

Bushfire and Natural Hazards Newsletter May 2021

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Federal government to create new natural disaster agency after bushfire royal commission recommendation

The Australian government will give \$600 million to the new National Recovery and Resilience Agency (NRRA) with the aim to oversee national responses to major natural disasters, advise on how to mitigate the impacts of future weather events, and help communities recover and rebuild.

In the past two years, Australians have faced floods, bushfires, cyclones, drought and now the COVID-19 pandemic. The agency will be given \$600 million to fund projects to bushfire and cyclone-proof houses, and build levees in disaster prone areas. It will also support telecommunications infrastructure to better withstand disasters.

The federal government will also announce the creation of an Australian Climate Service, gathering experts from the Bureau of Meteorology, the CSIRO, ABS and Geoscience Australia, to better collate data to inform emergency management policy. The data will be used to help planning for power, water and telecommunications infrastructure, as well as housing in a future where climate change will continue to increase the frequency and intensity of natural disasters across Australia.

[More information](#)

Fire memories: gathering stories about the fire impacts and responses to build resilience

The project led by A/Prof Karine Dupre from Griffith University, on the [Bushfire Stories Project](#) aims to build community resilience to disasters by gathering and sharing first-hand experiences of the community responses to the 2019-2020 bushfires that impacted natural heritage sites.

The first pavilion of Bushfire Stories Research has been launched with Andrew Colvin, National Coordinator of the National Bushfire Recovery Agency.



The Australian Flammability Monitoring System: providing a clear picture of landscape dryness

www.bnhcrc.com.au/hazardnotes/88

Understanding and predicting fire danger and behaviour is a priority for fire agencies, land managers and sometimes businesses and residents. This is an enormous scientific challenge given the complexity of bushfires, with fire behaviour and severity driven by complicated interactions involving vegetation, topography and weather conditions.

The Australian Flammability Monitoring System (AFMS) is a website that provides a clear picture of vegetation and soil dryness across the Australian landscape. Accessible at <http://anuwald.science/afms>, it is the first national-scale, pre-operational fuel and soil moisture content and flammability monitoring system in Australia, delivering accurate spatial information about live fuel and soil moisture in near-real time.

The AFMS is being used by several key Australian emergency services and land management agencies to make informed decision about where a fire may ignite and spread, and what areas should be prioritised when sending resources and equipment to fight fires. It has also been used in Europe, South Africa, Argentina, the United States and China, and has been implemented in the emissions assessment and smoke-dispersion module of the European Commission's Forest Fire Information System. The AFMS was developed by the Bushfire and Natural Hazards CRC with researchers at the Australian National University. Researchers, led by Associate Professor Marta Yebra, investigated different methods of mapping flammability and worked with industry partners to ensure that the AFMS provided a comprehensive and accurate characterisation of flammability.

Read more about the AFMS [here](#) and access the tool [here](#).



HAZARD NOTE 88

The Australian Flammability Monitoring System: providing a clear picture of landscape dryness

Learn more at bnhrc.com.au/hazardnotes/88

Photo Credit: Bushfire and Natural Hazards CRC

The Prescribed Burning Atlas: a new system to plan effective prescribed burns

www.bnhcrc.com.au/hazardnotes/87

Prescribed burning is a central feature of contemporary fire management around the world, yet a quantitative basis for understanding and comparing its effectiveness at mitigating risk across different regions is lacking. New Australian research about the complexities of prescribed burning across varied landscapes and weather conditions is supporting the critical decisions on how and where to use fire to protect communities.

Drawing on cutting-edge science, the Prescribed Burning Atlas assists Australia's fire agencies and land management departments by presenting options for their prescribed burning strategies. The Atlas is the product of the Bushfire and Natural Hazard CRC's [From hectares to tailor made solutions for risk mitigation](#) project and was launched by the CRC in July 2020, in partnership with the University of Wollongong, the University of Melbourne and Western Sydney University. It is a website that incorporates thousands of fire simulations, comparing the level of risk reduction achieved from different combinations of prescribed burning strategies – such as smaller edge burns close to homes, or large landscape-scale burns – across different landscapes in south east Australia.

The Atlas compares the costs of different mitigation options and their effect on reducing the likelihood of life loss, property loss and environmental values, as well as reducing the likelihood of effects of climate change on prescribed burning effectiveness.

Learn more about the Atlas [here](#) and access the tool [here](#). You can also watch a recording of the launch of the Atlas [here](#).



