Bushfire and Natural Hazards Newsletter November 2020

Foreword

French and Australian News

New projects

Focus on YOU!

Opportunities and calendar

A French-Australian Bushfire and Natural Hazards Community is born

Building on the France and Australia Bushfire Science Workshop...

An online workshop has contributed to the open sharing of knowledge and expertise between Australian and French fire experts. Set up in partnership with the French Embassy in Australia, the Bushfire & Natural Hazards CRC, the Group of Eight, and the European competitiveness unit SAFE Cluster, this workshop provided a forum to explore and exchange on the expertise and best practices of the two countries, and on the more advanced research concerning the management of bushfires.

The event was opened by the Ambassador of France to Australia, Mr. Christophe Penot, who highlighted the benefits of France and Australia collaborating to tackle this global crisis. He explained the context of this workshop, and its purpose: "*to share our tools, our knowledge, and our strengths in order to respond in the best possible way to the forthcoming global changes that will affect us all*".

Prof Margaret Gardner, Chair of the Group of Eight, praised the benefits of expert collaboration and emphasised the importance of recognising bushfires as a global crisis. "*Knowledge has no borders,*" Prof Gardner said. "*It works across countries and it's best when it's given wings by international collaboration, by experts talking with experts across boundaries, sharing what they understand*".

With six expert panels across three days, more than 40 French and Australian panellists including key researchers, policymakers, government officials and agency representatives, discussed bushfire science and practices. Fire professionals shared their experiences about the different emergency responses and ways that both countries draw on research and collaboration for bushfire innovation. Fire behaviour studies and processes such as the formation of storms, or pyro-cumulous-nimbus, were also discussed. A specific panel was dedicated to regulations on fire-use practices in France and Australia, as well as urban fire-risk management. The impact of fires on our societies, our health, our economy, as well as on our environment are sometimes impossible to estimate, but studies were shared on how to take them into account in today's decisions, in order to form a better prepared and more resilient society. Climate studies and climate interactions with forest biodiversity and their fire regimes have been described to inform environmental restoration strategies. Finally, future risks were discussed and earth observations and climate models were presented as tools to better determine these emerging challenges.

Dr Richard Thornton, CEO of the CRC, hosted the final panel, which focused on specific opportunities for connection and ongoing collaboration. "*The CRC has been trying to foster these sorts of collaborations for many years now and this will continue as we transition into the new centre, announced in July of this year. It's really important that we work together. We're happy to help wherever possible, especially now that we've developed these relationships, so come and talk to us if you need connections*".

For more information and to replay the sessions

... and hosted by the AFRAN Association

Collaboration in research and innovation can foster transformation in the Bushfire and Natural Hazards fields.

The modern meaning of innovation is "a new idea, creative thought, a new imagining in the form of a device or method"... It does not necessarily involve invention, which is creating something completely new. Innovation means transforming or adapting something already existing to a new context, or to solve another problem. France and Australia are different, but both countries have experienced devastating bushfires and disasters. Sharing their knowledge, adapting their tools to the local specificities of the other country is innovating.

The transformation of the Bushfire and Natural Hazards field will happen through collaboration, exchanges between different disciplines, such as social sciences, climate science, or fire science; different points of view such as emergency services, academy, or governments; and different cultures and countries such as Australia and France, as a random example!

AFRAN is short for the Australian-French Association for Research and Innovation. This association is active in initiating, fostering and scaling up collaborations between France and Australia in the areas of research and innovation. The Association promotes and organises networking events and fora gathering academia, industries, community players and policy makers, it supports promising collaborations with seed-funding, offers insights into the French and Australian research and higher education systems, and coordinates a platform of experts to support research, technology, industries and communities.

The association is structured into local hubs and thematic communities. Building on the France and Australia Bushfire Science Workshop and the interest it triggered, an AFRAN Bushfire and Natural Hazards Community has emerged to share ideas, information, and research progresses about bushfire, natural hazard, and climate science, and to connect French and Australian researchers.

Do not hesitate to visit **AFRAN website** or to **contact us**
if you are interested to be part of the community and to promote your activities!

Royal Commission recommendations about National Natural Disaster Arrangements

The Royal Commission, established after the 2019-2020 Australian Summer Fires, has released its report on **Australia's strategies for prevention, preparedness, response and resilience to natural disasters** such as floods, bushfires, earthquakes, storms, cyclones, landslides and tsunamis.

