

# Detecting Active Fires using Himawari-8: a report from the NSW trial

Research advisory forum / **2019**

**Dr Chermelle Engel\*** / RMIT University, Bushfire and Natural Hazards CRC

**Prof Simon Jones** / RMIT University

**Assoc Prof Karin Reinke** / RMIT University

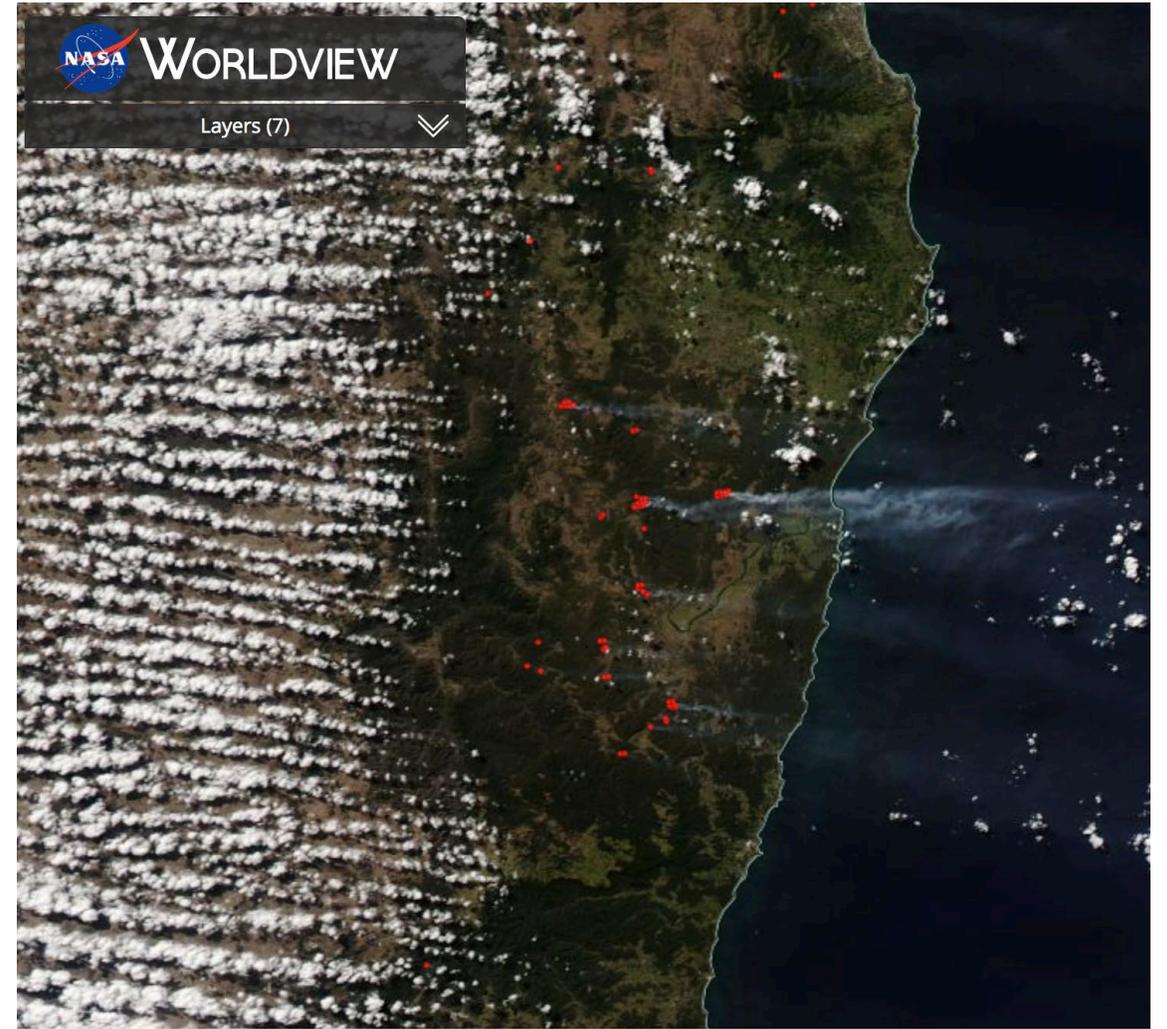
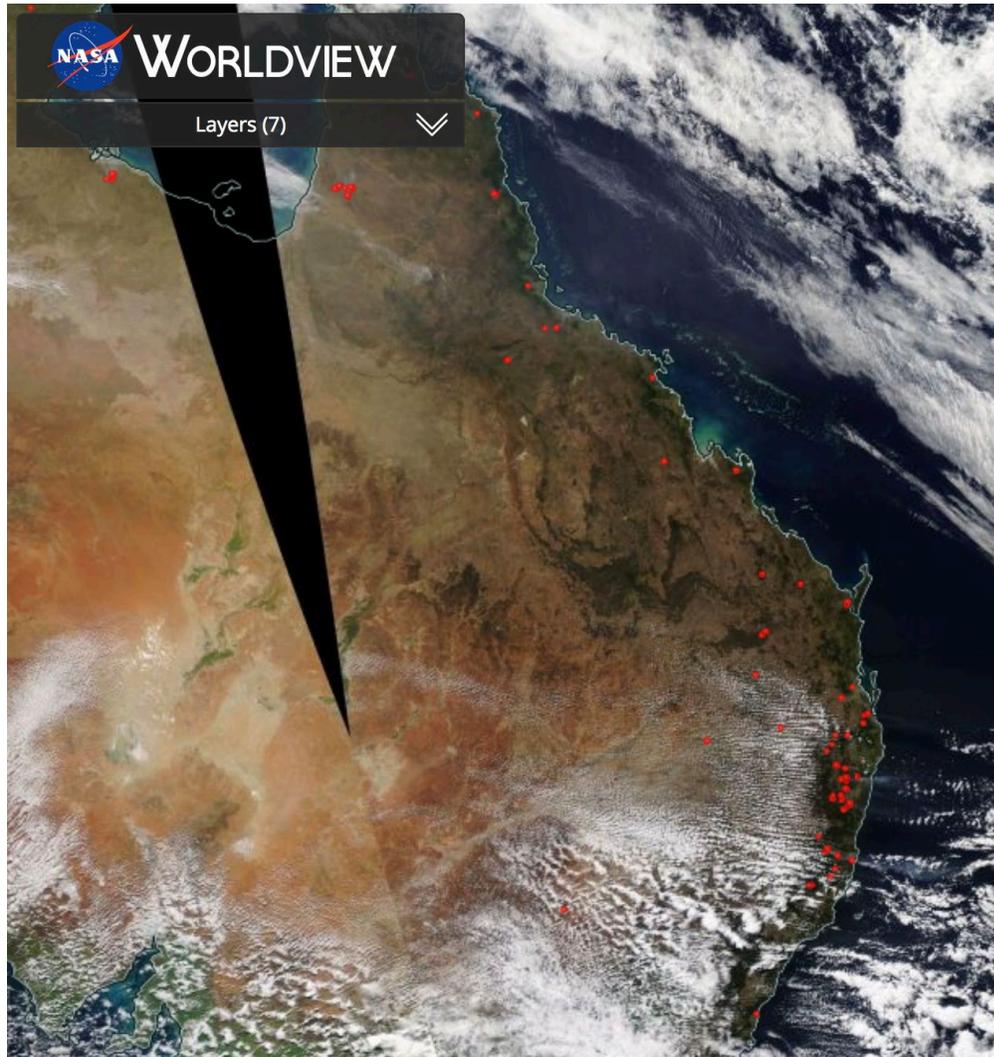
**Dr Stuart Matthews** / NSW RFS