HAZARD NOTE 87

The Prescribed Burning Atlas: a new system to plan effective prescribed burns

Learn more at bnhcr.com.au/hazardnotes/87

Photo Credit: NSW National Parks and Wildlife Service, Australia

The Australian Exposure Information Platform: uncovering national exposure

www.bnhcrc.com.au/hazardnotes/74

Understanding what is exposed at any location during emergencies is a highly valuable starting point for a variety of sectors. This information can be used for mitigation and operational decision making for any hazard within a defined area.

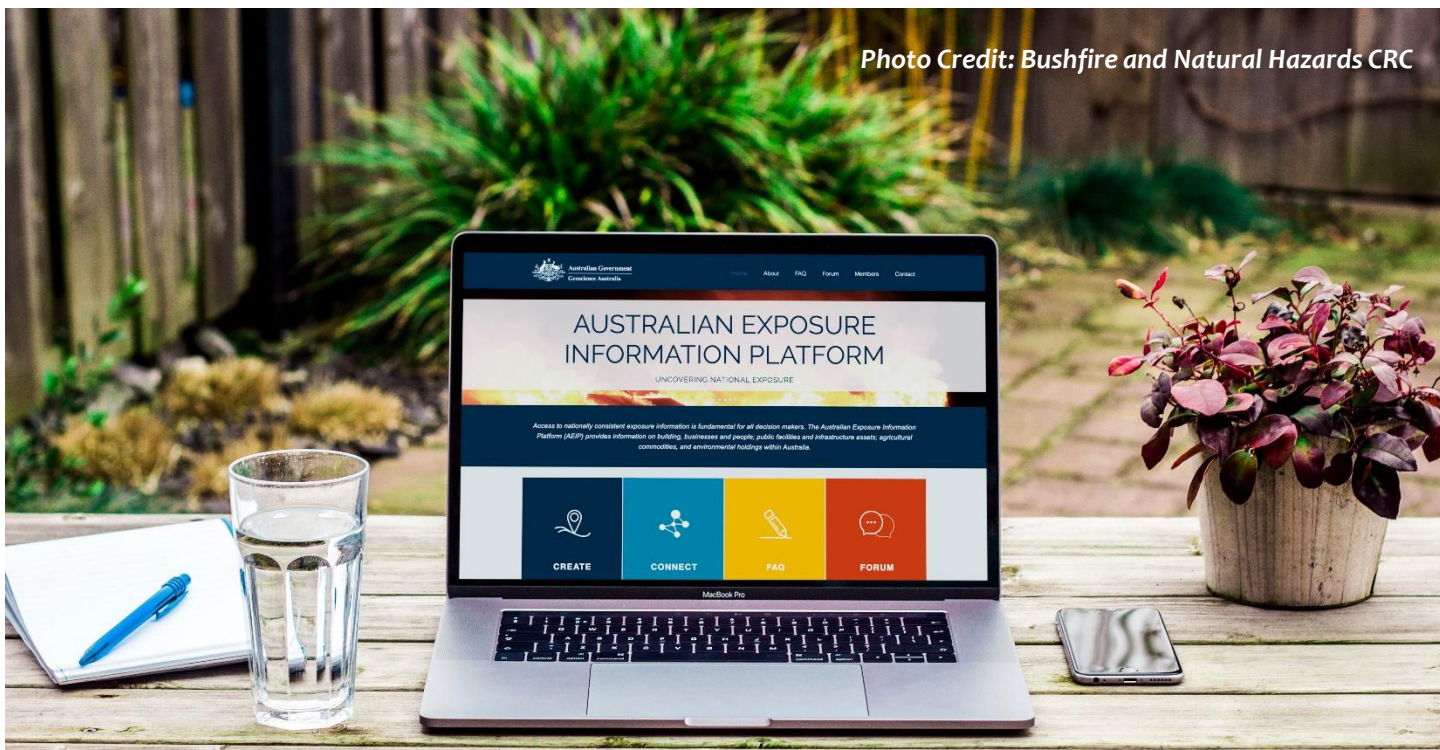
Through an online platform that was designed with, and specifically for, emergency management, the Australian Exposure Information Platform (AEIP) can be used to help estimate the potential impacts of natural or human-induced hazards or critical infrastructural failures on Australian communities. Decision makers can now easily access nationally consistent exposure information anywhere in Australia.

