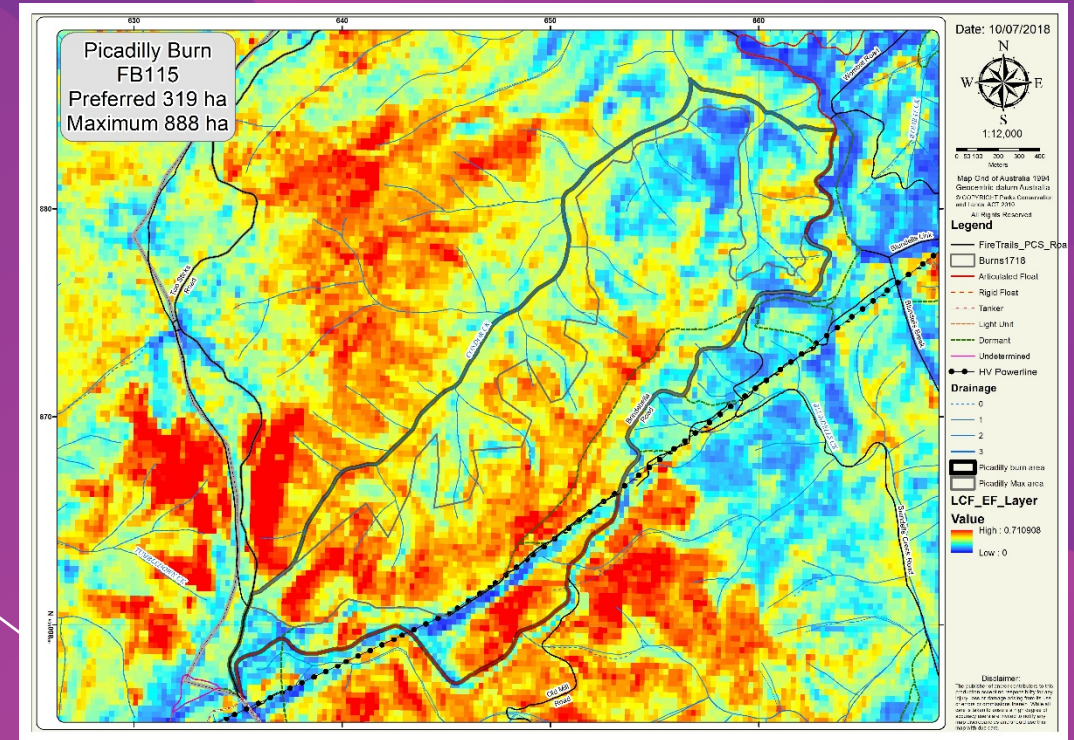


ACT GOVERNMENT

Remote-sensing Applications for Bushfire in Australia

