



Disaster Risk



Management



Knowledge Centre

Pooling knowledge and networks in disaster risk management

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In This Issue

Editorial by François Wakenhut from DG ENV..... 2

Partnership

1st European Drought Observatory (EDO) User Meeting, on 9-10 November 2017..... 4

Training Member States in the Use of the JRC's RAPID-N and ADAM Risk Assessment Tools..... 5

Towards educating the young generation of DRM professionals: training organized by CONRIS and DRMKC..... 6

Knowledge

The 2017 wildfires in the EU: weather extremes led to a wildfire season not to be forgotten..... 7

Flood disasters to the fore in the international news..... 8

DG CLIMA study: insurance and climate-related disaster risk..... 8

INFORM (Index for Risk Management) 2018: New methods for replacement of missing data..... 9

JRC study of chemical accidents in the media during 2016-2017, for OECD..... 10

2nd Science for Disaster Risk Management Report 2020: Upcoming Call for Interest for Authors and Reviewers..... 11

Innovation

Improving tsunami preparedness and resilience in Europe: the ASTARTE project..... 12

Driving Innovation in Crisis Management for European Resilience: the DRIVER+ project..... 13

News from PLACARD: Development of climate services for disaster risk reduction..... 14

Upcoming events..... 15



Editorial



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The drama surrounding severe floods is not new. In fact, great floods have so profoundly affected humans that they are often present as course-changing events in myth and religion alike: from Deucalion, to Noah, to Manu and Gun-Yu, deluges have provided an opportunity for freeing humans from their past choices and setting the stage for a new beginning.

An uncountable number of floods later, it is still our modern-day choices that largely define our interaction with excessive water, which is naturally occurring from time to time in our environment. Choices we have made, such as locating assets in floodplains or near the coast, the reduction of water-retaining surfaces, interventions to water courses and man-instigated climate change, contribute to an increase in the likelihood and adverse impacts of flood events.

It was, however, the 2002 summer of floods along the Danube and Elbe rivers in Central and Eastern Europe, which provided the impetus for a decision to manage significant floods at the European level. As a result, exactly ten years ago, in November 2007, the Floods Directive came to life.

Since 2007, the Floods Directive has revolutionised, I dare say, the flood policy landscape in the EU. Its textbook approach to how risk should be managed (identify - evaluate - react / repeat cycle) provided a powerful framework for Member States to shift their focus from mainly flood protection to prevention, preparedness and protection; from a local to a river basin wide approach to risk; not only considering consequences for people and economies, but also the environment and cultural heritage. Whereas it is not claimed that the Floods Directive actually invented flood risk management for the EU, it is fair to say that it created the conditions and provided a reference for all 28 Member States to move in the same direction, at comparable pace, albeit from different starting points.

So, in varying degrees, the Floods Directive strengthened flood risk management as a process; underpinned knowledge and led to the development or adoption of new databases, methods and models for better assessing and mapping flood risk - and periodic reviews of these; led to the consolidation of different plans into one coherent document; helped clarify priorities for measures to reduce the risk; improved the awareness of flood risk by citizens and stakeholders; strengthened coordination and collaboration between different sectors, beyond water, such as land use planning and civil protection.

Last but not least: the Floods Directive fostered cooperation between Member States and - through the Common Implementation Strategy (CIS) - provides a platform for advancement.

The principle of collaboration, at the heart of the CIS process, has been embraced by the Disaster Risk Management Knowledge Centre (DRMKC), the latter taking an all-hazard approach. We are delighted that our experience from fostering environmental policy was useful to other Commission departments and beyond.

Alas - and we are reminded frequently - one cannot declare victory over significant flooding, not yet.

Firstly, Member States should address any shortcomings identified during the first flood risk management cycle. Secondly, Member States must now implement the measures foreseen in their Flood Risk Management Plans (FRMPs). Also, the impact of climate change needs to be understood better and solutions provided by nature itself need to be utilised more widely and more frequently: ecosystems can reduce disaster risk by acting as buffers against storm surges, accommodating flood flows and helping communities recover after disaster strikes, in urban and rural environments. Protecting or restoring ecosystems that provide these services, or employing nature-based solutions, such as natural retention measures to reduce peak flows, should be explored early on in the design of measures to support the reduction of flood risk, and prioritised, where possible, as they often provide multiple benefits in addition

to flood protection and prevention. Speaking of benefits, we wish to increasingly rely on DRMKC-facilitated networking to collaborate with other sectors and to explore win-win prevention and adaptation measures.

Finally, once the FRMPs have been assessed, and in implementing its Better Regulation agenda, the Floods Directive - and other pieces of water acquis - will be subjected to an evaluation during 2018-2019 by the European Commission. You are already invited as an expert manager/practitioner/academic, or as a citizen who wants to contribute, to share your views on the Floods Directive in a public consultation in the second half of 2018.

Stay tuned!

François Wakenhut



The EU Floods Directive (2007/60/EC) aims to reduce and manage the risks posed by floods, including river floods, flash floods, pluvial floods, and floods from the sea in coastal areas.

© Photo courtesy of Joaquim Capitão



Partnership

1st European Drought Observatory (EDO) User Meeting, on 9-10 November 2017

The 1st European Drought Observatory (EDO) User Meeting was held on 9-10 November 2017, at the European Commission's Joint Research Centre (JRC), in Ispra, Italy. The two-day meeting gathered together experts from river basin commissions, national and international meteorological services, national water boards, regional and national drought management centres, private entities, and the JRC, to discuss the development, status and future evolution of EDO, and the related Global Drought Observatory (GDO).

At the EDO User Meeting, regional, national and local drought monitoring and forecasting systems were presented, and the potential for links to the EDO system was discussed. Besides the technical and scientific aspects of drought monitoring and forecasting, the discussions centred on the stakeholders' requirements and expectations, and their involvement in the continued development of EDO, through a sustainable network of partners and experts. The need to develop sustainable monitoring and forecasting systems at various scales, their inter-linkages and synergies, as well as important existing gaps in available data and information (e.g. a lack of standardised information on drought impacts) were highlighted.

The EDO User Meeting demonstrated the availability of a huge amount of drought-related expertise, data and information across the European continent. The public availability of the information and data contained in the EDO system, was seen as important for furthering understanding of the phenomenon of drought, and acceptance of EDO as a useful tool, as well as fostering involvement of different stakeholder communities. Throughout the meeting, the lack of standardized drought impact information was identified as an important gap in the available knowledge base. It was agreed that better impact information will improve understanding of the links between these natural phenomena and society, and will be particularly useful for calibrat-

ing models and evaluating damages and losses resulting from droughts. This is considered essential for raising public awareness and triggering policy action. Finally, the EDO User Meeting concluded that building a strong network and organising regular meetings to exchange experiences and information, are of fundamental importance in strengthening our resilience against droughts.