**Dr Alex Holmes\*** / NSW RFS

\*Presenters

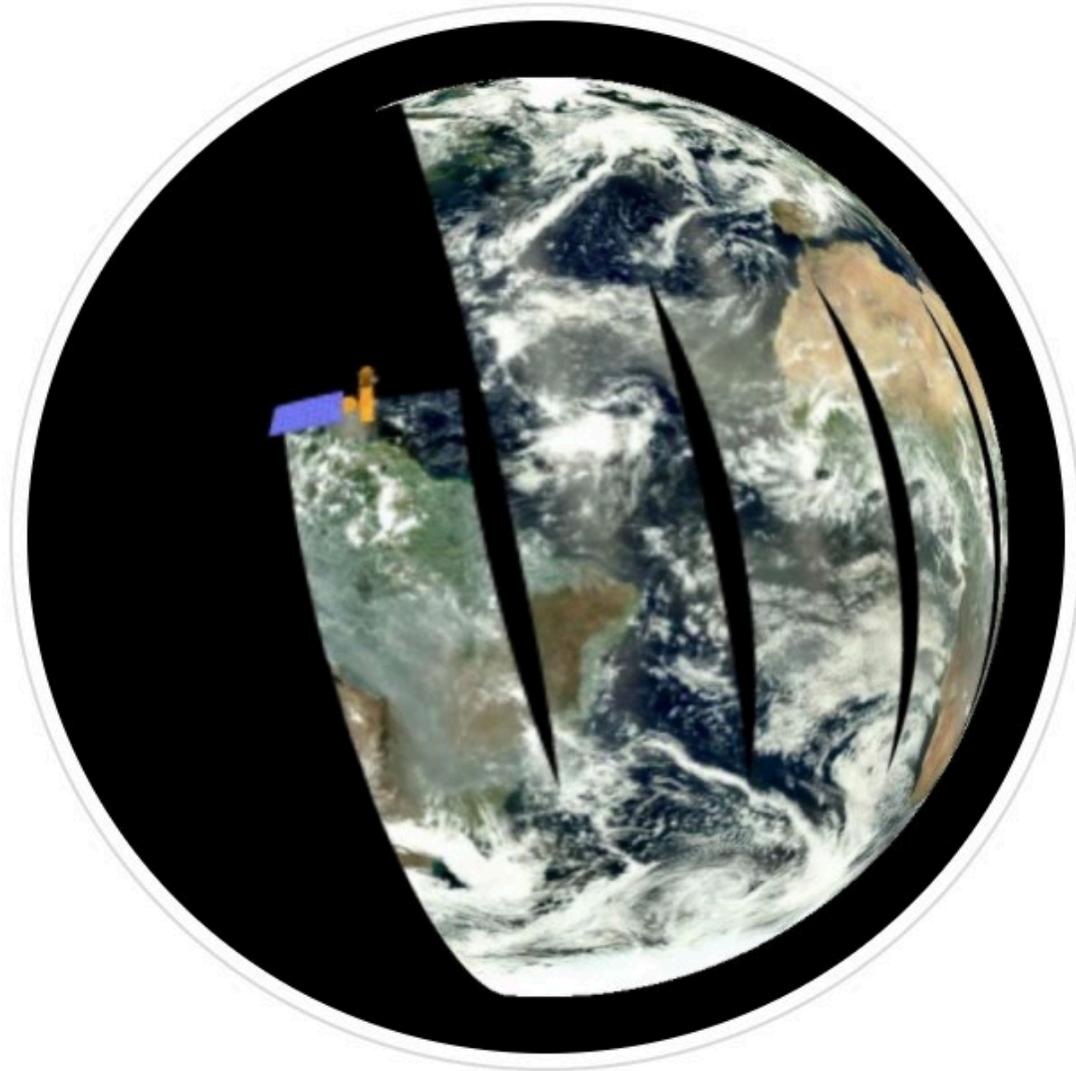


**Business**  
Cooperative Research  
Centres Programme



<https://worldview.earthdata.nasa.gov>. Aqua/MODIS (true color + fire anomalies)