Adam Leavesley and Marta Yebra



ACT
Government

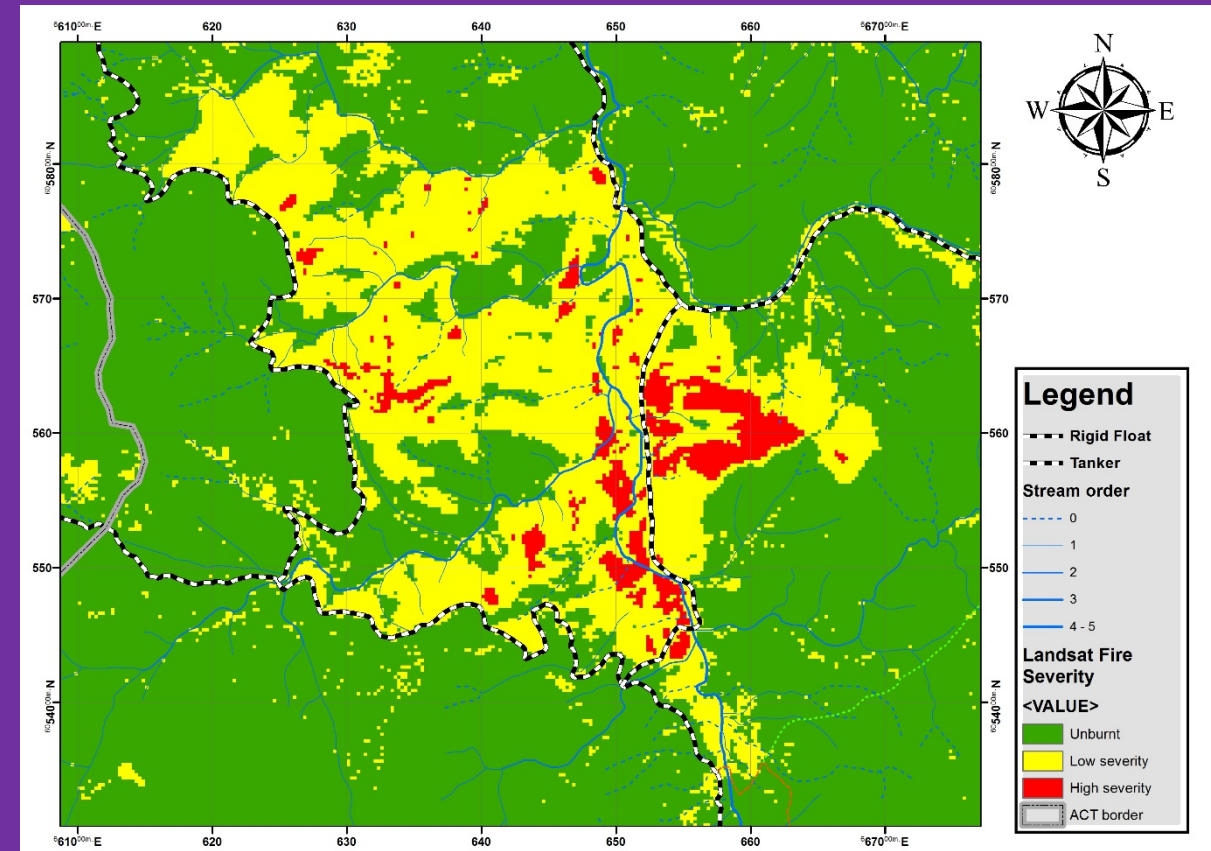
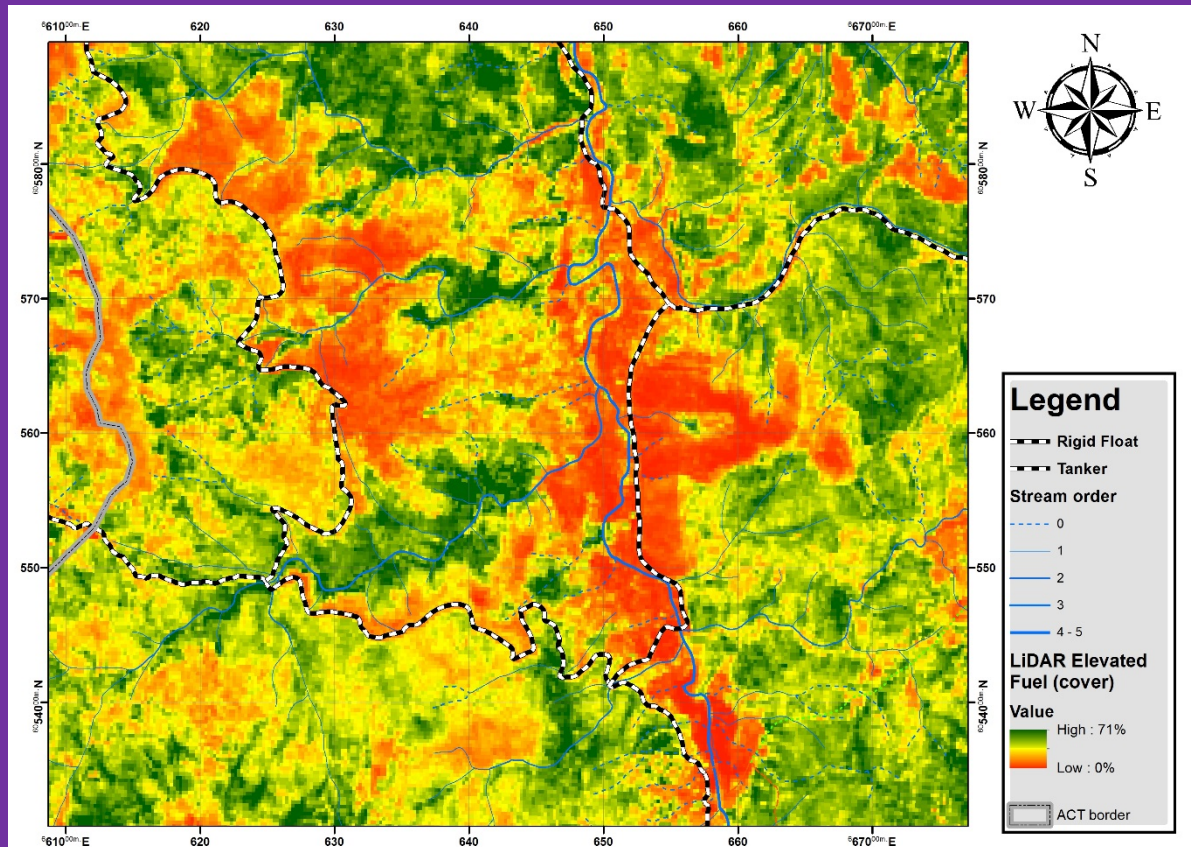


