Remote Sensing of fuel Flammability

Dr Marta Yebra
Director, ANU Bushfire Initiative
Fenner School of Environment & Society
Research School of Aerospace, Mechanical and Environmental Engineering
Institute for Space

Australian National University

@myebra12

North Black Range Fire-Dec 2019 @ Marta Yebra

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HAZARDSCRC

Australian Government
**Department of Industry,
Innovation and Science**

Business
Cooperative Research
Centres Programme

Applying remote sensing to bushfire decision making

Focus of my talk →
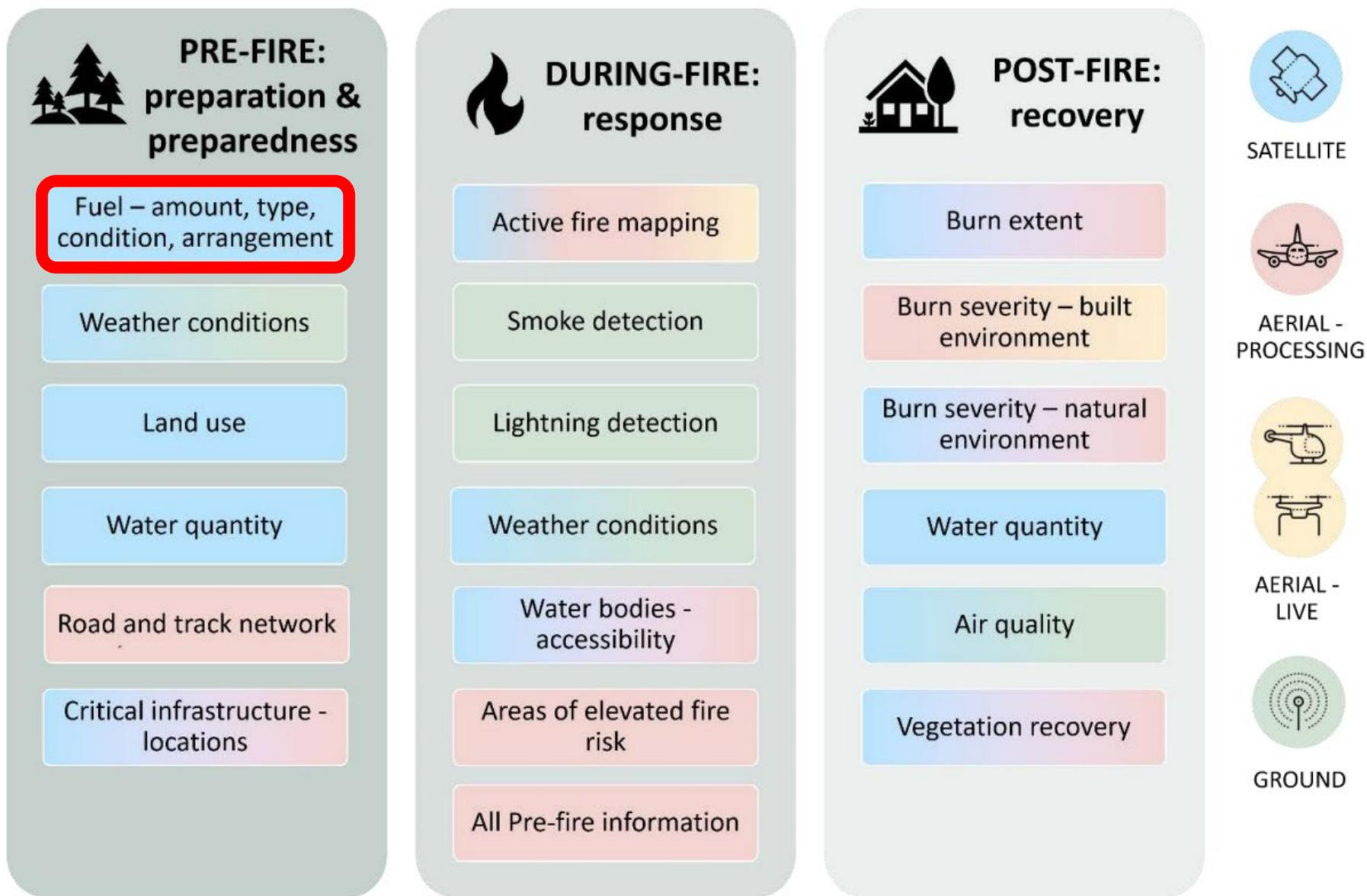
Fuel Flammability

Arrangement

Quantity/load

Moisture content (FMC)

↓

Flammability

(ignitibility, sustainability and combustibility)

Why monitoring live fuel moisture content?