About EDO:

EDO, which is accessed through the JRC's web portal (see below), provides a suite of drought indicators at different spatial and temporal scales, including 10-daily and monthly updated maps on the occurrence and evolution of drought events, as well as a 7-day forecast of soil moisture, while medium- to long-term forecasting is under development. At the continental scale, EDO includes a range of indicators on rainfall, temperature, snow pack, soil moisture, the photosynthetic activity of the vegetation cover, and river low flows. At the more detailed levels it includes selected indicators relevant for the respective authorities. EDO has been developed by the JRC within the context of the European Commission's main legislation and policies addressing the problems of water scarcity and droughts (WSD) at the EU level, including the 2000 "Water Framework Directive" or WFD (and its four subsequent implementation reports), the 2007 Communication "Addressing the challenge of water scarcity and droughts in the European Union" (and its three follow-up reports), and the 2012 Communication "A Blueprint to Safeguard Europe's Water Resources".

Jürgen Vogt

DG JRC, Directorate "Space, Security and Migration"

For more information:

<http://edo.jrc.ec.europa.eu/>

http://ec.europa.eu/environment/water/quantity/scarcity_en.htm



Some of the participants at the 1st EDO User Meeting, on 9-10 November 2017 in Ispra.



Training Member States in the Use of the JRC's RAPID-N and ADAM Risk Assessment Tools

Following a request by the Bulgarian government, on 18-20 October 2017 the JRC provided training in Bulgaria on the use of its RAPID-N and ADAM risk assessment tools, for the analysis of accident risks associated with industrial sites. RAPID-N (Rapid Natech Risk Assessment Tool) is a web-based application for rapidly assessing and mapping the risks of natural-hazard impact on hazardous industries, or so-called "Natech" (natural hazard triggering technological disasters) risks. ADAM (Accident Damage Analysis Module) is a tool for assessing the physical effects of industrial accidents resulting from an unintended release of a dangerous substance.

Over the three days of the training event, which was held in the town of Bansko in south-western Bulgaria, about 40 experts from central authorities and regional environment inspectorates (including Executive Environment Agency, Ministry of Interior, Fire Safety and Civil Protection Directorate) were introduced to the assessment approaches used in RAPID-N and ADAM, and they learned how to apply these tools in guided hands-on exercises using case studies.

Within the framework of implementation of the Seveso Directive (which is the main EU legislation dealing specifically with the control of on-shore major accident hazards involving dangerous substances), Bulgaria is in the process of strengthening its chemical accident prevention and preparedness programme. It is interested in assessing the risk of flood impacts on industrial installations and in learning

about the associated risk-assessment solutions.

Bulgaria had approached the JRC with a request for training, considering its efforts in supporting risk analysis, risk management, and exchange with the Member States, as well as the availability of unique assessment tools developed by the JRC. RAPID-N and ADAM training courses are offered to countries with an interest in industrial and Natech risk assessment and can be organised bilaterally upon request. The JRC's RAPID-N tool is available online (see web-link below), while ADAM will be available online in early 2018.

Elisabeth Krausmann

DG JRC, Directorate "Space, Security and Migration"

For more information:

rapidn.jrc.ec.europa.eu

References:

- Fabbri, L., M. Binda, Y. Bruinen de Bruin. 2017. Accident Damage Analysis Module (ADAM) - Technical Guidance. Software tool for Consequence Analysis Calculations. JRC Technical Report, EUR 28732 EN. Publications Office of the European Union, Luxembourg. 132 pp.
- Girgin, S. 2012. RAPID-N: Rapid Natech risk assessment tool. User Manual, Version 1.0. JRC Scientific and Policy Report, EUR 25164 EN. Publications Office of the European Union, Luxembourg. 106 pp.



Training event on the use of JRC's risk assessment tools, held on 18-20 October 2017 in Bansko, Bulgaria.



Towards educating the young generation of DRM professionals: training organized by CONRIS and DRMKC

On 19 October 2017, a meeting was held between the DRMKC team and a group of lecturers and researchers from Saxion University of Applied Sciences (Jeroen Neuvel, Marcel Paschedag and Volker Stillig), to discuss the preparation of the one-week training course based on the latest DRM-KC flagship report “Science for Disaster Risk Management 2017: Knowing Better and Losing Less”. The training course is planned to be implemented for the first time in April 2018, at Saxion University (in Enschede, the Netherlands), as a compulsory part of the safety and security management curriculum, and as part of the risk and emergency management module. The training will be provided to around fifty third-year university students.

Saxion University of Applied Sciences is part of CONRIS (Co-operation Network for Risk, Safety and Security Studies), a network of universities with accredited degree programmes with the goal of visibility in the areas of risk, increasing safety and security, and a stronger international call to consciousness. In order to enable the training in disaster risk management (DRM) to be replicated at other Universities - namely other CONRIS partners in other countries - Jeroen Neuvel, chairman of the CONRIS board, proposed that the training should follow a modular format. This should help ensure the sustainability of this pilot project.

The universities of Antwerp, Barcelona, Berlin and Coventry have already expressed their interest in participating in the development and implementation of the training week based on the Science for DRM 2017 report, and are now discussing the details for its concrete implementation, within their respective establishments. Other universities have also indicated their desire to join this DRMKC-CONRIS initiative. The University of Genoa, in collaboration with the CIMA Research Foundation (www.cimafoundation.org), is interested in a one-week training course on DRM to be delivered within their already established MSc programmes in Engineering for Natural Risk Management. Interest has also been expressed by the University of Florence and the Politecnico di Milano, where the report has already been used as a textbook for courses on disaster risk prevention.

The DRMKC will support this initiative through feedback on the outline of the training, and provision of guest lecturers from its network of experts, policy-makers and practitioners. This training will contribute to the dissemination of knowledge from the various fields of DRM, collated in the DRMKC “Science for Disaster Risk Management 2017” report, to students aiming to work in the DRM domain. The training will cover two major risks for the region in which training is provided, to make a one-week training feasible. Exercises that allow students to discuss new approaches and potential solutions, are also foreseen, as is the possibility to invite local authorities (e.g. mayors of neighbouring cities) to attend the final presentation by students, in order to analyse together the feasibility of their ideas and proposals for a more disaster-resilient EU.