The AEIP produces quick, customised exposure reports that provide a detailed statistical summary of the number of people, dwellings, other buildings and structures, businesses, agricultural and environmental assets, within a user-defined area.

Since the beta version was launched in 2018, the AEIP has been used regularly by more than 240 users across Australia, from agencies such as emergency management and local government, to produce thousands of reports each month. It has become an important part of planning for Australian community preparedness and improving safety. With an unprecedented and early start to the Australian 2019/20 bushfire season, the number of exposure reports produced from the AEIP was in excess of 14,000 by more than 200 individual users.

Find out more about the AEIP [here](#) and access the tool [here](#). You can also watch a short video about the AEIP [here](#).

Photo Credit: Bushfire and Natural Hazards CRC



When fires cause storms

Fire-generated thunderstorms, sometimes called pyrocumulonimbus clouds or pyroCbs, are ferocious weather systems that are becoming more common in Australia.

The smoke from Australian fires in Victoria during the 2019/20 bushfire season reached a height of 35 kilometres. Sergey Khaykin at the Laboratory of Atmospheric Research and Satellite Observations at Sorbonne University in France reported that the smoke was so thick that it acted like a planetary shade, blocking the sun and briefly creating a cooling effect – similar to a moderate volcanic eruption.

New research-backed technology is now available that helps measure and predict fire-generated thunderstorm formation, to improve warning systems and assist fire and weather agencies with analysis and forecasting. The Pyrocumulonimbus Firepower Threshold (PFT) is a new tool based on research by the Bushfire and Natural Hazards CRC, in partnership with the Bureau of Meteorology – Australia's national weather forecast agency.

The PFT measures the threshold or minimum firepower required for fire-generated thunderstorms to form, essentially assessing the atmospheric potential to support the development of a fire sufficiently intense enough for one of these storms to develop. The PFT is proving to be highly predictive, and it is now being used by fire agencies and land management departments, as well as by weather forecasters at the Bureau of Meteorology.

You can watch a recorded training session of the PFT that Dr Kevin Tory (Bureau of Meteorology) conducted [here](#). You can find more information about the PFT [here](#).



Photo Credit: Christine Harper, Department of Biodiversity, Conservation and Attractions, Australia

The Bushfire Behaviour and Management Group **The University of Melbourne**

Understanding the Origin and Development of Extreme and Mega Bushfires

Extreme and megafires result in significant damage to property and infrastructure and are associated with large suppression costs. These events form when separate fires merge. Their increase occurrence in recent seasons highlights the importance of developing tools and technologies that better predict extreme events to aid fire response and inform strategies for greater resilience. This collaborative project of 5 research organisations (UoM, UNSW, VU, SCIRO and SJSU) combines fire field experiments with computer modelling to determine factors driving extreme fire development, and develop new knowledge and models. These enable better prediction of active fires, enhance the knowledge base of fire managers for critical decision making and to improve risk modelling and mitigation planning for fire-prone communities. For more information contact Dr Alex Filkov (afilkov@unimelb.edu.au).

Characterising and Managing Fire Risks to Plantations Under Changing Climates

Changing climates are creating significant fire risks to Australian hardwood and softwood plantations. Fires are predicted to become more frequent and intense, potentially resulting in increased plantation losses to wildfire. Existing fire simulation models do not adequately represent fire in plantations due to inappropriate fire spread models and a lack of data for plantations throughout their lifecycle. This project aims to quantify risks to plantations from wildfire under a changing climate, and the ability of management to reduce those risks. With its national scope, including ten regionally based plantation collaborators from south-west Western Australia to Tasmania and southern Queensland, this project will provide a significant step forward in the capacity to understand and forecast fire risks to plantation and community assets. By improving the empirical basis for quantifying and predicting fire risks under changing climates and providing evidence on the best ways to reduce those risks, the project will improve the likelihood of avoiding plantation losses to fire in coming decades, and thereby contribute to the resilience of the plantation industry and of associated regional economies. For more information contact Dr Kate Parkins (kate.parkins@unimelb.edu.au).