Forest
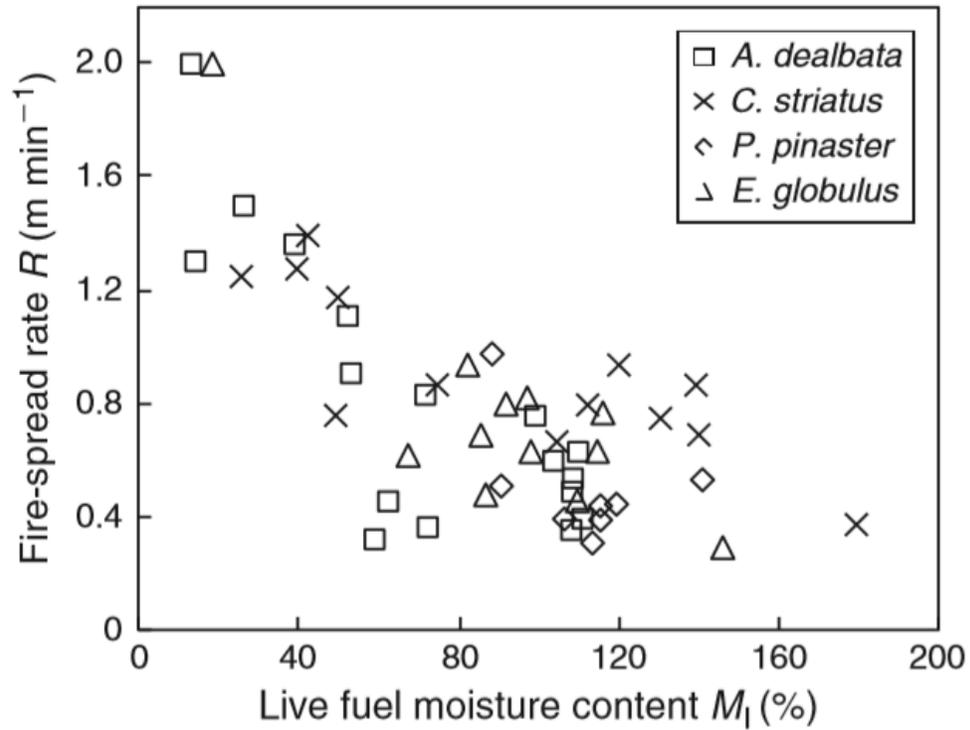
Rossa *et al.*, 2016, IJWF

Grass
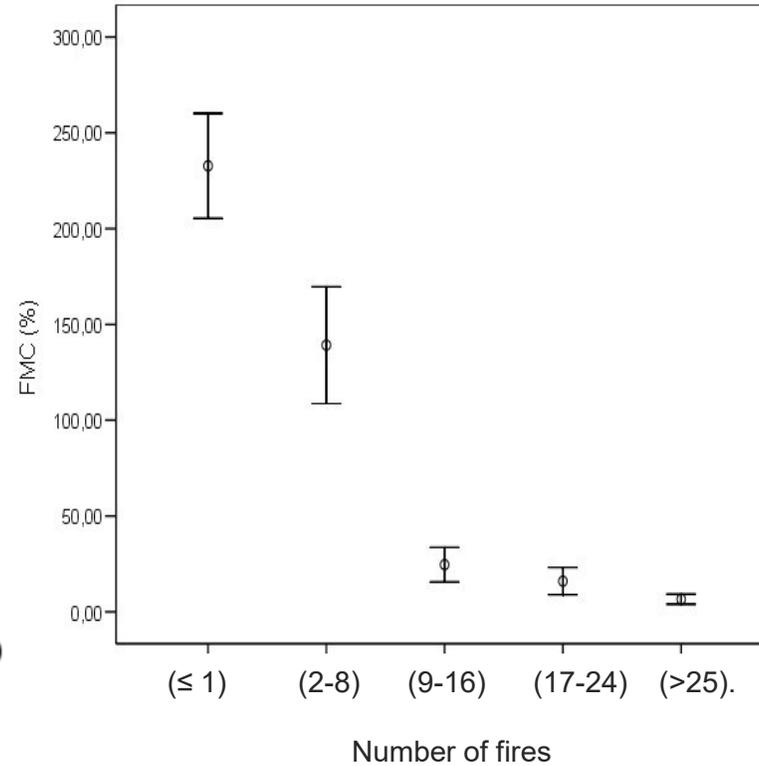
Chuvieco *et al.* 2009, IJWF

Mediterranean Shrub
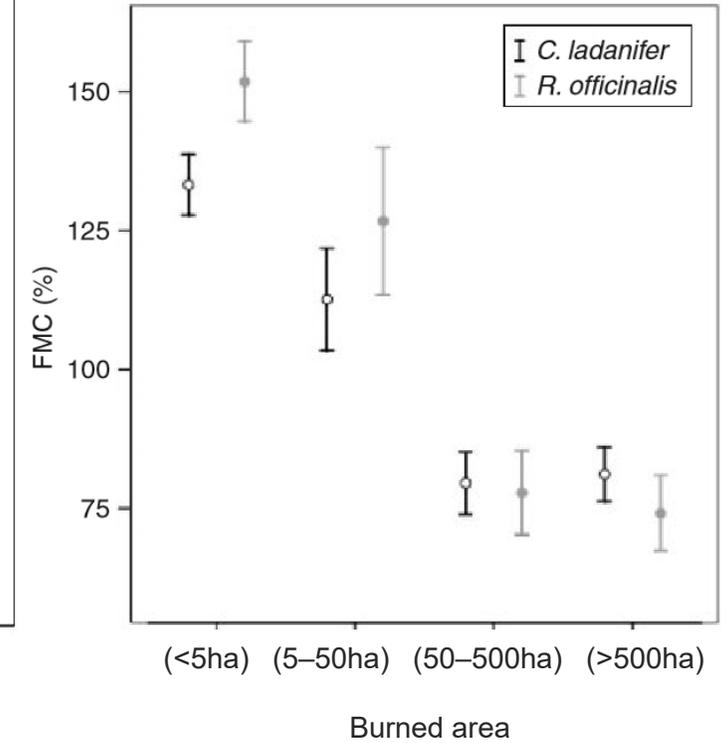
Why monitoring live fuel moisture content?