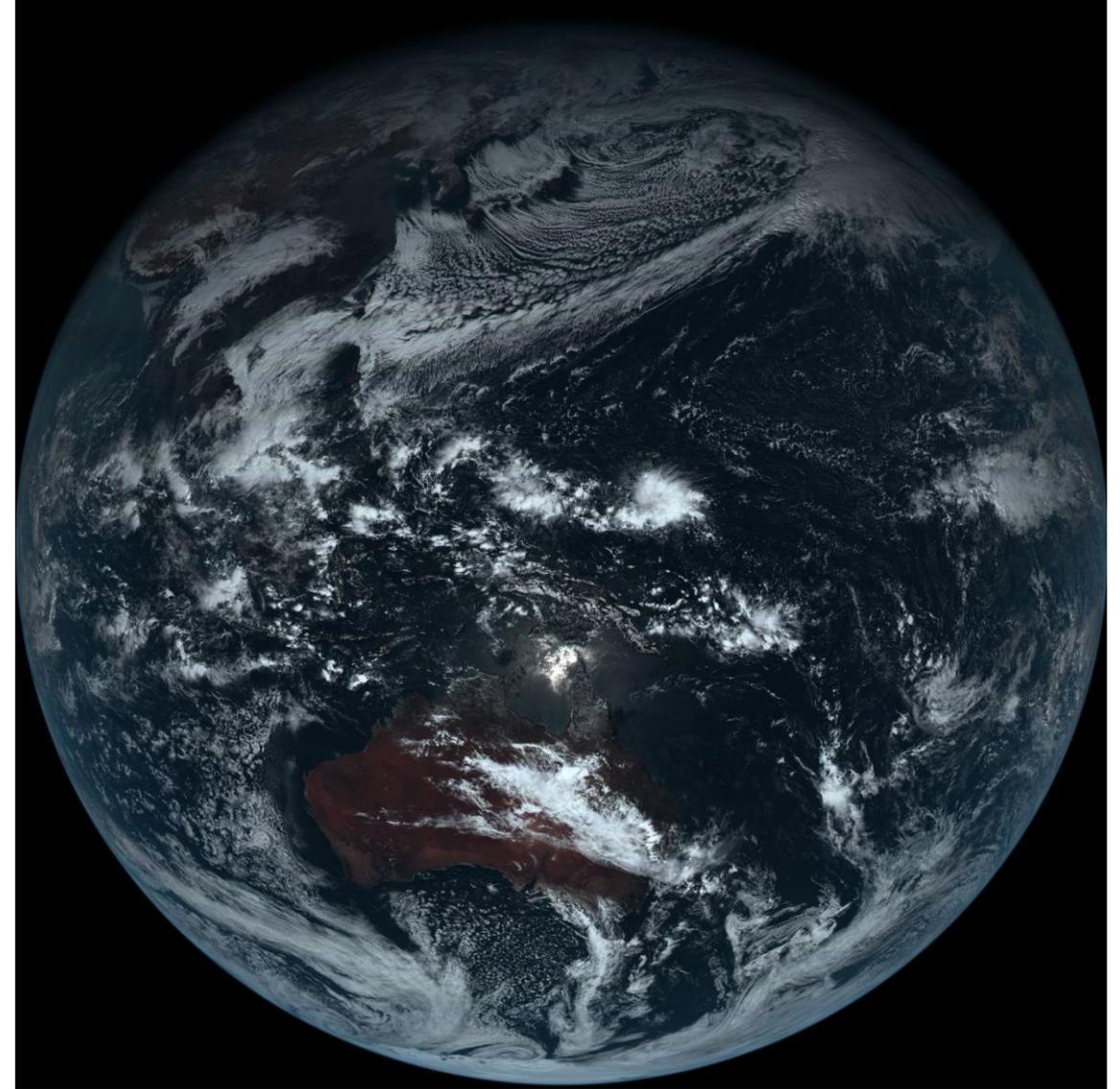
# Polar-Orbiting



Source: NOAA Science on a Sphere website

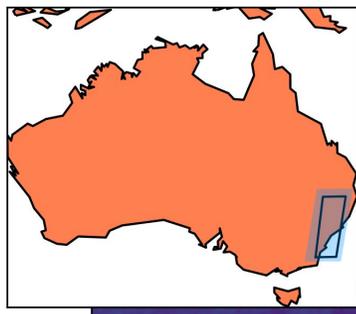
<https://sos.noaa.gov/>