The report's **80 recommendations** provide **advice on coordination at all levels of the nation** in the event of an emergency, and attempt **to fill gaps in current procedures**. They include public warning systems, fire-fighting resources, climate data, the role of the Australian defence forces, and how charities and other organizations can respond to disasters.

This report focuses on the future, in which **extreme weather events and natural disasters will become more frequent and severe**. The issue of adapting Australian current strategies is highlighted, as a resilient country must not only extinguish fires but also mitigate disaster risks with its management of the environment, urban areas, infrastructure, or education and preparation of its people, but also attend to the long-term consequences of these disasters.

A national approach

The report advocates for **a national approach to share responsibilities, and establish better cooperation and coordination of actions** and allowing sharing of resources, science and technology, and coordination of strategies between jurisdictions, states and agencies. States and territories should remain accountable for the protection of life, infrastructure and environmental management, and disaster management within their jurisdictions. However, **the federal government should play a more important role**, complementary to that of states and territories, since it can act at the national level and has the assistance of the Australian Defence Forces.

The report thus recommends **the establishment of a ministerial forum**, such as the national cabinet, **to lead the country towards greater resilience**. Its decisions should be informed by **a council of governmental agencies, industries, and experts** who would take into account all the possibilities of disasters, their impacts, and the long- and short-term necessary measures to mitigate, prepare for, respond to, and recover from them. A new legislation should allow the federal government to declare a "**state of national emergency**" and to provide assistance, in the event of a disaster and under clear legislation, without the request of the federated states, to provide logistical support, assist in the transportation of personnel, equipment, food or medicine, or assist in a large-scale evacuation.

This national approach should also result in **the creation of a national aerial firefighting capability**, but **also the possibility of deploying the Australian Defence Forces during disasters**, the sharing of information platforms, technologies, and resources across services, the harmonisation of data standards and fire warning systems at a national level, and the development of mobile phone applications. The report calls for ensuring the protection of essential services, infrastructures, and supply chains. Consistency and ongoing review of evacuation plans, accessible routes and protection shelters across all states and territories are also among the recommendations.

Climate change data and projections should be integrated into the national disaster risk information service, and developed locally by states and territories.

An assessment of the various **emergency services capacity** should be conducted on a regular basis, and multi-agency training exercises should be conducted at a national level. Finally, job protection for volunteers should be strengthened.

Air quality, which has been a major issue in the 2019-2020 bushfires, should be monitored in real time, and health advice given to populations in particular to vulnerable people. The recommendations also include the development of air quality monitoring and forecasting capabilities.

The report advocates for **better preparedness for medical intervention** at the time and after disasters, particularly on mental health issues.

The commission also made recommendations on **land management**. It advocates for simplified approving processes for private land management activities to reduce risk, for more communication on selected public management strategies, and for monitoring their implementations and benefits. Land use planning and **building regulations** should take into account known risks, and **new construction standards** taking into account extreme weather conditions should be established. The report also calls for the development of **knowledge on the geographical distribution and status of Australian animal and plant species,** and the development of **exchanges with aboriginals about their cultural knowledge of the country and land management**.

The report underlines the **education of the population** about the disaster risks, with the development of an information and warning system, training on evacuation measures and plans and on the specific features of the various protective equipment which the population may use.

Finally, **restoration and care activities** should be evaluated and coordinated at a national level, in order to allow the sharing of resources, training, and support in a consistent manner. Restoration programs should be in place and include measures to increase resilience.

https://naturaldisaster.royalcommission.gov.au/publications/royal-commission-national-natural-disaster-arrangements-report

The government statement in response to the Commission recommendations

The Australian government has announced its intention to support all the recommendations related to the federal government.