Maintaining 'greener' vegetation around houses provides additional protection from wildfires
(data from 499 houses from three wildfires that ignited on 7 February 2009 in south-eastern Australia)
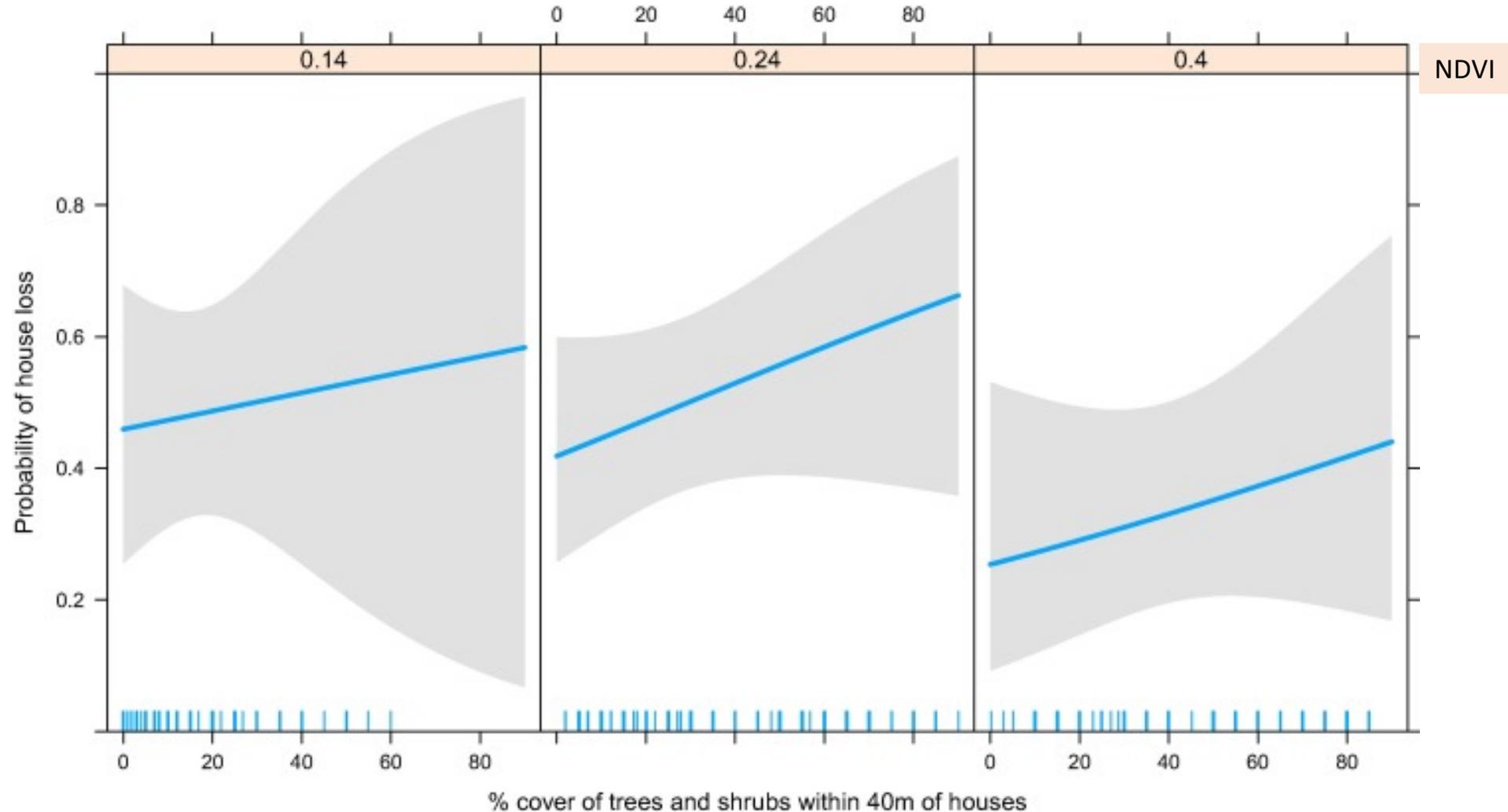
The Australian Flammability Monitoring System (AFMS)

First **continental-scale** web site providing spatial information on landscape-scale **fuel moisture content and flammability** derived from **satellite observations**

SATELLITE DATA → Fuel Moisture Content → FLAMMABILITY → DISEMINATION Web site

Australian Flammability Monitoring System

Live Fuel Moisture Co... ▼   « < 2020-01-25 📅 > »   Local Government Are ▼   Grid ▼

Live Fuel Moisture Content (%) ❶

▮	≥136
▮	119–136
▮	102–119
▮	85–102
▮	68–85
▮	51–68
▮	34–51
▮	17–34
▮	0–17

Chart ⌃

Map data ©2020 Google   10 km ⊢——⊣   Terms of Use   Report a map error

ABOUT THIS SITE   SEND FEEDBACK

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Very dry fuel in most of Australia in 2019

