November 2025, 09:00 - 17:30 (CET) – DAY 3

Parallel thematic sessions freely accessible upon registration:

- **Meeting of the Integrated drought management programme, Drought in the Anthropocene network, and European drought observatories and drought experts**
- **The Exposure mapping component of Copernicus Emergency Management Service**
This session provides an opportunity to discuss the exposure mapping component – through the Global Human Settlement Layer (GHSL) – with the science-policy community of the different thematic domains relevant for GHSL.
We will:
 - present the latest development of the GHSL portfolio
 - showcase different application domains, in which GHSL can provide relevant policy support
 - discuss future directions for the evolution of the GHSL and the exposure mapping component

Copernicus Emergency Management Service user meetings:

- 20th European Flood Awareness System (EFAS) annual meeting (by invitation only)
- On-Demand mapping users conference (by invitation only)
- Meeting of the Expert group on forest fires (by invitation only)

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