



JULES Fire Module update

Chantelle Burton (Met Office) & Doug Kelley (UKCEH)
& thanks to Ol Perkins

Processed-based



INFERNO



INFERNO-Peat



PPE

FireMIP ensemble
Burned area attribution

HDI

WHAM!
Human agency

Control burns

eXplainable AI
emulator

FWI/FFDI large
ensemble

Machine learning

ConFLAME

Extreme fire projections & attribution



Stochastic

Prescribed Observed Burned Area

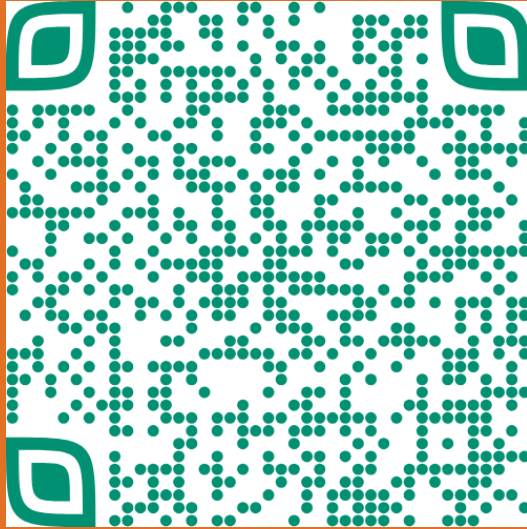
General updates

Seeking a new fire module lead

Due another fire meeting soon

JULES fire papers

Please add your own
here:



[https://docs.google.com/document/
d/1QBLbIzKZo81WJV-
HENoOzEX6y1QgxRIW2zQJ9GMRuB8
/edit?usp=sharing](https://docs.google.com/document/d/1QBLbIzKZo81WJV-HENoOzEX6y1QgxRIW2zQJ9GMRuB8/edit?usp=sharing)

Including **prescribed burning** in fire modelling: A case study from the Brazilian Cerrado using the JULES-INFERNO model (Renata da Veiga et al, Pyrogeography. June 2026)

Assessing the impact of the **Human Development Index** on historical trends in the INFERNO fire model. (João Teixeira et al. ESD. Jun 2026)

Influence of simulated vs. satellite-based burned areas on modelled **terrestrial carbon fluxes** (Ermitão et al., Carbon Balance and Management Jan 2026)

Estimating **future wildfire burnt area over Greece** using the JULES-INFERNO model. (Anastasios Rovithakis et al. NHESS. Sept 2025)

Understanding drivers and biases of simulated **CO emissions** from the INFERNO fire model over South America (Maria P. Velásquez-García et al., Biogeosciences, Feb 2026)

Recognition of **Loss & Damage from wildfires** is key for climate justice. (Renata da Veiga et al, Communications Earth & Environment

State of Wildfires 2023-2026

JULES-INFERNO developments



Diagnostic burned area: Tim Stripp (Exeter) see [preprint](#)