PhD completion

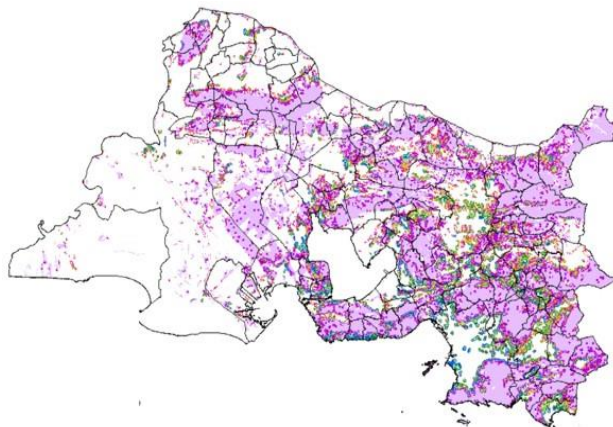
Annalie Dorph recently gave the completion seminar for her PhD and is planning to submit her thesis “Multi-scale drivers of vertebrate communities in flammable landscapes. Using extensive field studies of mammal and reptile communities and adopting multi-scale analytical approaches, she has examined how local and landscape level measures of environmental heterogeneity impact faunal communities. Specifically, her thesis explores how a faunal communities respond to landscape patterns in biophysical features, fire history and anthropogenic landscape modifications.

When protection takes over fighting : high velocity wind-driven fires facing dense habitat

Fire and Rescue Service of Bouches du Rhône

The department of Bouche du Rhône occupies an area of 523000 ha, composed of 119 municipalities hosting 2 005 000 inhabitants.

- 170 000 ha and 110 municipalities are exposed to wildfire hazard
- 199 780 constructions (over 20m²) located on forest border are categorized as subjected to STRONG, VERY STRONG or EXCEPTIONNAL wildfire hazard. This hazards level means likely to suffer serious damages.
- Each year, the Fire and Rescue Service Of Bouches du Rhône deals with an average of 160 fires, burning 910 ha.
- The landscape is composed with Mediterranean vegetation, mainly softwood and scrubland.



Wild fires are usually wind driven, sometimes topographic and exceptionally convective. Most of them spread through fire-sensitive vegetation, driven by a strong North-West wind. Their velocity is often over 2000 m/h axis spread, with many spotting, sometimes up to 1 km. Any fire ignition threatens housing and damages are unfortunately observed despite an incentive and repressive brushing politic. During operations, housing protection uses a large part of the fire-fighting resources, then unavailable to stop the fire spread.

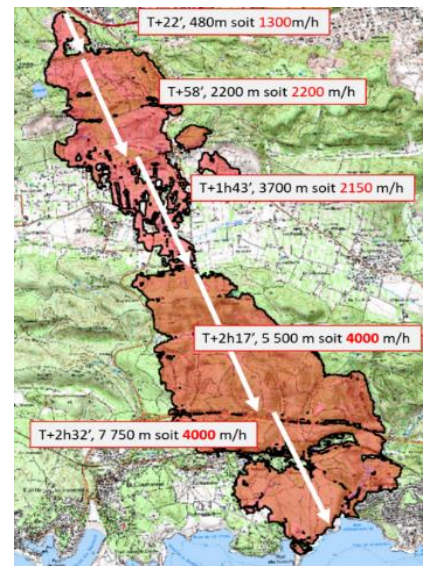


Exemple of Wildfire – Martigues – August 4th 2020

- Weather conditions : NW wind 52 km/h average speed, 90 km/h gust
- Burned area : 935 ha in 3h06
- Fire spread : 2,6 km/h average speed, max 4,8 km/h
- Damages : 72 housing impacted, 2 campsites totally burned
- Resources : 50 strike team, 200 engines, 1000 firefighters, 200 partners (forest service, Police, etc....)