As a result of the training, participants will understand better the main technological and natural risks that are relevant for their region, and will be able to communicate these risks to selected target groups, and to propose measures to



DRMKC meeting with CONRIS, on 19 October 2017 at JRC, Ispra. Left to right: Volker Stillig, Karmen Poljansek, Montserrat Marin-Ferrer, Marcel Paschedag, Jeroen Neuvel, Francesco Mugnai.
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reduce risks and increase resilience of society. The DRMKC-CONRIS initiative is not only a great opportunity to inculcate young DRM professionals with an international, state-of-the-art, evidence-based knowledge background in DRM, but it also involves the younger generation in raising to a new level the quality of future DRM practices, with joint efforts of the research and policy communities. If you are interested in joining this initiative, please contact: EC-drmkc@ec.europa.eu

Karmen Poljansek

DG JRC, Directorate “Space, Security and Migration”

For more information:

<http://www.conris.eu/>

<http://drmkc.jrc.ec.europa.eu/knowledge/Challenges-Sharing/>

6th European Civil Protection Forum



Civil Protection in a Changing Risk Landscape

5-6 March 2018
Brussels



The 2017 wildfires in the EU: weather extremes led to a wildfire season not to be forgotten

Towards the end of what was already the worst ever wildfire season in the EU, in October 2017 extreme weather conditions led to catastrophic fires in Portugal and Spain, increasing the burnt areas in the EU to over one million hectares, and the number of human casualties to over 100. During 14-16 October a tropical cyclone, Ophelia, made a detour to the Atlantic coasts of Portugal and Spain. At the time, wildfire danger conditions in that region were extreme, given the continuous drought and high temperatures since early May that had already resulted in wildfire damages above the average of those in the last decade.

On 15 October, Ophelia created extremely fast winds, which together with the dryness of the vegetation and high temperatures, led to unprecedented fire danger conditions in Portugal and in Galicia, the north-western region of Spain. Any wildfires igniting in such conditions are uncontrollable and cannot be stopped by ground or aerial means. Furthermore, due to their intensity, they produce so-called “spotting fires”, whereby ignited material is launched kilometres ahead of the wildfire front, generating new fire fronts. The presence of simultaneous, very high intensity fires in Portugal and Spain led to over 50 fatalities and nearly 300,000 hectares of land burnt in that weekend.

An image from EFFIS (see below) highlights the burnt area scars made by the wildfires in Portugal and Galicia, and some key characteristics of extreme wildfires, with the gradient of fire severity coloured from green (non-severely burnt, or almost non-existent), to red (very severely damaged). Also, as the fires were driven by very fast winds, the shapes of the scars are elongated following Ophelia’s south-north trajectory. Given the large number of intense fires in such a short time, a large amount of gas was also produced, creating large smoke plumes which, driven by Ophelia, travelled further north, affecting areas along France’s Atlantic coast and beyond. Other images in EFFIS (see web-link below) show the darkening of clouds, due to wildfire smoke, and plumes reaching as far as the islands of Great Britain and Ireland.

The 2017 wildfire season - the worst ever in the EU - has promoted recognition of the need for mutual assistance among countries, and increased prevention measures to avoid such catastrophic fires, which often burn based on continuous fuel layers arising due to lack of forest management, and so cannot be fought by existing fire-fighting methods. The European Commission has recently prepared a proposal to strengthen wildfire prevention, to increase preparedness in Member States, and to be better equipped to tackle wildfires such as described here.

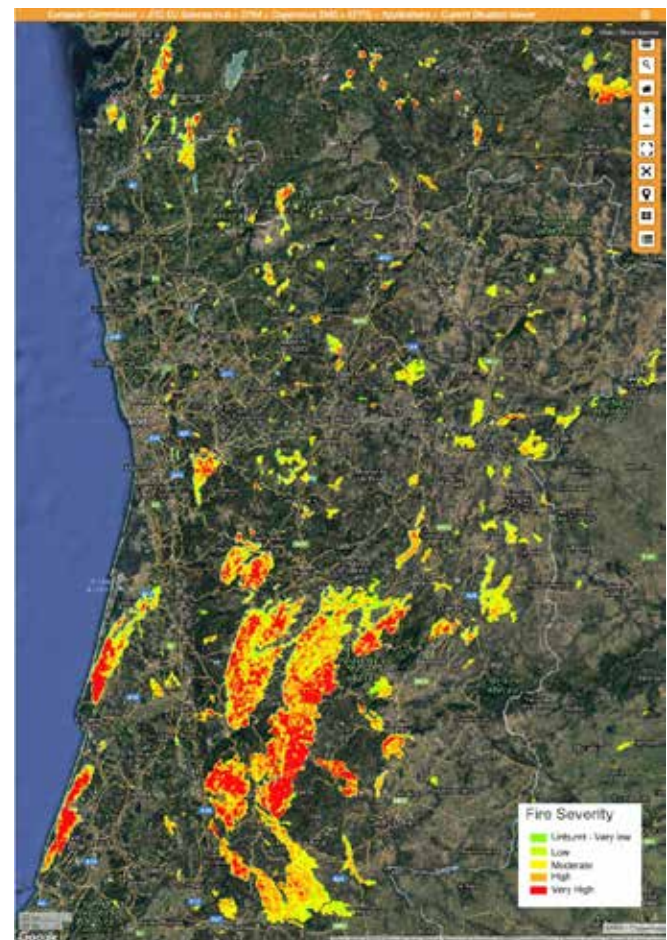
EFFIS team, led by Jesús San-Miguel-Ayanz
 DG JRC, Directorate “Space, Security and Migration”

For more information:
<http://effis.jrc.ec.europa.eu/>



Trend of burnt areas (larger than 30 ha in area) in the EU during 2017, mapped in EFFIS, showing the step increase on 14-16 October, after the wildfires in Portugal and Spain.

© European Commission



EFFIS view of burnt areas and wildfire severity in Portugal and Spain, in October 2017.

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Flood disasters to the fore in the international news

In late August and early September 2017, the threat from floods worldwide was once again propelled to the front pages of the international news. In south Asia (Bangladesh, India, and Nepal), flooding and landslides resulting from monsoon rains killed more than 1,200 people, with 45 million affected by the devastation. In South-Eastern Texas in the United States, at least 88 people died as a result of Hurricane Harvey, which became the costliest tropical cyclone on record, inflicting damage of nearly 200 billion US dollars, primarily from widespread flooding in the Houston metropolitan area.

In the context of these disasters, the lead article of the international weekly newspaper, the Economist, in its issue of 2-8 September 2017, reflected on how countries around the world deal with the devastating effects of storms and flooding, and considered several factors that exacerbate the impacts of these events, both in developing countries and in countries such as the United States. According to the article, while storms and flood generally cause far fewer deaths nowadays, due to better warning systems and flood protection measures, these events are becoming more costly, for several reasons. Apart from the underlying cause of global warming, poor planning plays a major role in cities like Houston, where rapid urban growth coupled with lax building regulations and out-of-date government flood maps (showing “100-year floodplains”) have led to a proliferation of impermeable surfaces (concrete) and housing developments in high-risk zones. The article also urges the better use of insurance as a tool for coping with the impacts of these disasters, noting that while developing countries are generally under-insured against natural disasters, in the United States the federal government subsidizes insurance premiums of housing in vulnerable areas, with the unwanted side-effect of discouraging developers from avoiding these areas, and property-owners from renovating or moving out. The article also advocates the increased use of ex-ante risk financing (“catastrophe bonds”) as a means of disaster risk management in developing countries.