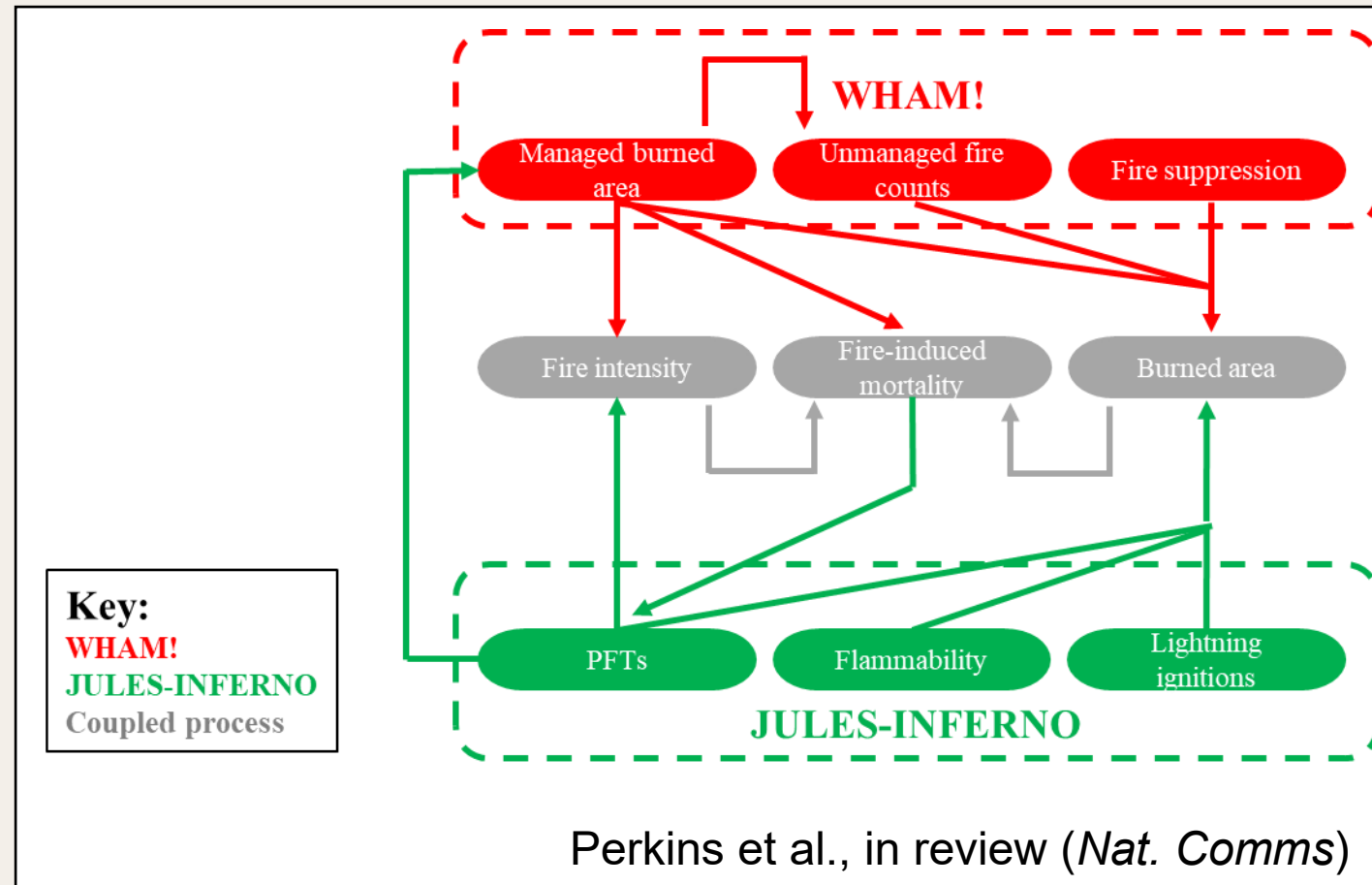
Pyrogenic carbon in the Amazon: Oscar Kennedy-Blundell (Exeter)



Peat fires: Remi Gaillard (Exeter) & Prerita Agarwal (Imperial) adding INFERNO-PEAT (developed by Katie Blackford) into JULES: **l_peat_fire** (outputs avg_ba_peat)

WHAM! agent-based model integration

- Representation of controlled human fire use & suppression
- Representation of fire intensity modulates mortality
- Coupling captures feedbacks between management, vegetation and fire
- Changes available via Github; pull request outstanding!