Australian
National
University



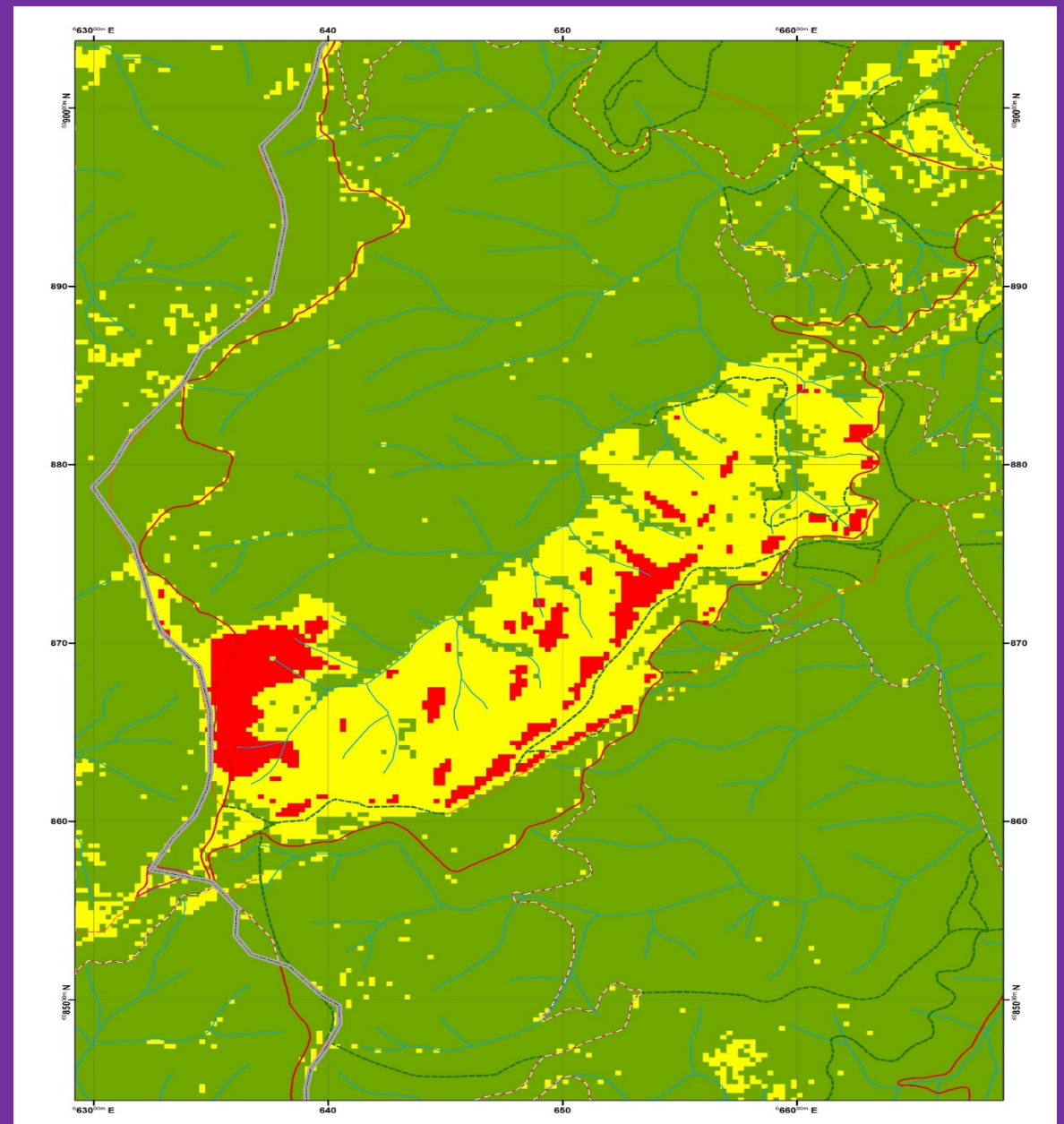
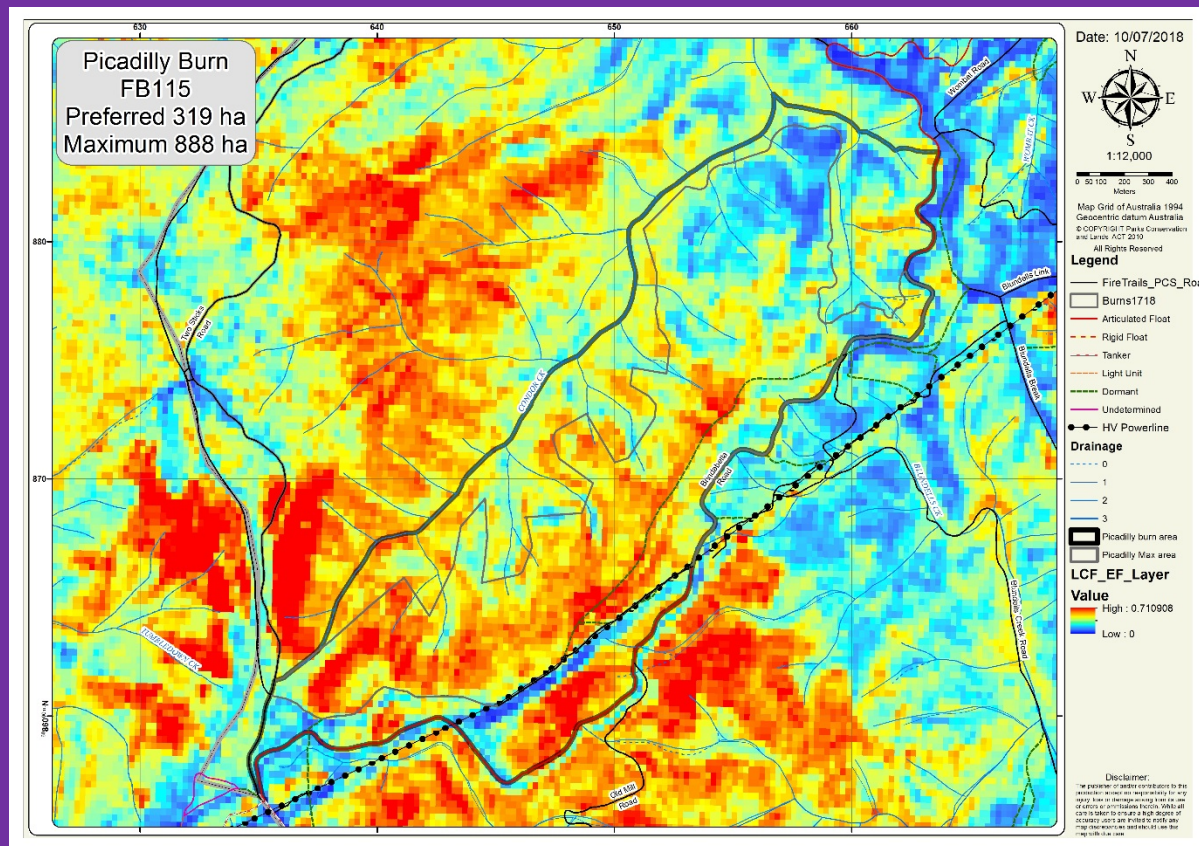
bushfire&natural
HAZARDSCRC