In recent years Europe has stepped up its efforts to reduce the impacts of floods, especially since the severe floods of 2002 that mainly affected Germany, Austria and the Czech Republic. Implementation of the EU Floods Directive, as well as the European Solidarity Fund and the Union Civil Protection Mechanism, have fostered better disaster risk management. Since 2012 the Copernicus Emergency Management Service (EMS) has been operationally supporting emergency preparedness and response at EU, national and local levels, through its on-demand, rapid mapping service and early warning systems such as the European Flood Awareness System (EFAS). A recent study by DG CLIMA, described in this Newsletter, focuses on the important role of insurance in weather- and climate-related disaster risk management.

Niall McCormick

DG JRC, Directorate “Space, Security and Migration”

For more information on Copernicus EMS and EFAS:

<http://emergency.copernicus.eu/mapping/>
<https://www.efas.eu/>

DG CLIMA study: insurance and climate-related disaster risk

The Final Report of a recent study, funded by DG CLIMA of the European Commission (EC), on the insurance of weather- and climate-related disaster risk, was published on 22 September 2017. The study, which builds on the EU strategy on adaptation to climate change (the “EU Adaptation Strategy”) of 2013, and on the Green Paper on the Insurance of Natural and Man-Made Disasters which accompanied the EU Adaptation Strategy, addresses the objective of encouraging the use of insurance to manage weather and climate-related disaster risk.

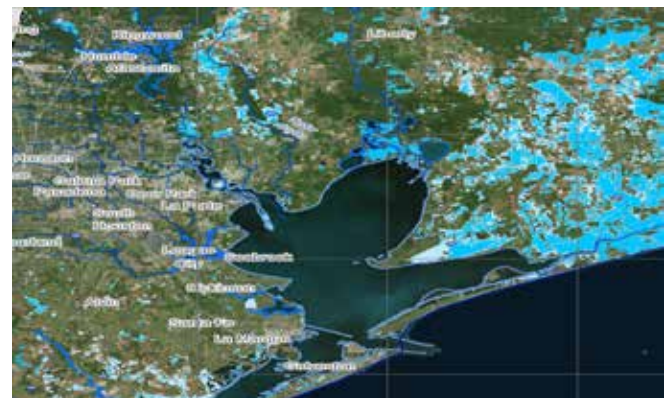
The study provides an overview of the use of insurance against natural disasters by documenting and analysing the available mechanisms to support damage prevention in the EU. It shows which factors consistently contribute to damage prevention and risk awareness through insurance against extreme weather events. It suggests general recommendations as well as specific recommendations on the role of the EC and other key stakeholders in addressing the issues uncovered, and encourages stakeholders’ efforts and best practices observed across the EU. The study consisted of the following tasks: (1) Stock-taking of insurance mechanisms covering weather-related disaster risks, applied in the EU; (2) Analysis of the cost-effectiveness of insurance mechanisms, including preventive capacity and an analysis of which mechanisms incentivise prevention of risk and support damage reduction; (3) Definition of next steps in insuring weather and climate-related extreme events. The Final Report of the study is freely available, at the web-link shown below.

Max Linsen

DG CLIMA, Directorate A - International and Mainstreaming

For more information:

<https://publications.europa.eu/en/publication-detail/-/publication/4f366956-a19e-11e7-b92d-01aa75ed71a1/language-en>



Portion of map made by the EU’s Copernicus EMS Rapid Mapping activity for the authorities in the United States, showing storm delineation (flooded areas) in the area of Houston on 30 August 2017, after Hurricane Harvey.

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INFORM (Index for Risk Management) 2018: New methods for replacement of missing data

INFORM (Index for Risk Management) is a global, open-source risk assessment for humanitarian crises and disasters, which can support decisions about prevention, preparedness and response. INFORM is a joint initiative of the European Commission and the Inter-Agency Standing Committee (IASC) Reference Group on Risk, Early Warning and Preparedness, in partnership with many UN Agencies, donors, NGOs, and Member States. In INFORM 2018 (the latest release of the tool), advanced statistical methods are being applied to address the issue of missing data, not only by “imputation” (i.e. replacing missing data with substituted values) from existing indices (predictors or variables), but also by predicting values and filling the gaps for those indices using information available for each year and country. These predictions come with a score or error to provide a level of accuracy for the model.

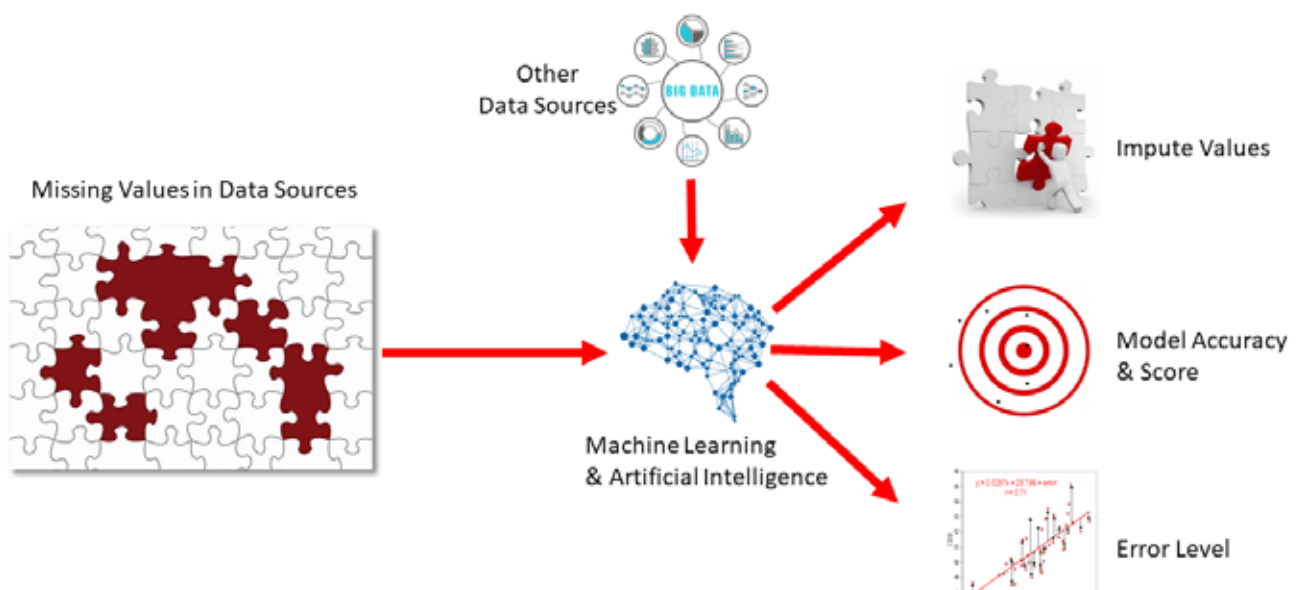
INFORM, like many other projects, uses tools that extract current information, sift through data looking for patterns relevant to the problem, and return answers and error-levels. Such tools, which have evolved over a number of fields including chemistry, computer science, physics, and statistics, are variously referred to as “machine learning”, “artificial intelligence” (AI), “pattern recognition”, “data mining”, “predictive analytics”, and “knowledge discovery”. While each field approaches the problem using different perspectives and tools, the ultimate aim is the same: to make an accurate prediction. The data used in INFORM come from different authoritative sources and represent a great deal of knowledge. However, due to its nature, the raw data come with gaps, creating some “noise” in the final results. Current INFORM datasets cover 67 years, 248 countries, and 249 indices, with the majority of information pertaining to the last 25 years. In INFORM 2018 we have added new data sources, for example from the “DataBank” World Development Indicators (<http://databank.worldbank.org/data/>) and