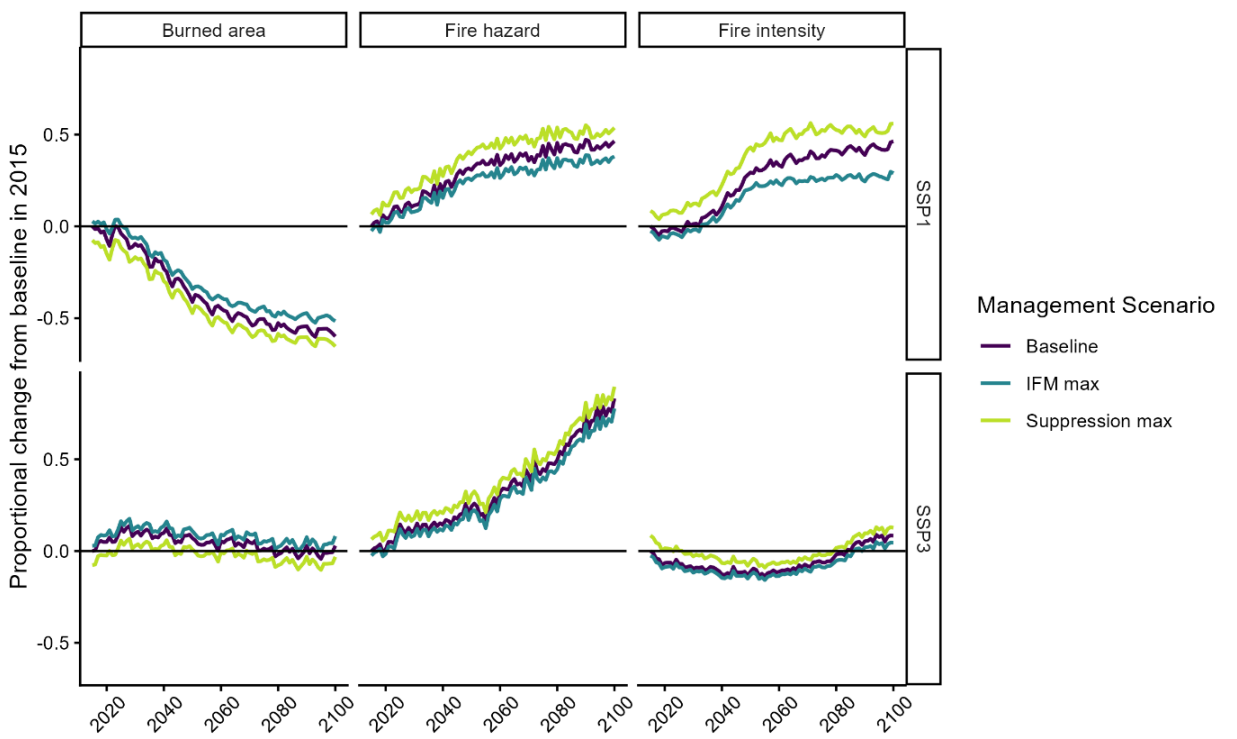
Modelling adaptation potential

- Three different scenarios of management responses to climate change
- Changes in management lead to large intensity increases under rapid socio-economic change
- Highlights potential barriers to implementing effective controlled burning

Below: Mgmt scenarios defined with WHAM! ABM

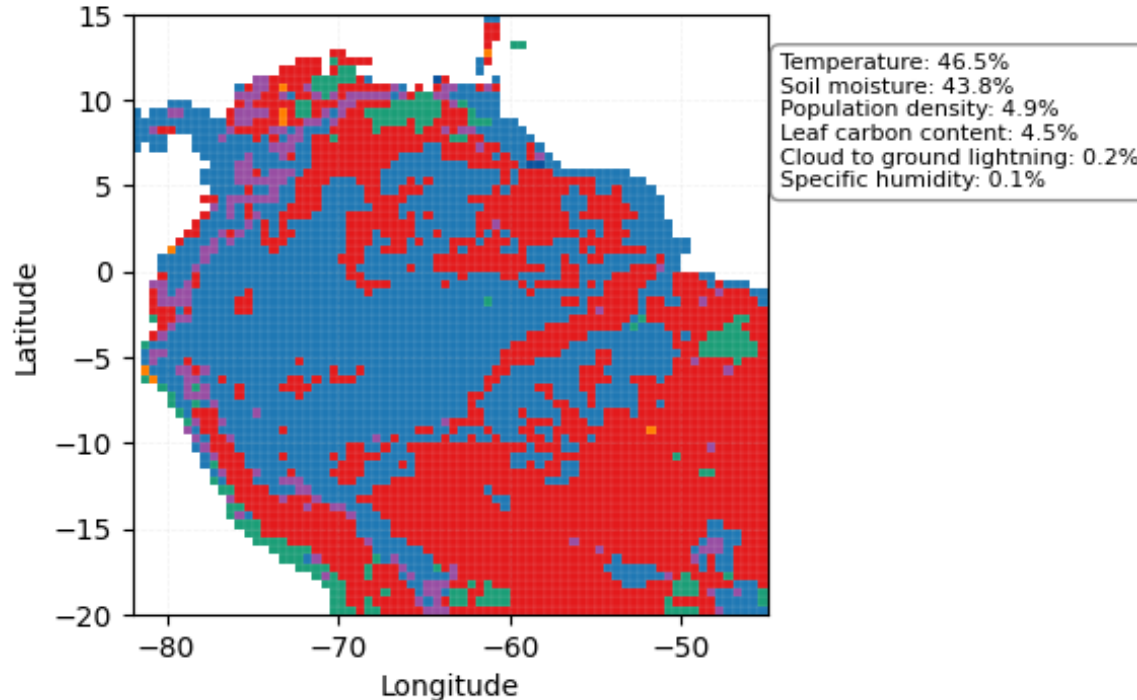
Management scenario	Social attitude to human fire use	State-led controlled burning	Fire suppression
Baseline	Default	Default	Default
Suppression-max	Opposed	Low	High
IFM-max	Supportive	High	Default

Below: Impact of alternative management on burned area, fire hazard and intensity. Hazard = intensity x flammability. IFM = integrated fire management



Emulators and Perturbed Parameter Ensembles

- WIEMIP (Eleanor Burke) – fire & permafrost, PPE, & pulling out hard-wired parameters for further tuning
- PPE work with ISIMIP driving data (Laura Gibbs)
- JULES INFERNO Emulator (Simone Zheng)



Spatial distribution of the first dominant wildfire drivers

- This figure shows the spatial distribution of the top 1 climatic drivers for the amazon area.
- **Temperature** and **soil moisture** are two dominant climatic drivers overall which ranks first in **46.5%** and **43.8%** of the study area, respectively.