Acknowledging that a national approach would allow to better coordinate and mobilise Commonwealth resources and help tackle the challenges states and local communities may face, a package of measures will strengthen Australia's emergency response and recovery capacity:

- A legislation will be introduced to give the Australian Government the power to declare **a national emergency state**.
- National Cabinet has also agreed to establish a National Emergency Management Ministers Meeting which will be initially responsible for driving and coordinating implementation of the Royal Commission's recommendations.
- National coordination arrangements will be enhanced and strengthened within **Emergency Management Australia**,
- A new **National Resilience, Relief and Recovery Agency** will be created, incorporating the functions of the National Bushfire Recovery Agency, the National Drought and North Queensland Flood Response and Recovery Agency, and the disaster recovery and risk reduction functions within the Department of Home Affairs,
- **Resilience Services** will be created to provide enhanced climate and disaster risk information and services.

https://www.pm.gov.au/media/reforms-national-natural-disaster-arrangements

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

A/Prof Karine Dupre from Griffith University, is leading the **Bushfire Stories Project.**

The 2019-2020 bushfires were devastating. Not only did they burn forests, farms, buildings to a greatest extent ever recounted, but they also took the life of 34 people and more than a billion of animals (CDP, 2020). In Queensland specifically, more than half of the Gondwana world heritage rainforests were burned, including the iconic Binna Burra Lodge. Our multidisciplinary research project is contributing to bushfire recovery and resilience and is jointly funded under the Commonwealth/State Disaster Recovery Funding Arrangements 2020.

The 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. Storytelling pavilions will be built on two impacted sites to collect and share memories, increasing awareness, fostering discussion and building collective learning.
The first pavilion will be erected in Binna Burra in December 2020.

Download the flyer

The Fire and Rescue Service of Southern Corsica

The Fire and Rescue Service of Southern Corsica is the center of management of the many crises to which Corsica is subjected, with, as an example for the year 2019:
- the storm Amélie Corsica (3 November 2019 - pumping operations in cellars and shops),
- the storm Fabien Corsica (21 December 2019 - 2 weeks of interventions, floods in the city of Ajaccio and its periphery - national reinforcements - protection operation, pumping - closure of Ajaccio airport for 2 weeks),
- the Bavella fire - Quenza (4 February 2020, 3 weeks of intervention with 5000 ha covered, one of the most important winter fires in the history of Corsica),
- the torrential floods in Ajaccio (11 June 2020 - nearly 400 vehicles flooded - about 30 vehicles washed away - 20 rescue actions carried out by first responders - 1 week of operations).

The Fire and Rescue Service of Southern Corsica proposes to carry out exchanges of experts or executives (crisis managers or senior fire brigade officers) for immersion operations, in order to enrich their experience in crisis centres and large operational structures.

This service has developed important links with the University of Corsica, based in Corte, and participates in numerous scientific programs in order to develop R&D programs on firefighting and natural disasters tools, or land use planning. It also offers the hosting of Post Docs (subject to funding) to introduce them to its strategy of inter-departmental crisis management on all types of disasters (fires, storms, floods).

Finally, the Fire and Rescue Service of Southern Corsica offers training seminars for decision makers responsible for safety and health issues, crisis managers, people engaged in collective actions in the public or private sector, or actors in relief and care services. These seminars are intended to share expertise and experience, but also to analyse practices and doctrines, and to review activities and outcomes in the field of fire management and natural disasters.

www.sis2a.corsica

Service d'incendie et de secours de Corse du Sud
Serviziu d'incendiu e di succorsu di Pumonti

The Bushfire Behaviour and Management Group
University of Melbourne

The Bushfire Behaviour and Management Group at the University of Melbourne aims to provide a strong scientific basis for the prediction of wildfire behaviour and the impact of wildfires in order to identify management strategies aimed at reducing the risk of damage to human values while maintaining environmental values in the landscape. To do this our work covers three primary research areas: fire behaviour; landscape flammability; and risk modelling.

Fire behaviour

In natural and Wildland-Urban Interface environments, the science of fire behaviour and fire dynamics is used to predict when and how wildfires spread through the landscape and the associated impacts to communities. This science is used to develop computer models to simulate wildfire spread, providing information to fire fighters and the general public about wildfires in their area. Our research focuses on understanding how fuel, weather, terrain and spatial scale interact and influence ignition, spread and fire intensity. We use a range of methods including retrospective analysis of past wildfires and computer modelling. Development of physics-based and operational models requires the knowledge of many characteristics of wildfires at different scales. Fire experiments are the only way to do this in a safe and quantitative way. We specialise in undertaking laboratory experiments, field observations of fires and prescribed burns to improve our understanding of fire behaviour, the impact on structures and provision of essential information for future fire modelling.