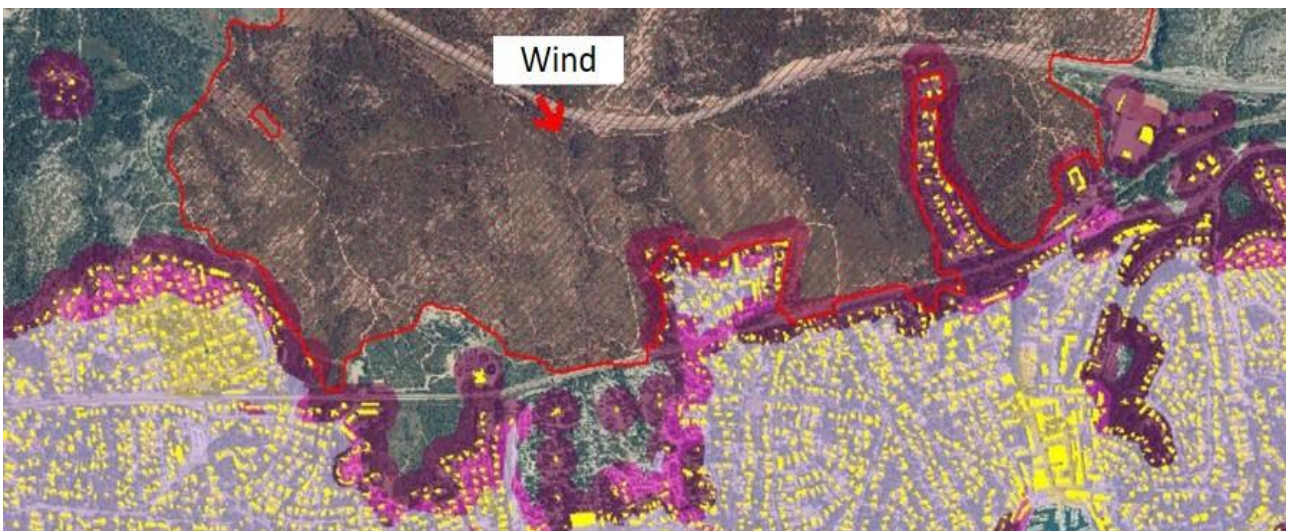
Developing Wildfire analysis skills :

- Team of 8 fire analysts and 25 végétation observers
- Production of a forecast bulletin about predicted fire behaviour to help decision makers and inform strike teams and leaders
- Wild fire analysis tools are used to design forest management.
- Wildfire analyst in the Incident Command Post to help the IC understanding fire behaviour and building his fighting strategy



Prospects

- Every citizen becomes the first prevention actor of wildfires,
- Self-protection of the housing through fuel suppression and pyro resistant built-in materials,
- Permeability of the forest-city boundaries to improve self-protection by densifying the buildings and therefore requiring less operational resources for its safety when fire occurs,
- Urban development regulation with enforceable territorial coherence scheme,
- Forest management oriented by wildfire analysis to control fuel and facilitate fighting by creating more useful path,
- Fighting adaptation by creating specific strike team devoted to housing protection.



Preventing and fighting extreme fires A substantial effort of Europe on Research and Innovation

After Australia and North America, Europe has really entered in the era of extreme bushfires during the last decade (the European preferred terminology is ‘forest fires’, even if we are more and more talking about ‘landscape fires’). It was particularly highlighted in 2017 in Portugal, when two catastrophic events claimed 117 lives in total.

In parallel, the European Commission (EC) published a report (Faivre et al. 2018) that critically reviewed the results of the initiatives in research and innovation in the past, and that paved the way for an adaptation of policy toward more prevention.

As a result, the EC launched several calls with a massive investment to understand, prevent and reduce the adverse effects of those extreme fires.

A first research and innovation project, **FIREURISK**, has started in April. It involves 38 partners across Europe, with a partnership in Australia. SAFE Cluster is leading the Work Package on ‘Fire Risk Reduction to improve protection’.

The outputs would pave the way for more projects to be funded in the frame of the Green Deal call.

With 80 M€, the **Green Deal** will fund 4 major Innovation Actions and one Coordination and Support Action.



Objective: develop, test and disseminate an Integrated and science-based strategy for wildfire risk management in Europe

Duration: 4 years; started April 2021

Budget: 10 M€

Coordinator: Pr D Viegas (ADAI, Portugal)

FR partners involved SAFE, RAMBOLL, IRD/CNRS Montpellier, LSCE Versailles

AU partner: BNHCRC

The objective announced in the call is to ‘speed up the pan-European adaptation process to extreme wildfires by advancing and applying research and innovation including demonstration pilot sites while making best use of existing data (e.g. remote sensing, in-situ or community-based data), technologies (e.g. Big Data and Artificial Intelligence) and services (as Copernicus, Galileo and EGNOS) and closely engaging and coordinating all concerned actors and communities’.

SAFE cluster, and most the research centres, industries and end-users engaged in forest fire research and innovations are competing in the call. Several partnerships with Australian actors have also been established. The EC may announce the winning proposals in few days. More information in next AFRAN Bushfire Newsletters!

contact: sebastien.lahaye@safeccluster.com

A new national natural hazard research centre: now seeking contributing partners

The new national research centre for disaster resilience and disaster risk reduction announced by the federal government in July 2020 is now due to begin operating in July 2021. The Bushfire and Natural Hazards CRC has been working on an establishment plan setting up governance and organizational structures, a 10-year research strategy, and the definition of an initial research agenda.