World Health Organization, providing a wide range of predictors which enable us to create several different datasets and models. The main reason to use these sources is to maximize both the available information for each country, and the correlation with the values we aim to predict. As a result, the new dataset used for INFORM comprises 67 years, 249 countries, and 507 indices.

Throughout this new development, we will focus on how machine learning and AI models can provide information about missing indices in INFORM. These models could be equally applied to any variable or predictor used in the data sources. The new approach is based on supervised learning, and the area of numerical prediction known as “regression”. Among the available regression models, we have tested various approaches including “Ridge”, “Lasso”, “ElasticNet” and “Random Forest”. Of these we found that the Random Forest provides the best balance between performance and complexity. A Random Forest is an ensemble learning method used for classification, regression and other tasks, which fits a number of classification decision trees on various sub-samples of the dataset, and uses averaging to improve the predictive accuracy while controlling over-fitting. The sub-sample size is always the same as the original input sample size but the samples are drawn with replacement if bootstrap is enabled. Another field within machine learning, with potentially be applied to this issue, is Unsupervised Learning, whereby clustering models are used to discover patterns inside the existing data, and predicting values for gaps.

Joaquin Bejar Garcia
DG JRC, Directorate “Space, Security and Migration”

For more information:
www.inform-index.org



Replacement of missing data in INFORM 2018: goals and concept.

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JRC study of chemical accidents in the media during 2016-2017, for OECD

On 10 October 2017, the JRC's Major Accident Hazards Bureau (MAHB) presented to the Organisation for Economic Cooperation and Development (OECD), the results on its study of chemical incidents which have been reported in the media throughout the world between 1 October 2016 and 30 September 2017. This study is a new JRC initiative to provide evidence of the importance of chemical accident risk management in order to support ongoing government actions to reduce these risks. The OECD greatly welcomed the visibility that the analysis brings to chemical accident risk. Loss of awareness constantly threatens to lead to loss of attention, undermining the significant risk reduction achieved over the past two decades. The study also serves to provide another baseline for measuring progress in reducing chemical accident risks in line with the UN's Sendai Framework for Disaster Risk Reduction (2015-2030).

As part of the study, MAHB compiled a total of 667 chemical incidents reported in the media, identified through the JRC's European Media Monitor (<http://emm.newsbrief.eu>) news briefs dedicated to the topic. The largest number of accidents occurred in the oil and gas industries (279), followed by those in chemical processing sites (183). Accidents in non-chemical industries were almost as high (143), despite often dealing with much lower volumes of substances. (This category covers a wide range of industries, such as food and beverage production, warehouses, and waste management facilities that often lack competence in chemicals risk management). Approximately 15% of the accidents reported were judged to be major accidents, on the basis of applying the European Gravity Scale (developed by Amendola et al., 1994) to information available in the media report. While OECD countries accounted for around 60% of the accidents reported, they were responsible for less than 10% of total fatalities (59) reported. Chemical accidents occurring in non-OECD countries were reported to have cost 478 lives, nearly half of which (219) were in one devastating accident involving a petrol tanker explosion in Pakistan on 25 June 2017. Some of the results of the JRC study are summarized in the figures on the right.

While many of the accidents reported in the study did not result in loss of life, they often involved serious injuries, significant damage to property and environment, and major social and economic disruptions (e.g. community evacuations, power outages, job losses, etc.). The impacts on human health from numerous natech (natural hazard triggering technological disasters) chemical releases caused by Hurricane Harvey in Texas, USA, during September 2017, are not yet fully known, and some may only become apparent over a longer period of time. In its next annual study, the JRC will include more statistics on these kinds of impacts.

Maureen Wood

DG JRC, Directorate "Space, Security and Migration"

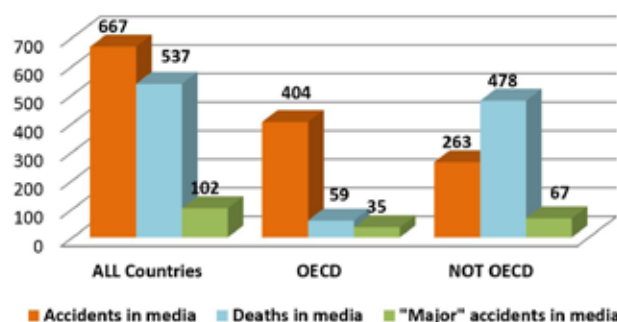
Reference:

Amendola A., F. Francocci, M. Chaugny. 1994. Gravity scales for classifying chemical accidents. Proceedings of 7th ESReDA Seminar on Accident Analysis, Ispra (Italy), 13-14 October 1994. Pp. 55-67.



Chemical incidents reported in the media (1 Oct 2016 – 30 Sept 2017) - by continent.

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Chemical incidents reported in the media (1 Oct 2016 – 30 Sept 2017) - OECD vs. non-OECD

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3rd Annual Seminar of the DRMKC

26-27 April 2018

Bulgarian Academy of Sciences, Sofia (Bulgaria)



eu2018bg.bg
Bulgarian Presidency of the Council of the European Union



2nd Science for Disaster Risk Management Report 2020: Upcoming Call for Interest for Authors and Reviewers

The Disaster Risk Management Knowledge Centre (DRMKC) is already making preparations for the second Report in the “Science for Disaster Risk Management” flagship series, which will be launched by the end of 2020. This coming work will follow on the first Science for Disaster Risk Management Report, which was published in May 2017 under the sub-title “Knowing Better and Losing Less” (Poljanšek et al., 2017). Building on that Report’s successful outcome, and learning from its multi-sectorial and multi-disciplinary networking process (which involved over 270 contributors), the 2020 Report will take a step further to reinforce the science-policy interface, by centring its analysis on the impacts of disasters across the different sectors of human life and activity.