Landscape Flammability

The nature of fire behaviour varies greatly through space and time; some years high levels of rainfall may result in few wildfires with little impact on human values. During other years, in particularly during periods of prolonged drought, the likelihood of uncontrollable wildfire is high. Therefore, an understanding of the processes which drive spatial and temporal variation in landscape flammability is critical to for assessing fire risk. We study landscape flammability from two different perspectives: the development of methods to extend laboratory research to large landscape scales; and the development of methods to extract information from fire observations and large scale measurements to determine the roles of key environmental drivers (i.e. dryness, vegetation type). This enables the processes that drive fire behaviour at large scales to be better understood, and identification of potential levers that managers can use to influence future fire risk.

Risk modelling

Risk modelling provides a methodology for investigating alternative burning strategies, management scenarios and decisions. We examine scenarios such as the impact of individual fires; to the effect of climate change on fire regimes. Our risk modelling approach provides a systematic method for assessing trade-offs between different management strategies, with estimates of residual risk and cost-effectiveness across a range of values and assets types. Our work in this field aims to provide robust calculations of risk (at the local and landscape scale) to assist decision making and inform on-ground management for a range of assets including people, property, economic, environmental, cultural and infrastructure. Through new software developed by our team we also have the capacity to integrate future climate scenarios, enabling the assessment of risk under a changing climate. We use a range of modelling approaches to quantify risk, specialising in fire simulation, spatial data analysis, Bayesian Network Modelling and fire regime simulations.

www.bushfirebehaviour.net.au

Reconstructing past fire and ecology on Kangaroo Island during the Holocene – Lucinda Cameron Duxbury

Kangaroo Island - it's about as quintessentially Australian as a placename gets. There should be no surprises then when I tell you that I'm from the University of Adelaide, South Australia. I'm completing a Master of Philosophy in Earth Sciences with a focus on paleofire and I'm excited to be able to connect with the French bushfire community, especially as I lived in France for a year in Aix-en-Provence and Grenoble.

Last summer, as I'm sure you did, I watched with baited breath as my country burned out of control for months. Friends lost their vineyards in the Adelaide hills, family was evacuated from the Victorian high country and the air quality was so bad that I couldn't work out if it was healthier to go for a run or stay inside on the couch. It was petrifying but ultimately these events were a spark of inspiration for my current research on the fire history of Kangaroo Island, especially as nearly half the island was burnt in the blaze.

Of course, fire has long been a familiar and important part of Australian ecosystems. However, anthropogenic climate change has heralded major shifts in fire regimes, negatively impacting ecosystems and threating human lives. Destructive megafires are predicted to increase in coming years; the summer of 2019/2020 was already amongst the worst witnessed since European arrival in Australia.

Despite these projections, there is still considerable uncertainty surrounding fire regime trajectories and their corresponding environmental impacts. This is due partly to a lack of historical data on centennial to millennial timescales. In South Australia, the driest state on the driest inhabited continent, the problem is exacerbated. This is because permanent bodies of water, and therefore continuous paleoenvironmental records, are few and far between.

Lacustrine sediments on Kangaroo Island are exceptions to this rule and provide otherwise unattainable Holocene records for the South Australian region. Our study aims to address the research gap by analysing lake sediment cores from Kangaroo Island. In September this year, we collected several lake sediment cores from Lashmar's Lagoon on eastern Kangaroo Island, reaching a maximum depth of 7.39 metres, likely representing the past ca. 5000 years (about half of the Holocene).

We have further plans to collect additional cores from Grassdale Lagoon in the far west of the island and the more central Birchmore Lagoon in early 2021. I'm hoping that we have enough arm strength to push further through the Holocene at these sites! On all of our cores, we will be conducting high-resolution charcoal, sedimentary ancient DNA (*sedaDNA),* pollen and geochemical analyses to elucidate the complex interactions between climate, fire and the environment.

Kangaroo Island is also unique in that it is believed to have been largely uninhabited and unmanaged by Aboriginal people for millennia. Our results could therefore offer important insights into ecological baselines and the effects of cessation of Aboriginal fire management on ecosystems. As I also am interested in Aboriginal knowledges, it is a long term goal of mine to further explore the role of Aboriginal burning practices in ecological management. More generally, I am fascinated in the relationship between western science and Aboriginal knowledge systems, especially where they are complementary. Aboriginal Peoples have been sustainably managing Australian landscapes for a very long time and it is disappointing that their knowledge systems are all too often disregarded.