Qualitative truthing



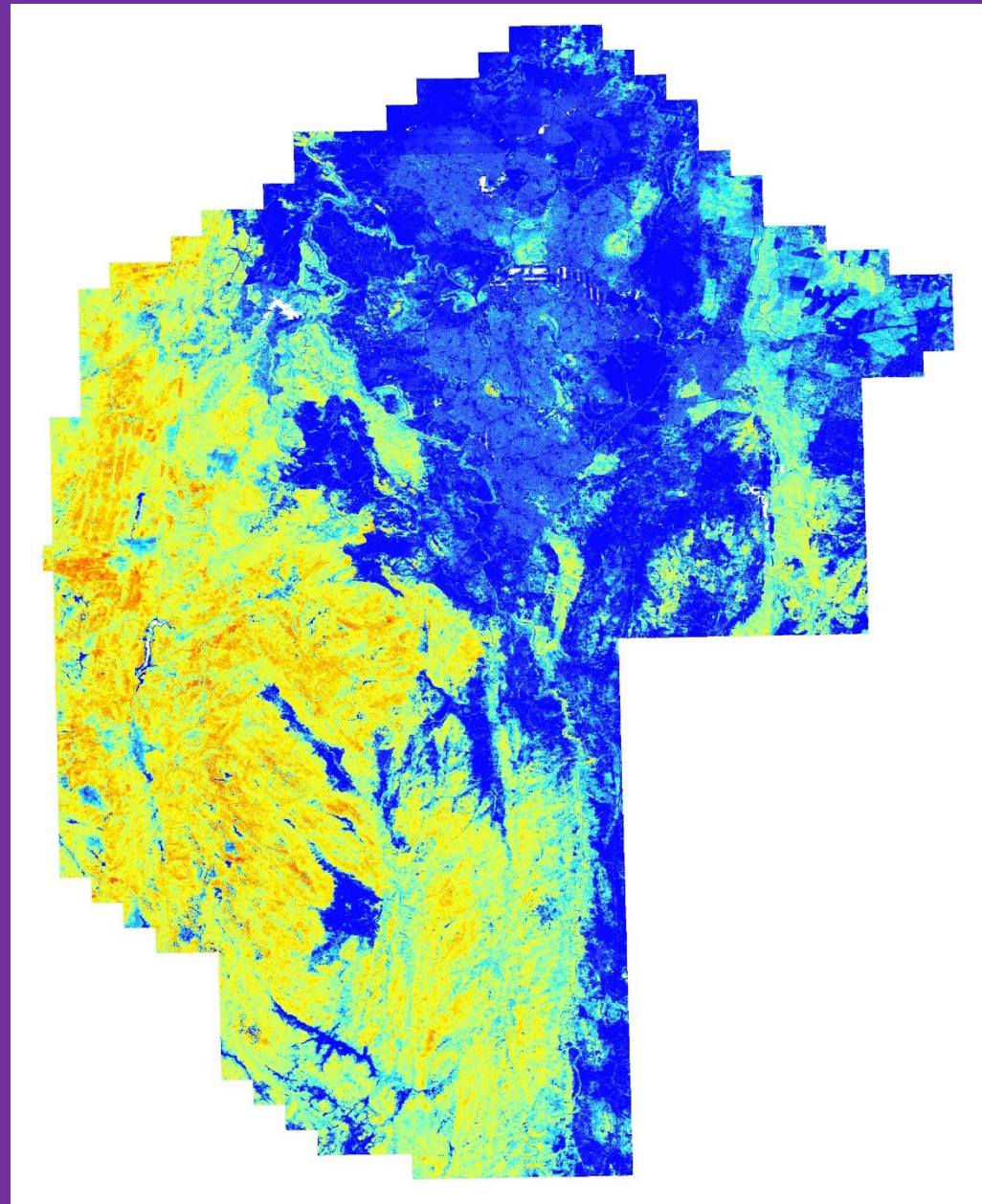
Fire severity analysis, April 2015

LiDAR-derived Elevated Fuel, May-June 2015



Wrap up

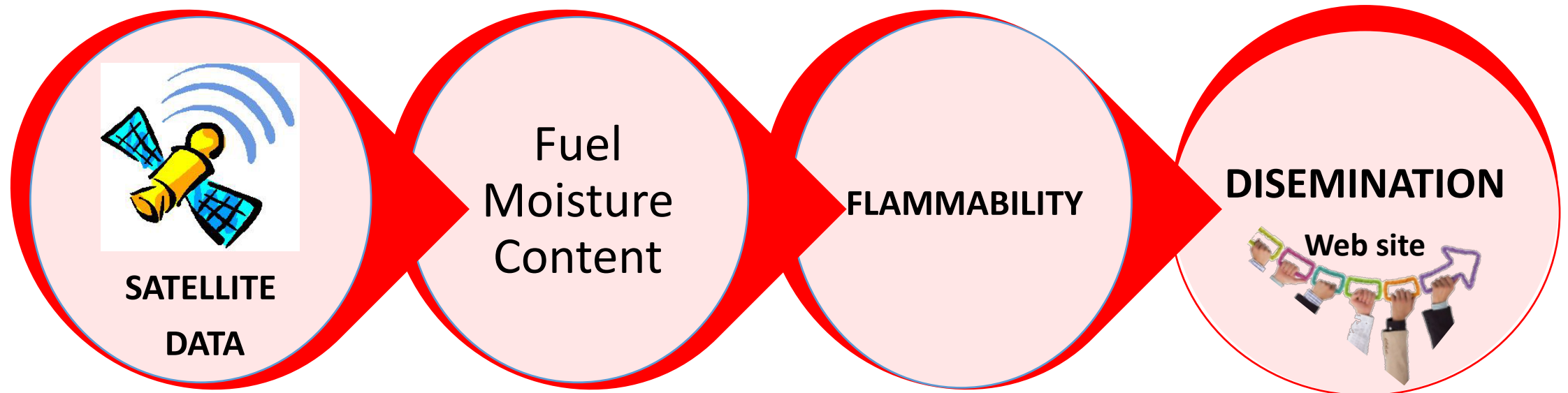
1. Generally suitable for fuel mapping, but...
2. ... issues with bark and litter.
3. Suitable for fuel, carbon and post-burn hydrology
4. Low frequency suitable for burn planning?
5. Move to “remote-sensing enable systems”