Annual minimum live fuel moisture content for 2019

Scortechini, IN preparation
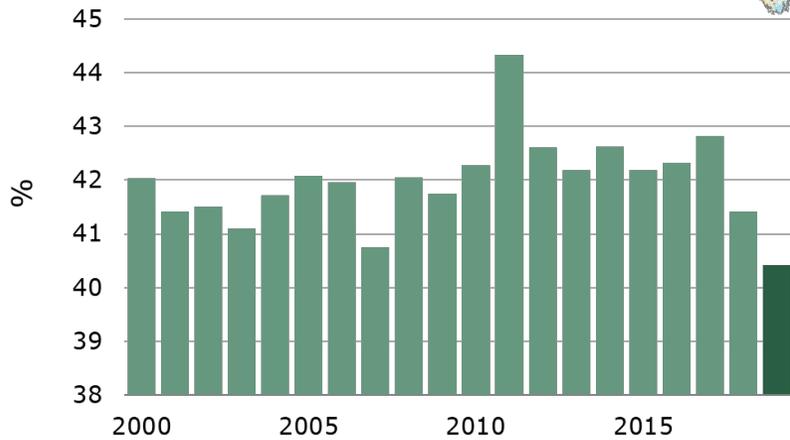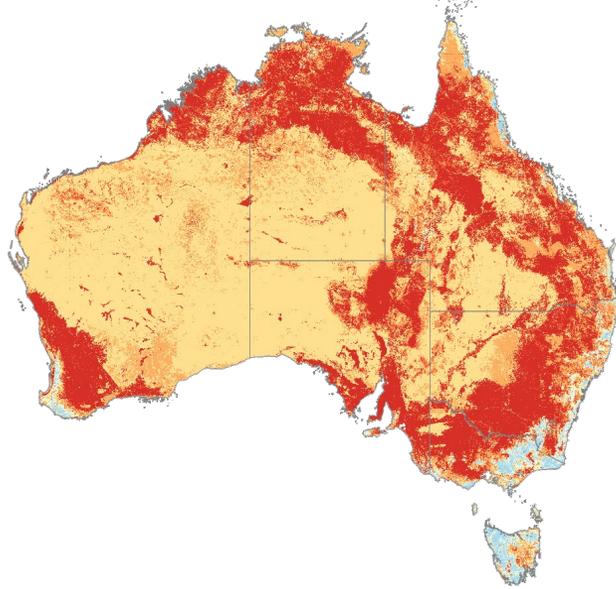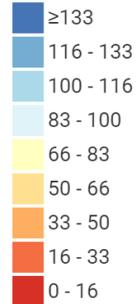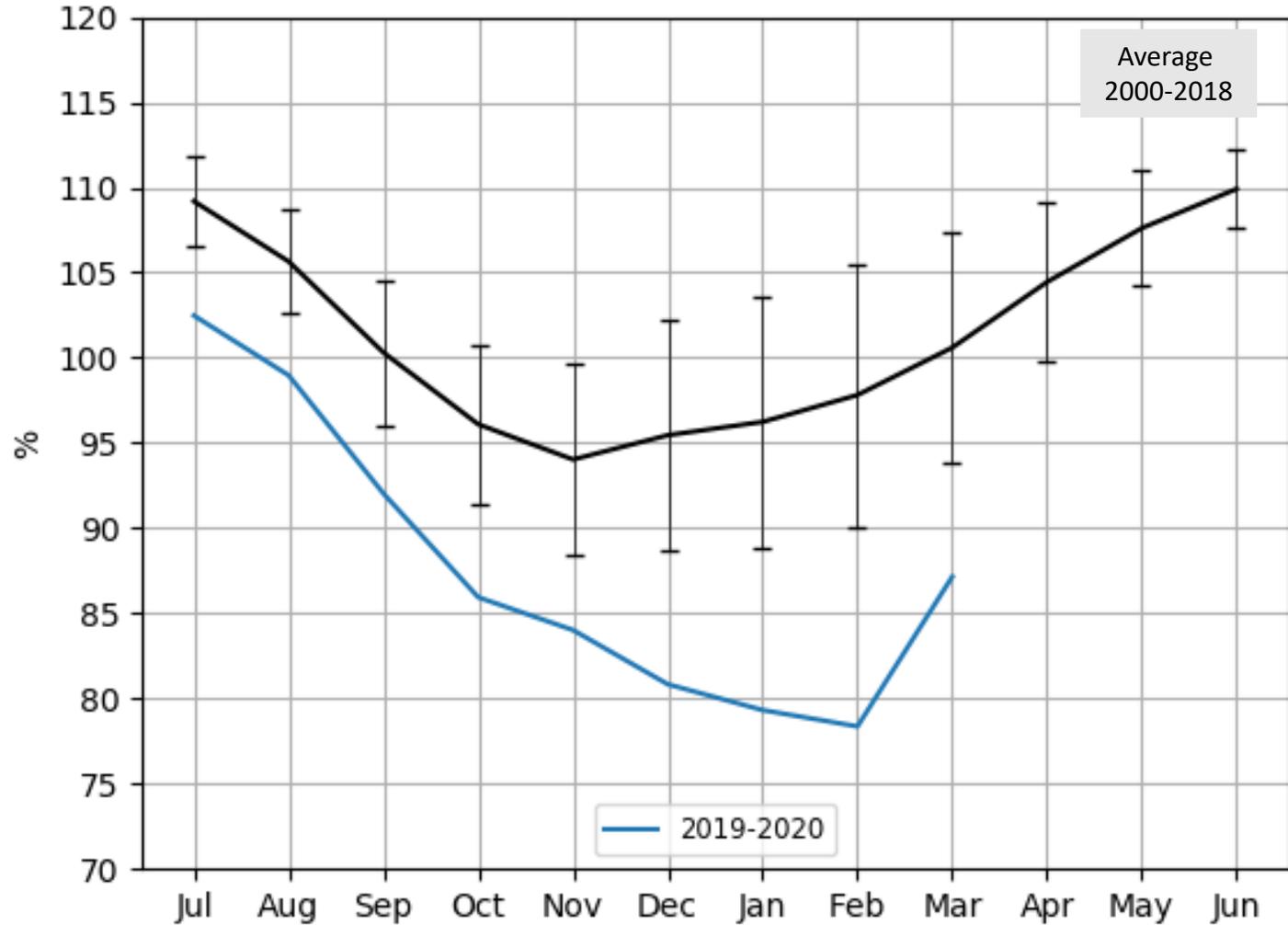
Higher spatial resolution version of the AFMS