With the 2nd Science for Disaster Risk Management Report, we look forward to strengthening the bridge between scientists, practitioners and policy-makers, and further enhancing the use of sound knowledge for communicating and managing disaster risk more effectively. In a nutshell, it will be a Science Report aimed at finding concrete innovative solutions - in other words, moving from identifying needs to identifying solutions. A broad outline of the envisaged framework for the new Science Report, including its purpose and scope, is shown in Figure 1.

Anyone wishing to contribute to the 2nd Science for Disaster Risk Management Report 2020, please note that a “Call for Expression of Interest from Authors, Reviewers and Advisors”, will be published before the end of the 2017 (see web-link below), and will remain publicly open for 2 months. The Call for Interest will be based on specific Terms of Reference defining the roles, guidelines and assessment criteria for selecting Coordinating Lead Authors (Level 1 Chapters), Lead Authors (Level 2 Sub-Chapters, and Level 3 Sections under Chapter 3), Reviewers (Experts, Policy-Makers, Practi-

Title	• Science for DRM 2020
Purpose	• Provide science-based and prevention-oriented solutions in DRM for decision-makers, practitioners and citizens
Focus	• Global contributions , but on topics that are relevant and impacting to the EU
Scope	• Comprehensive on DRM cycle and disaster impacts , emphasising the role of communication in articulating disciplines, sectors and stakeholders
Message	• Preventing risks, reducing losses (<i>preliminary</i>)

Envisaged framework for the 2nd Science for Disaster Risk Management Report 2020
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Planned Structure for the DRM Report 2020

1. INTRODUCTION

- 1.1. Review of hazard related risks affecting the EU
- 1.2. Moving towards prevention: from Disaster Management to Disaster Risk Management
- 1.3. Local solutions for global disasters

2. INTEGRATING THE RISK MANAGEMENT CYCLE

- 2.1. Risk Assessment
- 2.2. Risk Management Planning
- 2.3. Implementing Risk Management Measures

3. IMPACTS AND ASSETS AT RISK

- 3.1. Methodologies for Disasters Impact Assessment
- 3.2. Population: Life threat, Housing/habitat threat, Society/externally affected.
- 3.3. Economy: Residential, Agriculture, Industry and Energy, Private Services.
- 3.4. Critical infrastructures: Public facilities, Network infrastructures, Core industrial and energy facilities, Communication systems.
- 3.5. Environment and ecosystems: Ecosystem services, Environmental assets.

4. COMMUNICATING DISASTER RISK TO ALL

- 4.1. Linking stakeholder, sectors and governance levels
- 4.2. Citizen participation and public awareness
- 4.3. Integrating tools for prevention and response communication systems

5. GLOBAL SYNERGIES OF EU EXPERTISE

6. CONCLUSIONS AND FINAL RECOMMENDATIONS

- 6.1. To Scientists
- 6.2. To Policy-makers
- 6.3. To Practitioners
- 6.4. To Citizens
- 6.5. Future Challenges

tioners, and Citizens), and Advisors (internal and external). These Terms of Reference will include a Concept Note, a Workplan, and a detailed Table of Contents, based on the structure shown in Table 1.

Afonso do Ó

DG JRC, Directorate “Space, Security and Migration”

Reference:

Poljanšek, K., M. Marín Ferrer, T. De Groeve, I. Clark (Eds.). 2017. Science for Disaster Risk Management 2017: Knowing Better and Losing Less. EUR 28034 EN, Publications Office of the European Union, Luxembourg. ISBN 978-92-79-60679-3. doi:10.2788/842809, JRC102482.

For more information:

<http://drmkc.jrc.ec.europa.eu/knowledge/Challenges-Sharing/>



Innovation

Improving tsunami preparedness and resilience in Europe: the ASTARTE project

Tsunamis (also known as tidal waves or seismic sea waves) are low frequency but high-impact natural disasters. The Indian Ocean tsunami on 26 December 2004, triggered by a huge earthquake (9.1 - 9.3 on the Richter scale) off the west coast of Sumatra, Indonesia, killed more than 250,000 people, and devastated many parts of Indonesia, Sri Lanka, India, and Thailand. A massive tsunami on 11 March 2011, triggered by a huge earthquake (9.0 on the Richter scale) off the Pacific coast of north-east Japan, caused enormous damage, including nuclear accidents, in Japan's Tōhoku region, with waves reaching up to 40.5 metres in Miyako, Iwate, and which, in the Sendai area, traveled up to 10 km inland.

Such devastating events highlighted the limitations of our knowledge about the sources and impacts of tsunamis. In the European seas there are complex sources of tsunamis around the so-called NEAM (North-East Atlantic, Mediterranean and Adjacent Seas) Region, including earthquakes in the Hellenic (or Aegean) Arc, the North Anatolian Fault and south-eastern Spain, volcanoes in the Canary islands (Spain) and Santorini (Greece), and mega-landslides in the Norwegian margin.

The aim of the EU FP7 project ASTARTE (Assessment, Strategy and Risk Reduction for Tsunamis in Europe), which ran from 2013 to 2017, was to develop a comprehensive strategy to mitigate tsunami impact in the NEAM region. ASTARTE was a multi-disciplinary project, coordinated by the Portuguese Institute for Sea and Atmosphere (IPMA / <https://www.ipma.pt>) with contributions to different fields of tsunami research. Some of the results of the project are summarized below:

- ASTARTE completed an assessment of potential sources of tsunamis, including uncertainty treatment and tsunami height sensitivity to source parameter values.
- ASTARTE presented novel tsunami forecasting techniques, and produced new methods for inverse modelling,

analytical benchmarks for model validation based on laboratory experiments for marine structures common in the Mediterranean Sea.

- The hazard assessment include scenario-based and seismic probability-based studies. The results, presented as maps, depict flow-depths and inundation limits for specific scenarios. The probabilistic studies fostered the design of the pioneer TSUMAPS-NEAM map, the first European-wide effort intended for Civil Protection: <http://www.tsumaps-neam.eu/>
- ASTARTE developed a new Pilot Analysis Support Platform, providing a prototype tool to visualize and manage results of tsunami hazard, vulnerability and risk analyses.
- ASTARTE developed a new tool for emergency management, called FIND (Finding Inaccessible People in Natural Disasters: <http://accessible-serv.lasige.di.fc.ul.pt/~find/>)
- ASTARTE assessed the preparedness skills in NEAM communities, and concluded that there is a low level of awareness of tsunami hazard in the region, and recognized the need for evacuation plans and educational materials.

As recently as 21 July 2017, a powerful earthquake (6.5 on the Richter scale) in the Aegean Sea, off south-western Turkey, triggered a small tsunami (maximum height of 1.9 metres) that caused local flooding and some damage along the coasts of the Bodrum Peninsula in Turkey, including the city of Bodrum, which lies in one of the ASTARTE test-sites, as well as parts of the Greek island of Kos. There is an urgent need for lessons to be learned regarding the preparedness of local populations and tourists to face these events.