I embark on this research journey with hope that the knowledge I gather of the past can inform present and future bushfire predictability as well as ecological management and restoration. I very much look forward to learning more about others' work in this space too.

 I have to say here that my favourite part about talking about my research in French is that these are not sediment 'cores' but 'carrots'

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Researcher portrait: Stéphane Mangeon

G'day,

I am Stéphane Mangeon (PhD), a CERC postdoctoral fellow in the Model-Data Fusion team in CSIRO Data61. Leaving countryside France to go study in the United Kingdoms for University, I eventually received a PhD in Space and Atmospheric Physics from Imperial College London and the UK Met Office, where I built its fire module for climate models (INFERNO). I worked with the UN's World Meteorological Organisation and the Singapore-MIT Alliance for Research and Technology (SMART) on South-East Asian Haze events. Then I spent about a year in commercial Data Science and AI in Singaporean start-ups. My wife and I moved to Brisbane in 2019 to work with Australia's Commonwealth Scientific and Industrial Research Organisation (CSIRO). Now, my time is split between working on Data Science research (Data Assimilation frameworks for count data), the spark bushfire simulator, and bushfire risk mapping for commercial clients.

Allow me to say a little more about the latter. It is established that bushfires are a major natural hazard here in Australia, and are compounded by droughts and vegetation that can significantly quicken fire spread. Yet bushfires remain particularly difficult to predict, from ignition risks to spread and the aftermath: the losses due to fires. Nevertheless, many sectors of the Australian economy and government need to make informed decisions based on the risk that bushfire might occur and if they do, on their likely consequences.

Fortunately, we have a growing number of methods and tools to support these stakeholders. In my work, these would be:
- Data science and statistics, as exemplified by the **bushfire Data Quest**. We have a growing amount of data available, and in the quality of algorithms available to handle that data.
- Fire spread and consequence simulations, through dynamics-driven models such as the **Spark fire simulation framework**

If this is of interest, I am keen to connect with other scientists and build up some sustainable collaborations between France and Australia on the topic.

**Connect with Stéphane on LinkedIn,
or see my work on my google scholar profile.**

Shape the AFAC21 Conference Program

AFAC21 will explore the theme: *Balancing impact and expectations.*

As recent emergency events have shown, there's an evolving extreme that is producing new challenges in terms of impact on the community, environment and economies. The community expects the emergency management sector to stay ahead of these events but with resourcing challenges, overlapping seasons here and abroad, and the surge in reviews, inquiries and recommendations, what do agencies do differently?

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.

The committee encourages you to submit an abstract for the Research Day, AFAC Conference or a Conference Poster under one of the following supporting topics:
• new approaches
• embedding research into practice
• looking after ourselves and others
• communities.
Don't miss out on the opportunity to be part of Australasia's premier emergency management conference and exhibition.

Abstract submissions close on Monday 8 February 2021.

The Institution of Fire Engineers (IFE) Australia national conference will be held in conjunction with AFAC21. The Conference will explore the theme **Vision 2021: Shifting the culture; Enhancing safety, sustainability and resilience**.

See the **Call for Papers information here**.

The Australian Institute for Disaster Resilience (AIDR) will once again be co-locating the Australian Disaster Resilience Conference with AFAC21. The conference will explore the theme **Meeting in the middle: community voices and complex choices.**

more information is available on the **Australian Disaster Resilience Conference** website.

Embassy collaboration programs

PHC FASIC 2021 Program

Deadline for applications: 11th of January 2021

The objective of this program is to develop **scientific and technological exchanges of excellence** between laboratories in France and in Australia, by encouraging **new cooperation** and **the participation of young researchers**. Submitted projects must be **joint research projects** involving at least a French and an Australian research partners.

A matching fund from the partnering Australian research institutions is mandatory and will stand as one of the eligibility criteria of the submitted projects. **A letter of financial support** from the research Australian institutions must be attached to the application.

This program will be implemented through three specific instruments:
- **The FASIC Workshops Scheme**
- **The FASIC Researchers Scheme**
- **The FASIC PhD Scheme**

More information

Interested in joining the community?

You are welcome to register with **AFRAN**, or **contact us**