See poster tomorrow

Coupled model updates

Fire now in UKESM2 prototype

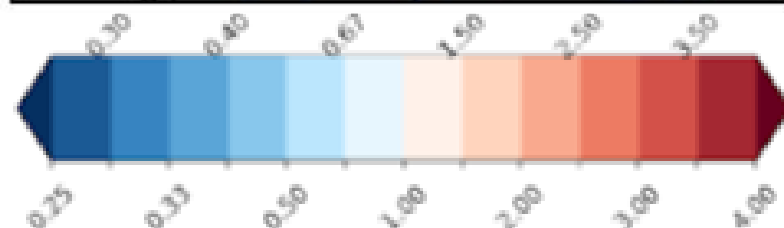
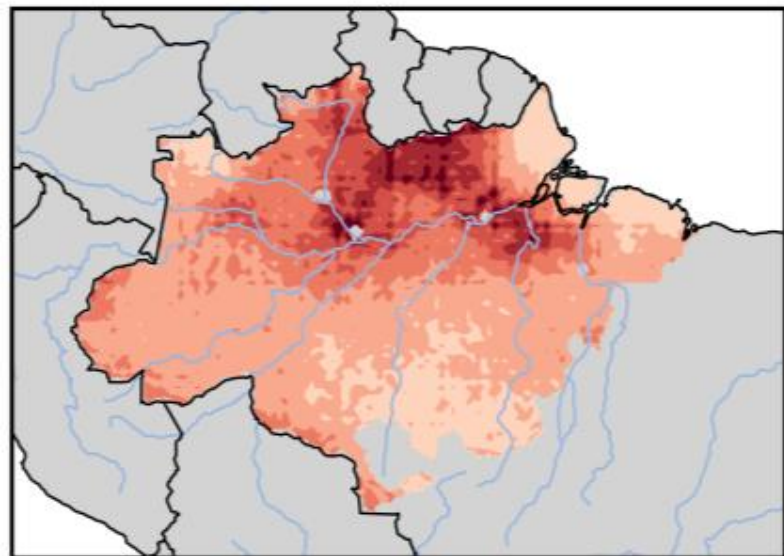
TWISTA pyrocumulus plume
modelling (Ben Johnson and
Jim Haywood)

BASE Wildfire Loss & Damage

Maria LF Barbosa (marbar@creh.ac.uk)

Attribution science = ConFLAME-HadGEM/-ISIMIP

Communities knowledge = observations of the season + validation of model approach





UK pavilion event

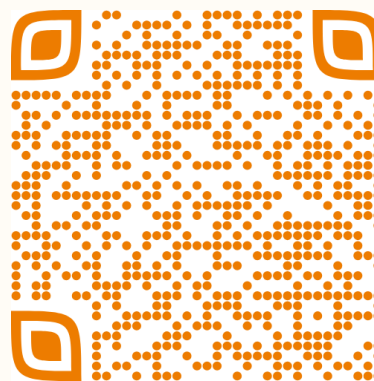
Wildfires: Science, Stories, and Strategies for Resilience in Amazonia

UNFCCC official side event

Building Resilience through Integrated Fire Management: Policies, Early Warning & Safeguards



Maria LF Barbosa (marbar@creh.ac.uk)



Policy Brief
October 2025

Integrating wildfire impacts into the Loss & Damage agenda for climate justice: evidence from Brazil

Climate change increases drought conditions, which can aggravate heatwaves, intensifying the frequency and severity of extreme events such as wildfires, turning them into systemic crises. On the frontlines of this reality stand volunteer and community brigades—the first to respond when fire breaks out. Yet their work remains precarious, largely invisible, and chronically underfunded.

Despite these challenges, brigades embody the power of direct, flexible, community-led action that integrates prevention, rapid response, and ecosystem restoration.

Supporting them is therefore not only a matter of justice, but a strategic investment in climate resilience—bridging mitigation, adaptation, and urgent responses to loss and damage.

KEY MESSAGES

- Attribution studies confirm that burned areas were, on average, twenty times larger in the Amazon and fifty times larger in the Pantanal due to climate change. These biomes, once reliable carbon sinks, risk becoming net carbon sources due to fire-induced degradation that has persisted for decades.