MODIS (500m)

Sentinel-2 (10m)

FMC [%]

FMC for Europe (EFFIS)

April 2011 | May 2011 | June 2011

July 2011 | August 2011 | September 2011

FMC (%)
- <35
- 35 - 70
- 70 - 105
- 105 - 140
- >140

LFMC median and burnt area for grass fuel type (2008-2019)
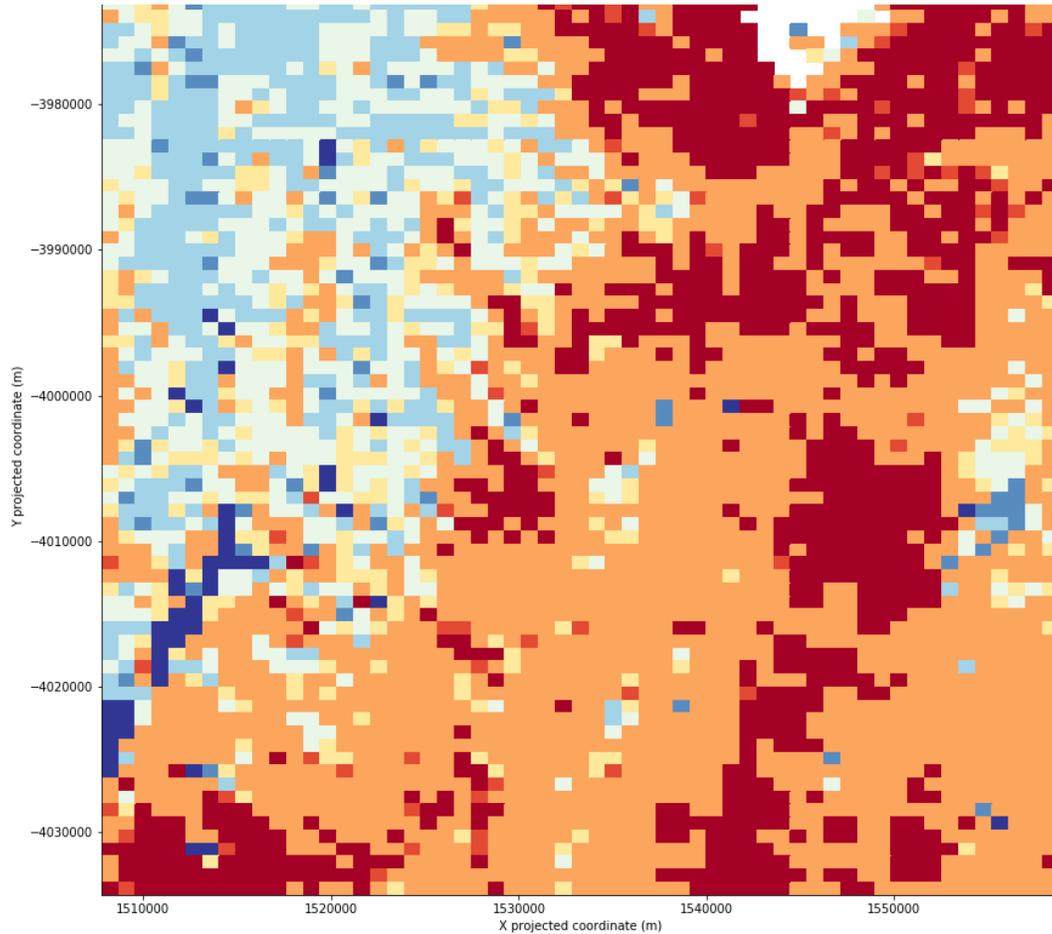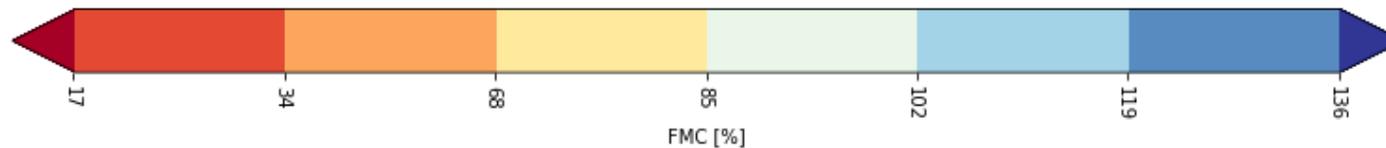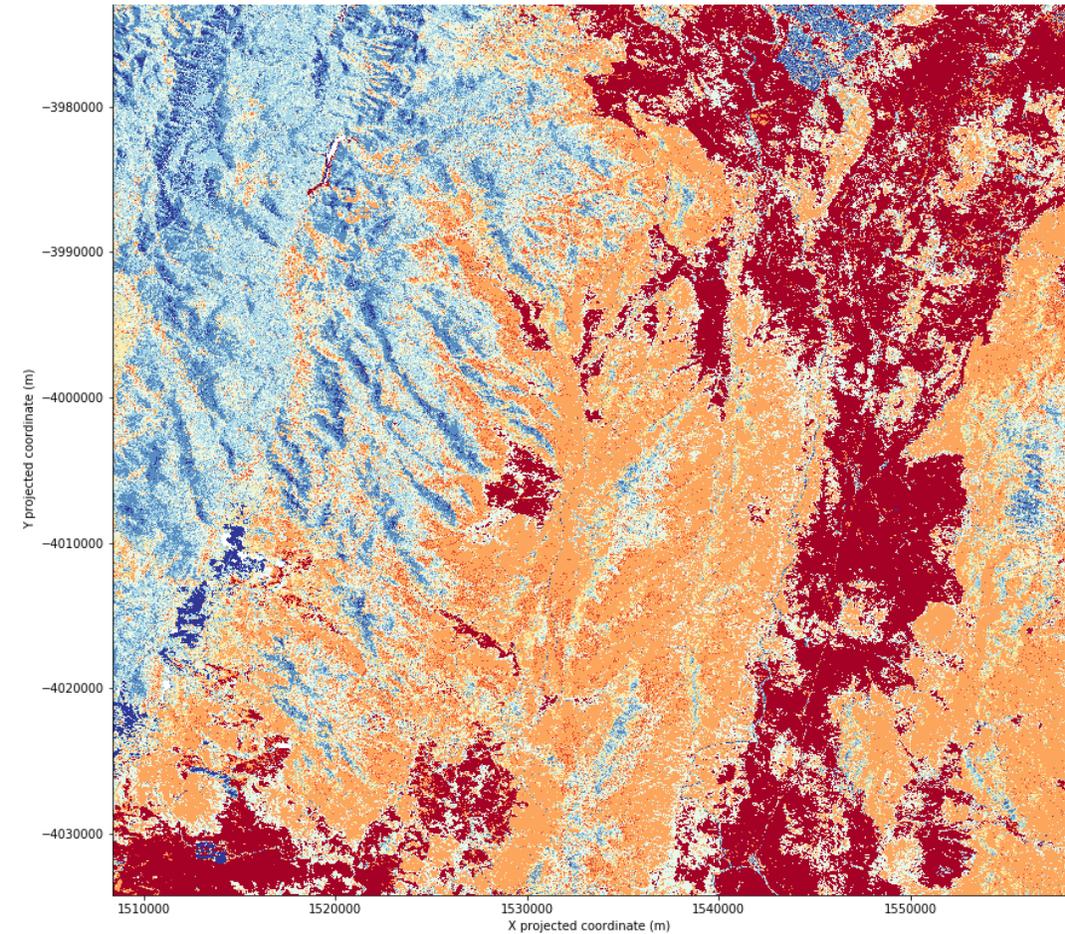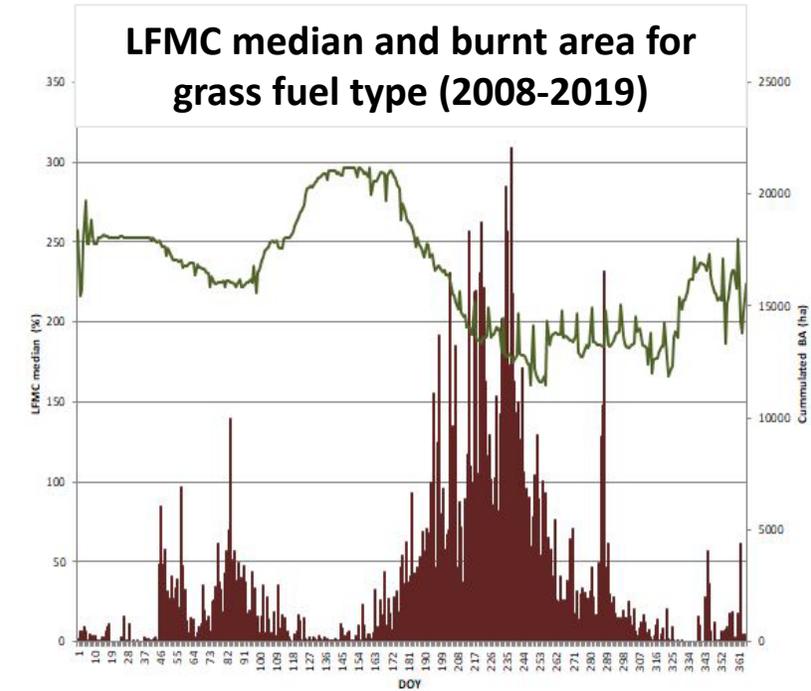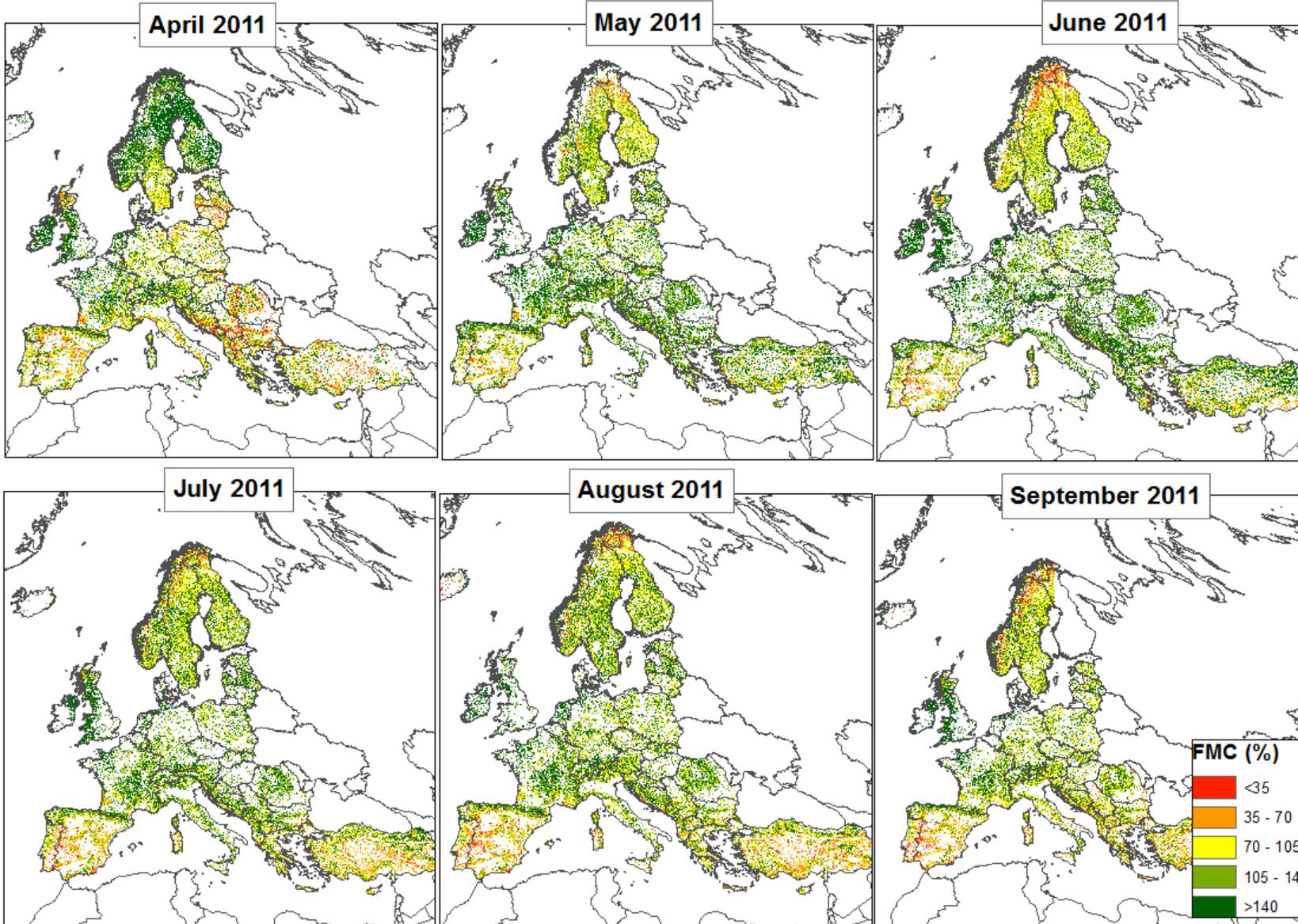
Preliminary analysis