The Commonwealth has committed \$85 million to the centre across 10 years, with the expectation that there would be co-investment from end-users. The CRC is now seeking partners to sign up, contribute to and influence the next decade of natural hazards research in Australia.

How to become a contributing partner?

The CRC has now been tasked to coordinate the process of actively seeking end-user partners to invest in the new centre and play a role in influencing how it runs. Investment in the centre will also allow partners to substantially leverage the funds they invest, by receiving access to the centre's research output and expertise.

Please contact the CRC's CEO Dr Richard Thornton for expressions of interest or more information:

richard.thornton@bnhcrc.com.au

[More information](#)



Photo credit: Bushfire and Natural Hazards CRC

The Democrite Project

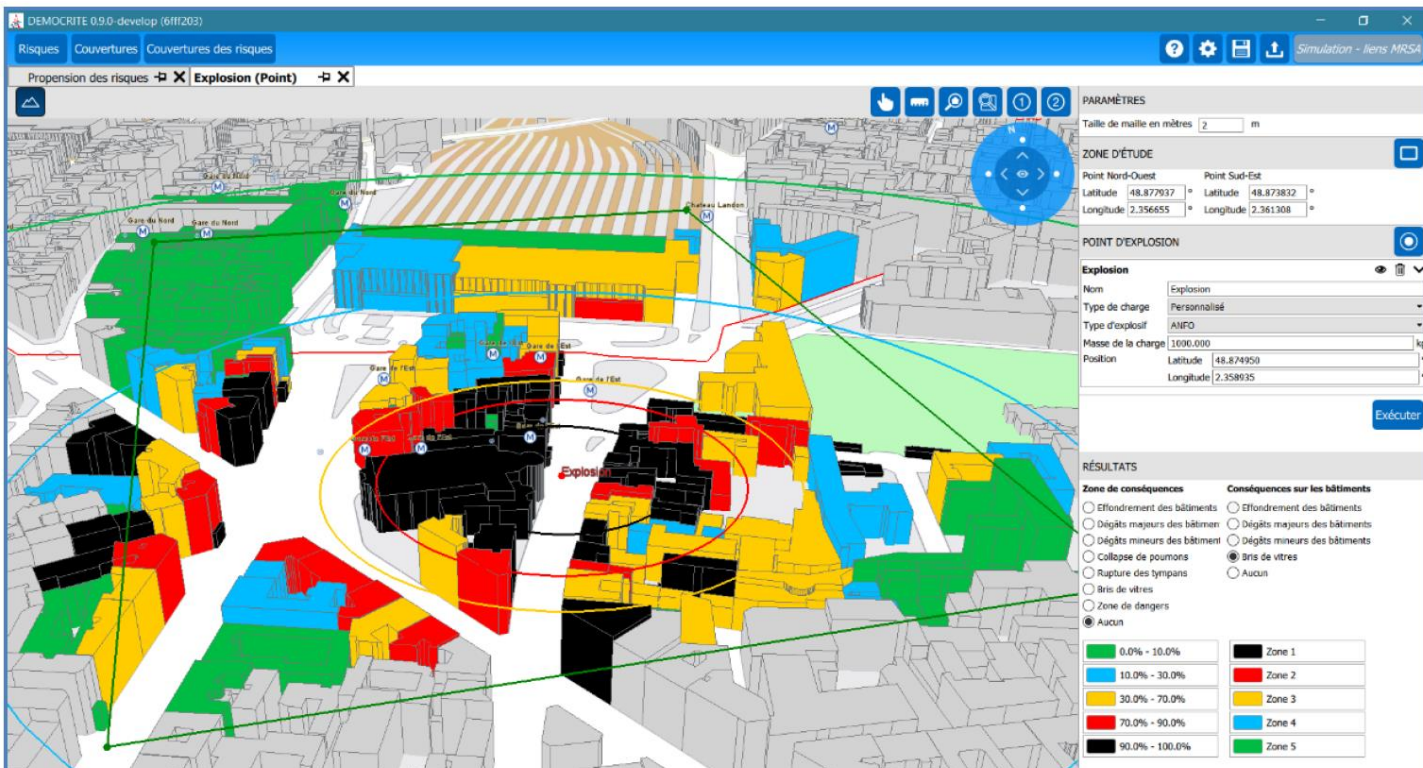
I graduated as a military engineer from a French “Grande École d’Ingénieur” and my career always stayed focused on scientific developments and technical project management. My initial speciality was in explosives and warheads (senior expert), but I soon extended my interests to CBR risks and more generally to a broader approach of risks of various natures. My trigger towards entrepreneurship has been the DEMOCRITE research project I coordinated between 2014 and 2018. This project aimed at providing the Paris Fire & Rescue Service with an operational software platform for risk analysis and risk coverage.