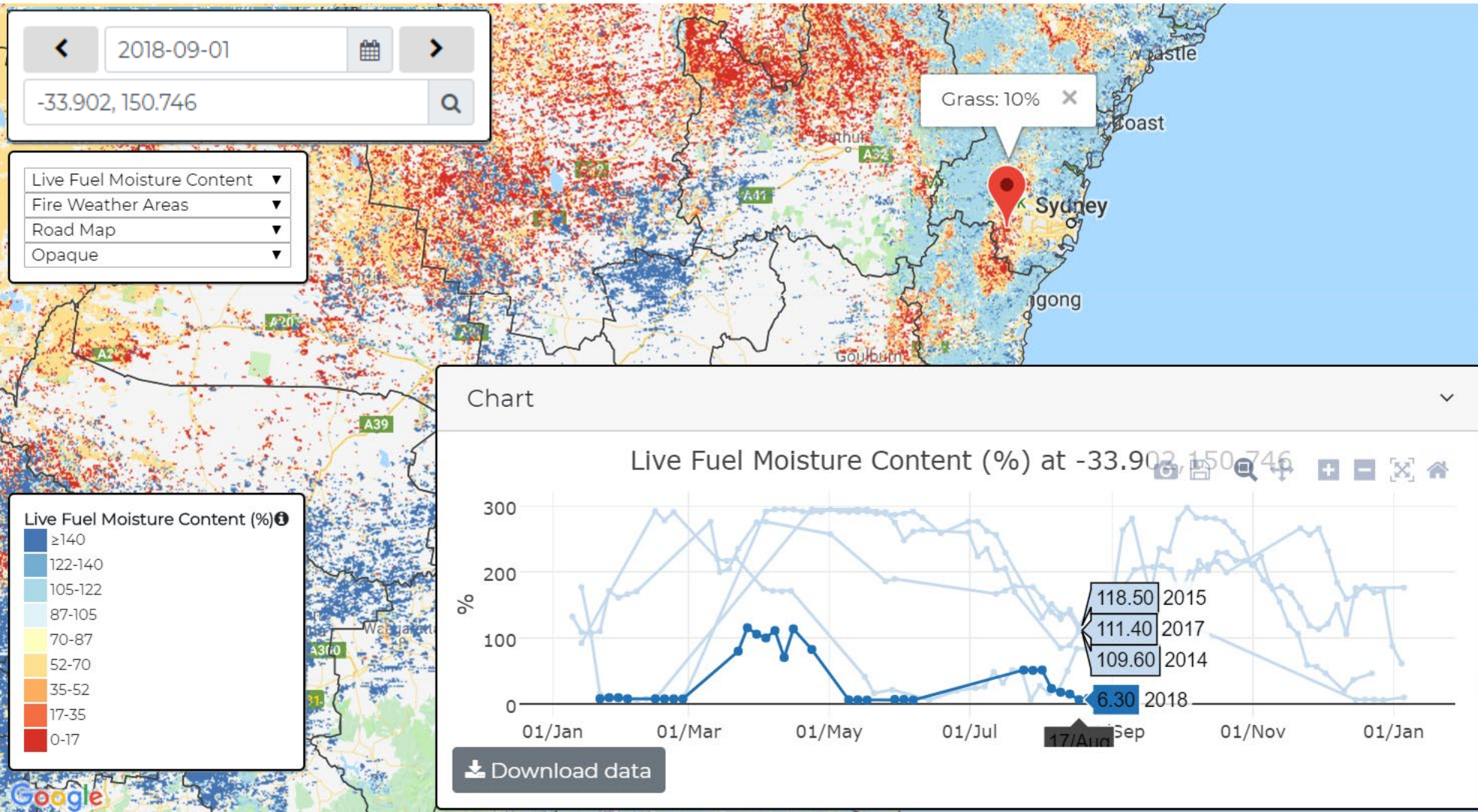


LiDAR-derived estimate of Near-surface Fuel

The Australian flammability monitoring system (AFMS)

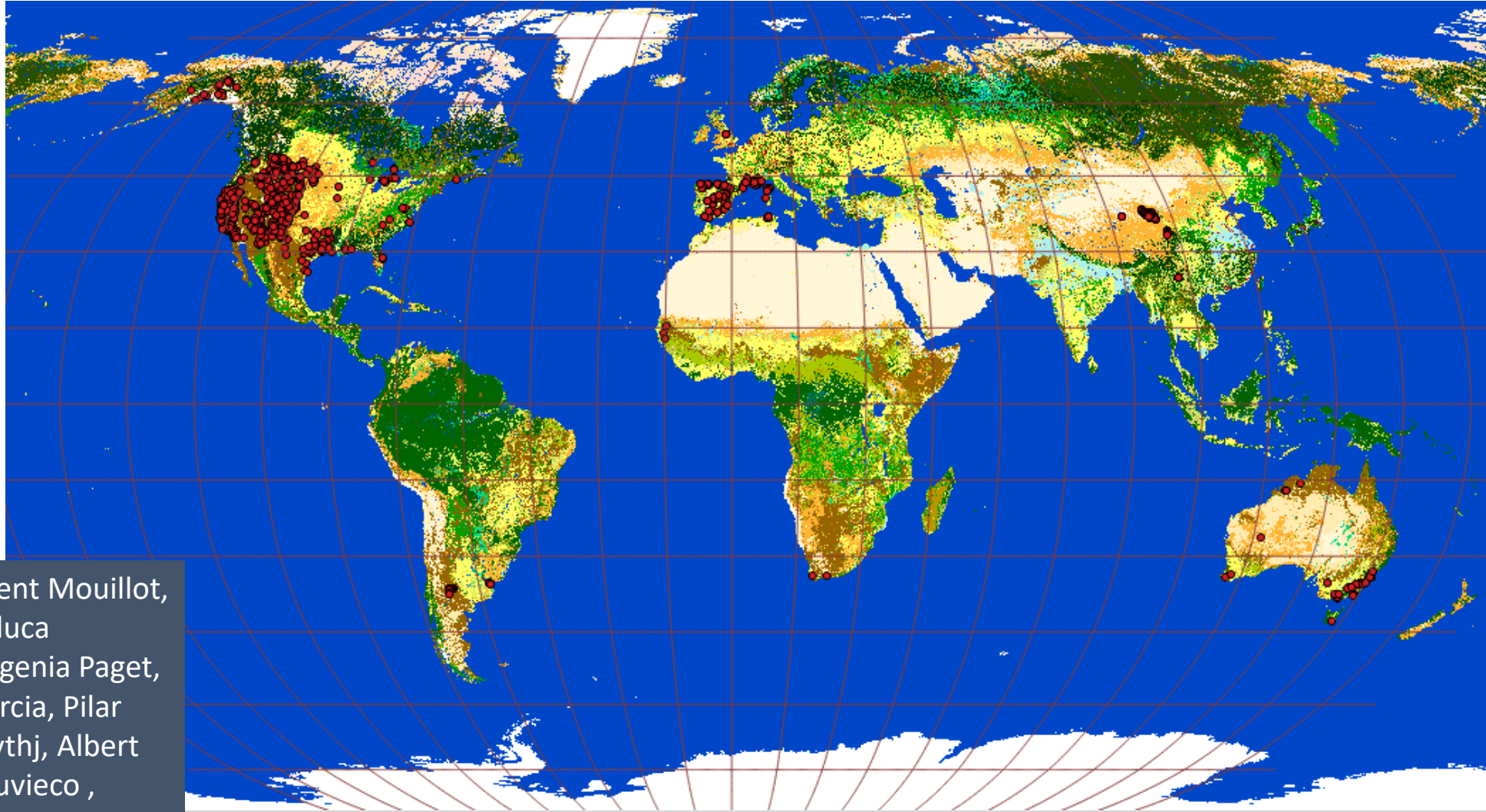
First **continental-scale** web site providing spatial information on landscape-scale **fuel moisture content** and **flammability** derived from **satellite observations (currently MODIS)**