Fuel age maps derived from satellite
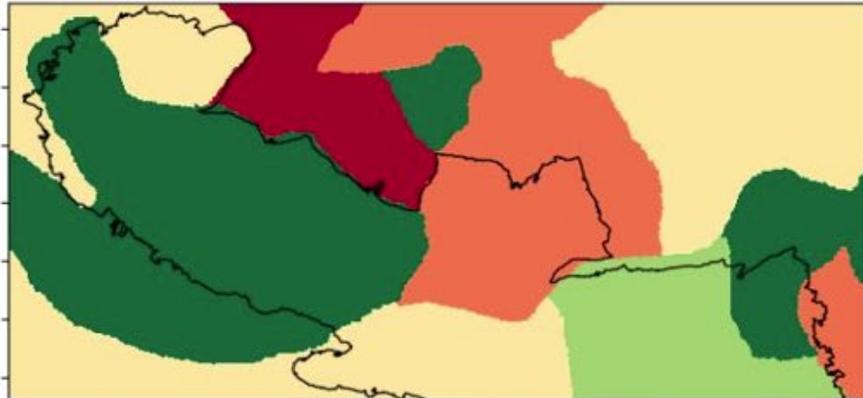
Fuel age maps from fire history
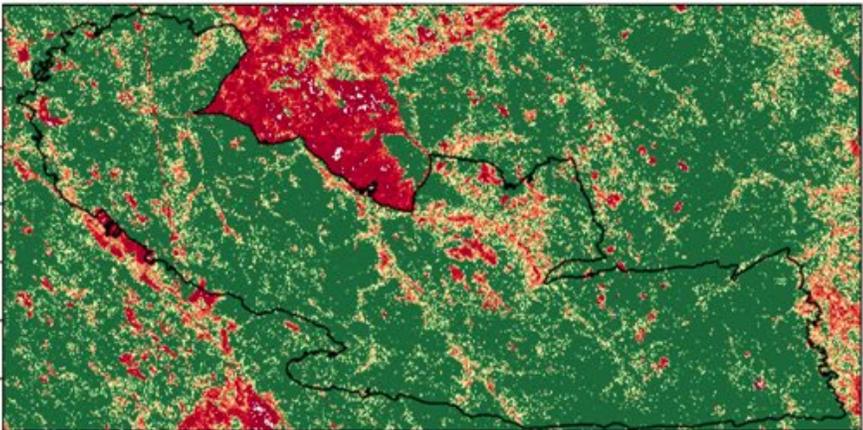
Fuel age maps from satellite