Maria Ana Viana Baptista
 Instituto Dom Luiz (IDL), University of Lisbon

For more information:
<http://www.astarte-project.eu/>



Map of the ASTARTE test sites.
 © ASTARTE



Driving Innovation in Crisis Management for European Resilience: the DRIVER+ project

Launched in May 2014, the EU FP7 project DRIVER (Driving Innovation in Crisis Management for European Resilience) aimed at coping with current and future challenges due to increasingly severe consequences of natural disasters and terrorist threats, by the development and uptake of innovative solutions that address the operational needs of practitioners dealing with crisis management (CM). After a transition period, the project has returned with a facelift: new name (DRIVER+), new leadership, new structure, new partners and new visual identity. The team is more committed than ever to improve the way that capability development and innovation management are addressed in CM, by assessing solutions in dedicated trials targeting the various capability gaps faced by practitioners before, during and after large-scale crises.

To inaugurate this new phase of the project, which is coordinated by TNO (Netherlands Organisation for Applied Scientific Research), all of the DRIVER+ partners met on 25-27 September 2017 for a fruitful kick-off meeting in Rotterdam, the Netherlands. The event set the stage for forthcoming project activities, and provided an exchange forum with invited EU-funded projects, initiatives and practitioner organisations. By April 2020 (the end of the project), DRIVER+ is committed to delivering the following results:

- A pan-European Test-bed for crisis management capability development, enabling practitioners to create a space in which they can collaborate in testing and evaluating new products, tools, processes or organisational solutions. It will provide a reference implementation of the technical infrastructure as well as a pragmatic step-by-step guidance to designing and assessing trials.
- A Portfolio of Solutions (PoS) in the form of a web-based online catalogue aimed at documenting and presenting details on solutions tested and evaluated during the trials. By including third-party solutions already in use or resulting from previous projects, the sharing of best practices and

lessons learnt will be supported, thereby facilitating successful implementation.

- To make the project sustainable, DRIVER+ will facilitate a shared understanding in crisis management across Europe, and enhance the cooperation framework at local, regional and international levels. This will be achieved, in part, by building a dedicated Community of Practice in Crisis Management (CoPCM), closely aligned to and supporting both the Community of Users (CoU) initiative of DG HOME, and the Disaster Risk Management Knowledge Centre (DRMKC).

Regarding the definition of concrete synergies between DRIVER+ and DRMKC, for example, after initial discussions during the DRIVER+ kick-off meeting, it was agreed to explore joint options to integrate the DRMKC's Project Explorer and the DRIVER+'s Online Community Platform, to serve as a common on-line tool for community building and as a vehicle to facilitate exchanges and cooperation between its members. Furthermore, DRIVER+ will seek to involve both DRMKC and the Emergency Response Cooperation Centre (ERCC), in the preparation of the DRIVER+ Trials and the Final Demonstration. In addition, these organisations will be invited for policy-research dialogues. These identified synergies will be further developed in dedicated bilateral exchanges. Stay tuned for more information!

Are you active in the field of crisis management, either as a practitioner, researcher, policy-maker, or a solution provider interested in showcasing your innovative products, and would like to collaborate with us? Contact us at: cooperation@projectdriver.eu

Chiara Fonio

DG JRC, Directorate "Space, Security and Migration"

For more information:

https://www.psc-europe.eu/images/DRIVER/Driver_first-press-release-final.pdf



Kick-off meeting of the DRIVER+ project, on 25-27 September 2017 in Rotterdam, The Netherlands

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News from PLACARD: Development of climate services for disaster risk reduction

In the context of the European Commission's initiative in the field, "climate services" (CS) are defined as "transforming climate-related data and other information into customised products such as projections, trends, economic analysis, advice on best practices, development and evaluation of solutions, and any other climate-related service liable to benefit society". Because climate change in many regions increases the frequency and intensity of extreme weather and climate events, access to relevant and quality climate information is crucial to enable informed decisions for addressing existing and emerging risks. In this context, it is important to understand future trends of extreme events, and those of slow-onset events (e.g. droughts) caused by climate change.

However, while CS have been associated with Climate Change Adaptation (CCA), it is still an unfamiliar term in the Disaster Risk Reduction (DRR) community, and so the development of CS catering for the needs of DRR and its actors, is not yet adequately explored.

A range of European and international initiatives and programmes consider DRR in the context of CS. DRR is one of the five priorities of the Global Framework for Climate Services (www.wmo.int/gfcs/) and is a key sector for the Sectoral Information System of the Copernicus Climate Change Service or C3S (<http://climate.copernicus.eu/>), and for the Climate Services Partnership (www.climate-services.org/case_study_sectors/disaster-risk-reduction/). However, in many of the current CS initiatives, DRR aspects are considerably underdeveloped in practice.

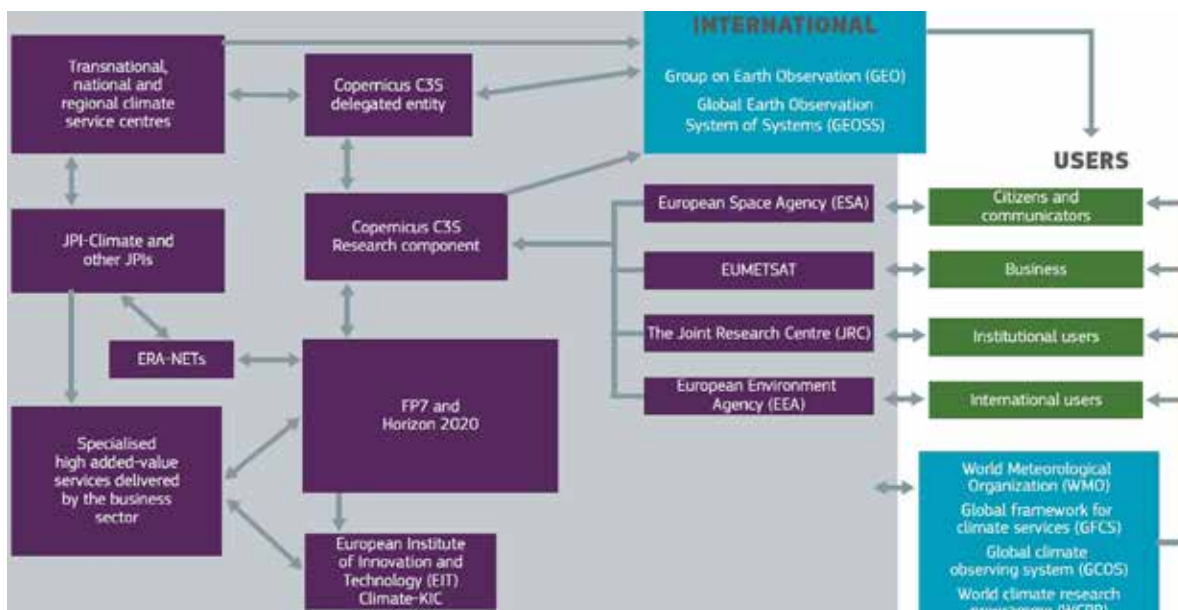
The EU H2020 project PLACARD (Platform for Climate Adaptation and Risk Reduction) aims to serve as a hub for dialogue, knowledge exchange and collaboration between the CCA and DRR communities. In this context, PLACARD organised a session at the Royal Netherlands Meteorological Institute (KNMI) 2015 workshop "Innovations in Climate