TOWARDS A GLOBAL FMC PRODUCT

- **1181 sites; 59629 observations**
- MODIS NBAR data set (MCD43A4 V006)
- Advance computational methods (The Australian National Computational Infrastructure's Fujitsu Primergy)



Marta Yebra, David Riaño, Florent Mouillot, Matt Jolly, Phil Dennison, Gianluca Scortechini, Xingwen Quan, Eugenia Paget, Carlos M. Di Bella, Mariano Garcia, Pilar Martín, Philip Frost, Greg Forsythj, Albert van Dijk, Geoff Cary, Emilio Chuvieco, Susan Ustin

VALIDATION SAMPLE

Country	Sites	Observations	Dominant Land Cover	Years	Contact
Global	1181	59,629	-	-	Yebra, M.
Argentina	16	86	Shrubland	3	Di Bella, C.
Australia	47	499	Tree cover broadleaved evergreen closed to open (>15%)	11	Bradstock, R. Newnham, G.
China	231	232	Grassland	4	Quan, X.
France	26	6,821	Tree cover needle leaved evergreen closed to open (>15%)	17	Mouillot, F.
Italy	1	107	Shrubland	6	Mouillot, F.
Senegal	3	96	Cropland rainfed	1	Mouillot, F.
South Africa	2	26	Tree cover broadleaved evergreen closed to open (>15%)	3	Frost, P.
Spain	98	1,434	Cropland rainfed - Herbaceous cover	15	Yebra, M. Chuvieco, E. Martin, P.
Tunisia	8	124	Tree cover broadleaved evergreen closed to open (>15%)	2	Mouillot, F.
UK	6	26	Shrub or herbaceous cover	3	Danson, M.
USA	743	50,178	Tree cover needle leaved evergreen closed to open (>15%)	40	Jolly, M. Ustin, S. Riano, D.

Active Fire Surveillance

The Problem: Absence of continuous and timely detection and monitoring of active fire across the Australian continent

Opportunity: Launch of the geostationary satellite, Himawari-8, providing 10 minute observations in near-real time

Solution: Three new innovative algorithms that take advantage of the temporally data rich source provided by Himawari-8.