Age (Y)

0 2 4 6 8 10 12 14

Age_RS

Frequency (n = 250)

0.0 0.2 0.4 0.6 0.8 1.0
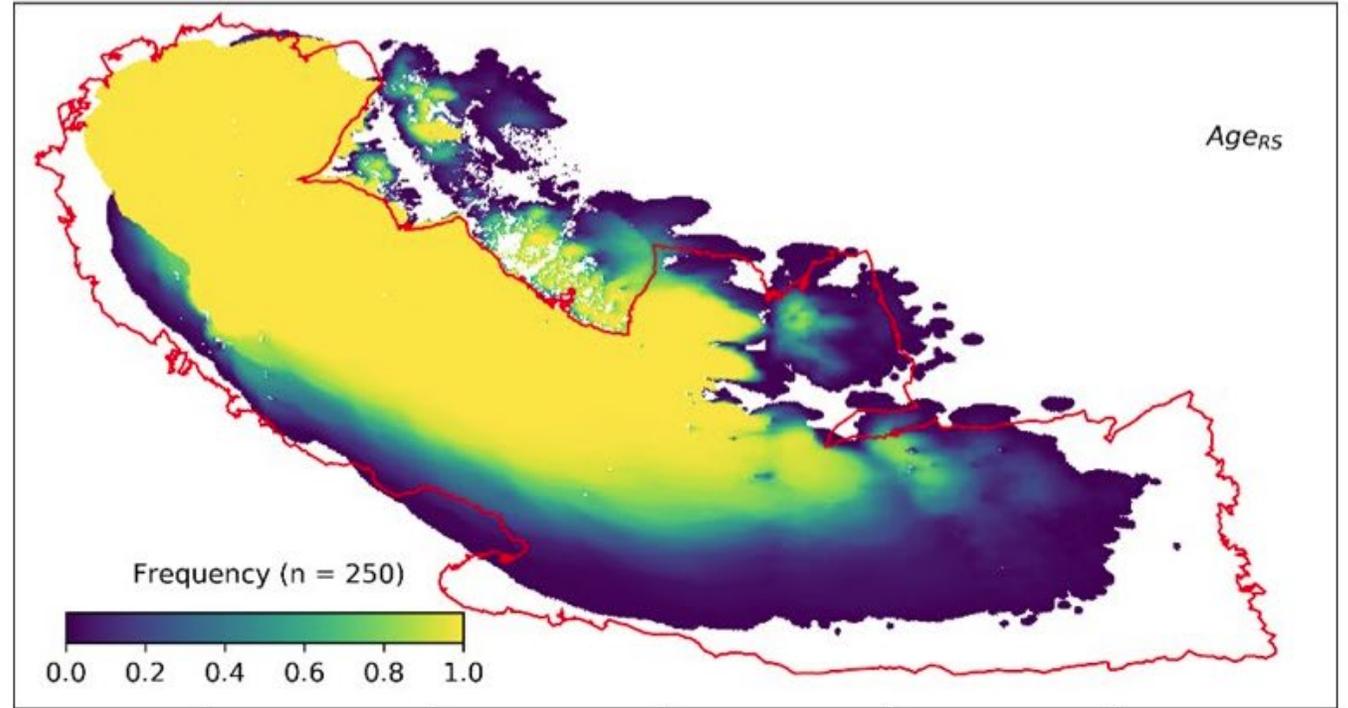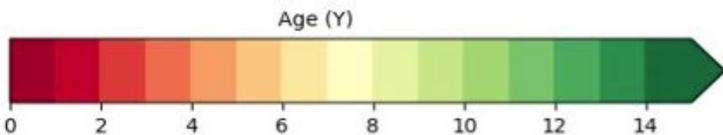
Most likely spread of the fire using SPARK (CSIRO 61)

Take home message

- **Effective adaptation** to extreme fire events and an increasingly challenging fire management situation **requires accurate and timely data on fuel flammability**

- **Remote Sensing technology** provides accurate and detail information on fuel flammability but it is still not used at full potential in fire management (e.g. not directly ingested in current operational systems)

- **Further R&D is needed so** remote sensing derived-fuel flammability variables are
    - converted into secondary variables more easily to be integrated into fire management decision making
    - incorporated into the new generation of fire behaviour models

Thanks

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Institute for Space

Australian National University.

Associated Editor, Remote Sensing of Environment.

+61-2-612 54107
marta.yebra@anu.edu.au
twitter: @myebra12

After the Orroral Valley Fire @ Marta Yebra