Services", and co-organised a session at the 2017 European Climate Change Adaptation Conference (ECCA), with the projects MARCO (<http://marco-h2020.eu/>), EUMACS (<http://eu-macs.eu/>) and SECTEUR (<http://climate.copernicus.eu/secteur>), and a webinar, with the projects ERA4CS (www.jpi-climate.eu/era4cs) and ESPRESSO (www.espressoproject.eu/), on CS for DRR. These three dialogue events showed that CS are important for DRR, especially for informing planning related to disaster risk prevention and recovery. It was also evident that there is a need to engage with a variety of relevant stakeholders in DRR, to inform better the future development of CS and to ensure that the provided services and information are useful, relevant, accessible and credible.

As this topic is highly relevant for preparing societies for future challenges brought by a changing climate, it is important to explore how CS can be effectively developed to meet the various needs of the DRR community, with its diverse actors and sub-communities, and to identify current research and innovation gaps for developing such services, to better support decision-making in climate risk management. To address these questions, PLACARD is organizing a workshop on "Climate Services for DRR", in collaboration with C3S and ERA4CS, on 29-30 January 2018 in Bologna, Italy. More information soon on PLACARD's web-site (see below).

Mário Pulquério, University of Lisbon
Roger Street, UK Climate Impacts Programme (UKCIP)
Rob Swart, Wageningen Environmental Research
Jaroslav Mysiak and **Eleni Karali**, Euro-Mediterranean Centre on Climate Change (CMCC)

For more information:
<http://www.placard-network.eu/>



Relationships within the European climate services landscape. (From the 2015 EU publication "A European research and innovation roadmap for climate services", available at <https://publications.europa.eu/en/home>). © European Commission

Upcoming events



PARTNERSHIP

Community of Users Thematic Workshops

05 December, Brussels (Belgium)

Thematic workshops will be held on the following topics: terrorist radicalisation (on invitation only), strategic foresight, and cyber crime. A number of EU-funded projects in this research area will be presented.

KnowRISK Final Conference

11-12 December, Lisbon (Portugal)

KnowRISK (Know your city, Reduce seismic risk through non-structural elements) is a EU Project that aims to facilitate local communities access to expert knowledge on non-structural seismic risk protection solutions.

The Final Conference will be hosted by Instituto Superior Técnico and Laboratório Nacional de Engenharia Civil, in Lisbon. Admission is free of charge.

International Conference on the Recent Tsunami Events in the Aegean Sea

12-13 December, Ispra (Italy)

This summer, two major earthquakes occurred in the Aegean Sea that have generated Tsunami along the coasts of Greece and Turkey.

The JRC is organizing an International conference to discuss technical, organizational and societal aspects of these two events, inviting the Tsunami Monitoring Organizations, the Academics, the Civil Protection and Local Authorities of the affected locations (Plomari, Karaburun, Bodrum, and Kos).



KNOWLEDGE

Risk Management Capability Assessment Workshop

14-15 December, Ispra (Italy)

The workshop aims to boost the link between risk assessment exercises and Disaster Risk Management planning through the intermediate step between both: the risk management capability assessment (RMCA). To do so, methodologies and experiences in carrying out this type of evaluation would be pre-

sented.

The 2nd International workshop on Modelling of Physical, Economic and Social Systems for Resilience Assessment

14-16 December, Brussels (Belgium)

This workshop is organised by the JRC, in close collaboration with NIST (National Institute of Standards and Technology, US Department of Commerce) and the Colorado State University.

It aims at bringing together the most up-to-date knowledge in the field of resilience across different disciplines, establishing a dialogue between policy and research. It will also contribute towards establishing a coherent resilience assessment framework for communities and societies and identify the constituents for measuring the resilience at various scales.

Ninth session of the World Urban Forum (WUF9)

07 February, Kuala Lumpur (Malaysia)

The Theme of this session "Cities 2030, Cities for All: Implementing the New Urban Agenda" – places the Forum's focus on the New Urban Agenda as a tool and accelerator for achieving Agenda 2030 and the Sustainable Development Goals.

6th European Civil Protection Forum

05-06 March, Brussels

The event will bring together representatives from governments, European and international institutions, academia, civil protection authorities, first responders, and other stakeholders to share experiences and formulate recommendations for strengthening the implementation of the Union Civil Protection Mechanism (UCPM) in a changing risk landscape.



INNOVATION

United Nations/South Africa Symposium on Basic Space Technology

11-14 December, Stellenbosch (South Africa)

The event will focus on "Small Satellite Missions for Scientific and Technological Advancement" and will cover space

technology applications for disaster risk reduction, among other topics.

4th International Conference on Information and Communication Technologies for Disaster Management

11-13 December, Münster (Germany)

Organised by the Centre de recherche sur l'information scientifique et technique (CERIST) in Algeria, the European Research Center for Information Systems (ERCIS) and the Institute of Electrical and Electronics Engineers (IEEE), ICT-DM'2017 aims to bring together academics and practitioners who are involved in emergency services, ad hoc planning and disaster management and recovery, in order to learn about the latest research developments, share experiences and information about this area and develop recommendations.

For more information:
ict-dm2017.ercis.org

Data Science for Emergency Management

11-14 December, Boston (USA)

Co-located with the IEEE BigData 2017 conference, the workshop engages researchers, practitioners and governmental bodies to discuss on emergency management analytics open issues and future developments. Topics of interest include: Big Data and social media analytics, decision support systems using spatio-temporal data, artificial intelligence, crowdsourcing, gamification, climate change models, risk maps, real-time spatial crisis data acquisition and processing, among others.

First Workshop on ICT Tools for Emergency Networks and Disaster Relief (I-TENDER 2017)

12 December, Seoul/Incheon (South Korea)

Co-located with the 13th International Conference on emerging Networking EXperiments and Technologies (conferences2.sigcomm.org/co-next/2017), The I-TENDER workshop will aim at capturing the research and technology trends that may support and enhance emergency management and response in case of natural disasters.

Topics of interest include: network systems, social media-based localization and data filtering, user interface and mobile application design for emergency management.



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