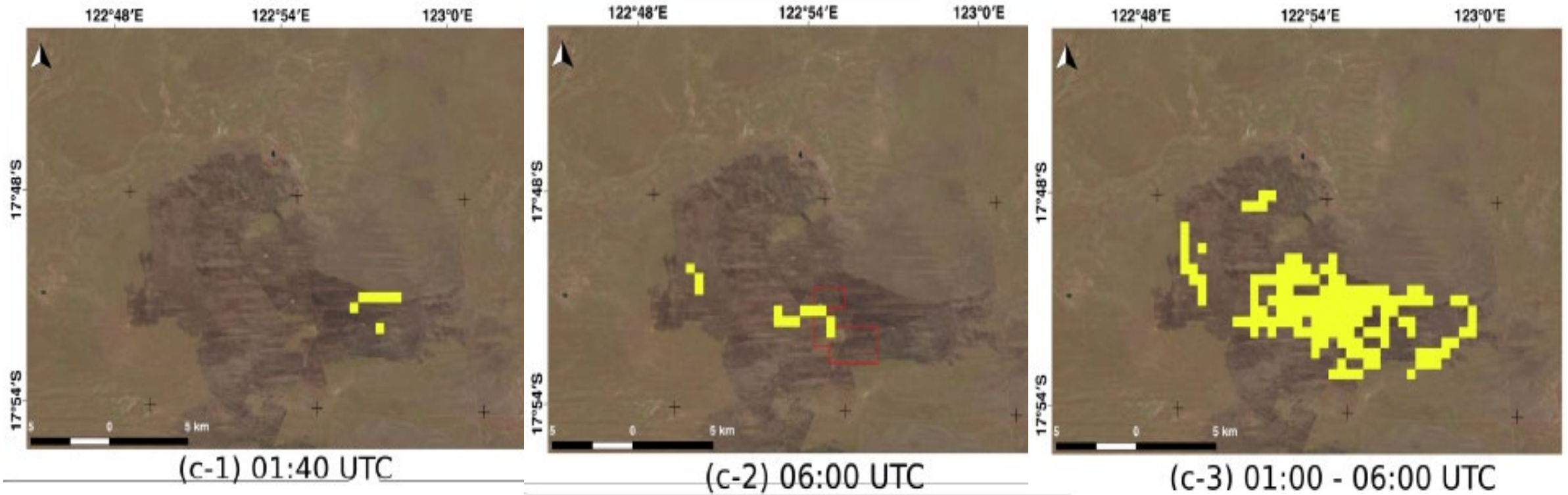
- **(algorithm I)** early fire detection / hotspots based on broad area temporal fitting method (AHI-BAT)
- **(algorithm II)** early fire detection / hotspots based on bioregion + seasonal threshold statistical method (AHI-IBRA)
- **(algorithm III)** multi-resolution 10 minute active fire line mapping algorithm (AHI-FSA)

AHI-BAT early fire detection performance



Hally, B., Wallace, L., Reinke, K. and Jones, S., 2017. **A broad-area method for the Diurnal characterisation of upwelling medium wave infrared radiation.** *Remote Sensing*, 9(2), p.167.

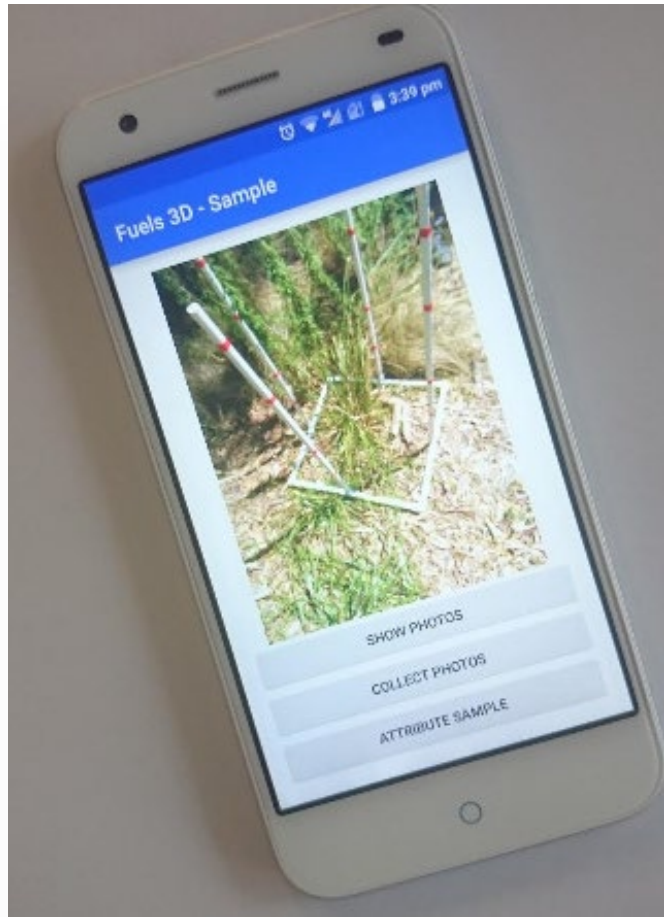
AHI-FSA active fire mapping



Wickramasinghe, C.H., Jones, S., Reinke, K. and Wallace, L., 2016. **Development of a multi-spatial resolution approach to the surveillance of active fire lines using Himawari-8.** *Remote Sensing*, 8(11), p.932.

Wickramasinghe, C.H., Wallace, L., Reinke, K. and Jones, S., 2018. **Implementation of a new algorithm resulting in improvements in accuracy and resolution of SEVIRI hotspot products.** *Remote Sensing Letters*, 9(9), p.877-885.

Fuel Hazard Field Assessments - Fuels3D



Wallace, L., Hally, B.; Reinke, K. and Jones, S. (2016) **Leveraging smartphone technology for assessing fuel hazard in fire prone landscapes.** Proceedings for the 5th International Fire Behaviour and Fuels Conference, April 2016, Melbourne, Australia.

Other work

- National Scale Grassland Curing Product (CFA and Landgate)
- Grassland Biomass Product Development (Landgate)
- Fire severity analysis for carbon credits (CDU)