The DEMOCRITE software platform is a geographic information system embedding:

- Maps on past interventions (RETEX) to quantify risk probabilities.
- Maps of human and social vulnerabilities.
- Fast mapping of risk coverage / vehicle availability / residual risks.
- Fast-running models for several risks: explosion, fire propagation, water quality/quantity...

I would like to build a research project with Australian and French partners (academic, industry, stakeholders and first-responders) in order to apply a similar approach to natural and/or industrial risks in Australia. We could focus on cities and suburbs first, with the identification and mapping of major stakes, fast-running models for the selected risks, risk coverage (if needed) and evacuation modelling. These are only my preliminary thoughts, and I am open to other ideas...

Contact: Emmanuel LAPEBIE emmanuel.lapebie@apex-solutions.fr



Project of Rainforest and Peat Fires Center of Excellence Indonesia and Southeast Asia

As founding member of the Alliance for the Conservation of the Rainforest, France is engaged in the protection of tropical forests. Indonesia is the most affected country in South-East Asia by vegetation fires. In addition, this country hosts the most important peatlands of the world, representing more than 20 % of carbon stored in soil worldwide. For these reasons, France has decided to make a specific effort in order to support Indonesia in its progress to fire reduction.

A project with the Faculty of Forestry Sciences, University of Bogor ([Institute Pertanian Bogor](#) - IPB), which hosts the Regional Fire Management Resource Center – South East Asia (<https://rfmrc-sea.org/>) is being set up to establish a Center of Excellence (CoE) for rainforest and peat fires. As IPB has a strong knowledge in science of vegetation fires, the first phase of the CoE will be to develop training capacities.

For the three first coming years, 2021 to 2024, the ambition is to develop Standards Operating Procedures, training programs, education material, in Bahasa and English, dedicated to the specificities of rainforest and peat fires. It includes also the development of digital content and online platform, that will facilitate the dissemination across the country and beyond.

Australia supports Indonesia on forest and land management since many years, and is strongly concerned by climate change, and by rainforest issues, with large rainforest areas in Queensland and North Territories. Researchers in Australia could be interested to join this Center of Excellence initiative on rainforest and peat fires in Indonesia. This project is at the proposal phase, and we would welcome Australian partners !

Contact: Jean-Michel DUMAZ jean-michel.dumaz@diplomatie.gouv.fr



AFAC Conference: *Balancing impact and expectations*

17 – 20 August 2021 International Convention Centre, Sydney, Australia

AFAC21 will focus on how we manage the consequences of major events and meet the expectations of the community and government. The program will explore how the sector can continue to learn and find opportunities to deliver with new and innovative approaches.

[More information](#)

Envirorisk

23 – 24 September 2021, Aix en Provence, France

SAFE and its partners are organising the 19th edition of the ENVIRORISK Forum on **Extreme Climate Events: From Analysis to Resilience** with live broadcasts. The Forum will be an opportunity to meet French and international experts, and discuss natural and technological risks in the context of climate change, and pathways from crisis management to resilience.



[More information](#)

Numerical WildFire 2021

15 – 19 November 2021, IESC Cargese, Corsica, France

More frequent occurrence of large wildfire events is a major public safety concern, as is their possible increase with climate change. Advances across a broad range of scientific disciplines can help predict the outcomes, guide decision support, and therefore help to mitigate losses from large wildfires.

In particular, we note the availability of large computing facilities and new observation systems that can enhance our ability to estimate and forecast wildfire.

The Numerical Wildfire 2021 workshop is specifically focused on this topic, gathering scientists to synthesize approaches that can provide pragmatic answers to current problems with tools that can be made available rapidly- i.e. within 1-2 years - to decision makers.

[More information](#)

Interested in joining the community?



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