# Himawari-8

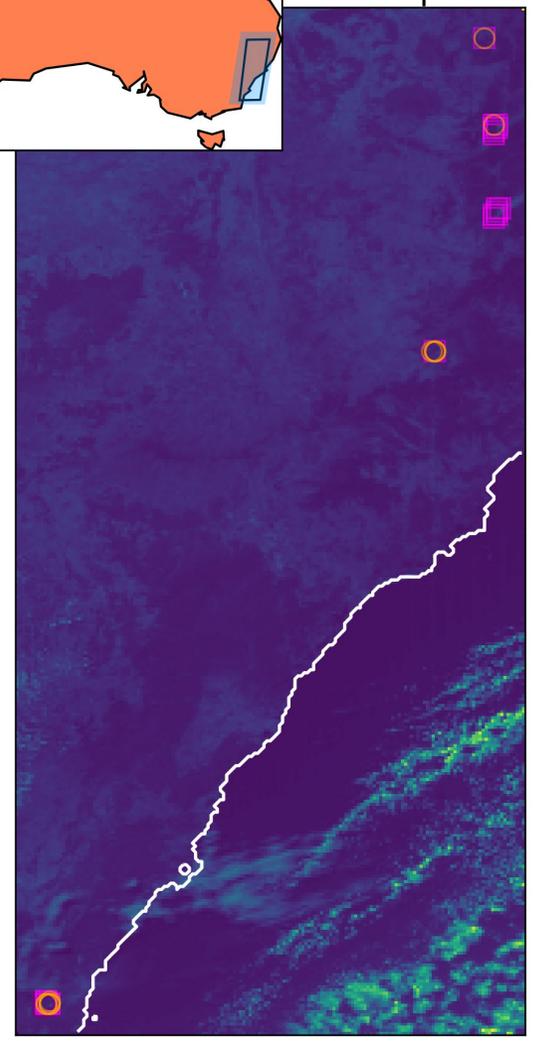


Source: Japan Meteorological Agency website

<http://www.jma-net.go.jp>

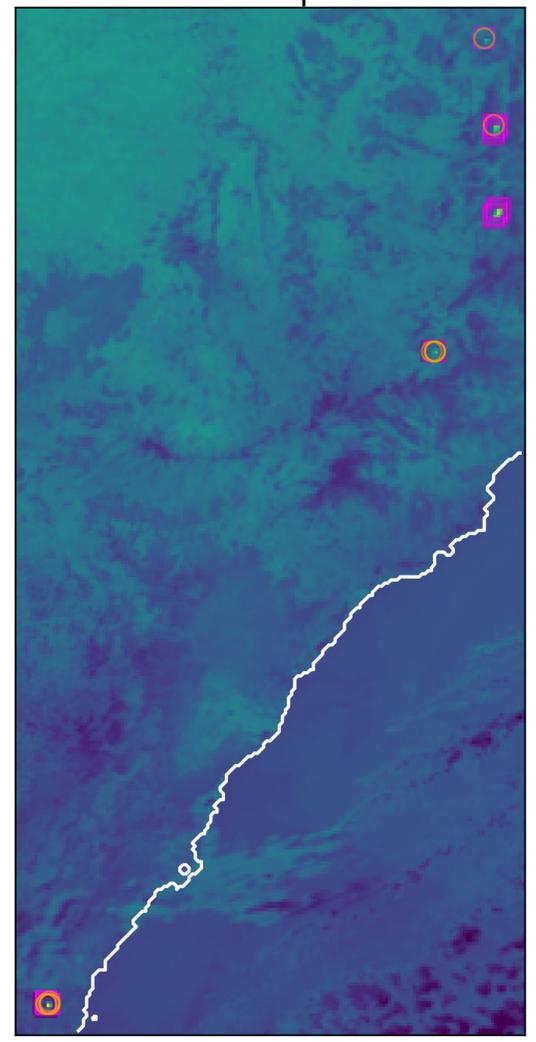


0.64  $\mu\text{m}$



0.0 BDRF [sr-1] 1.2

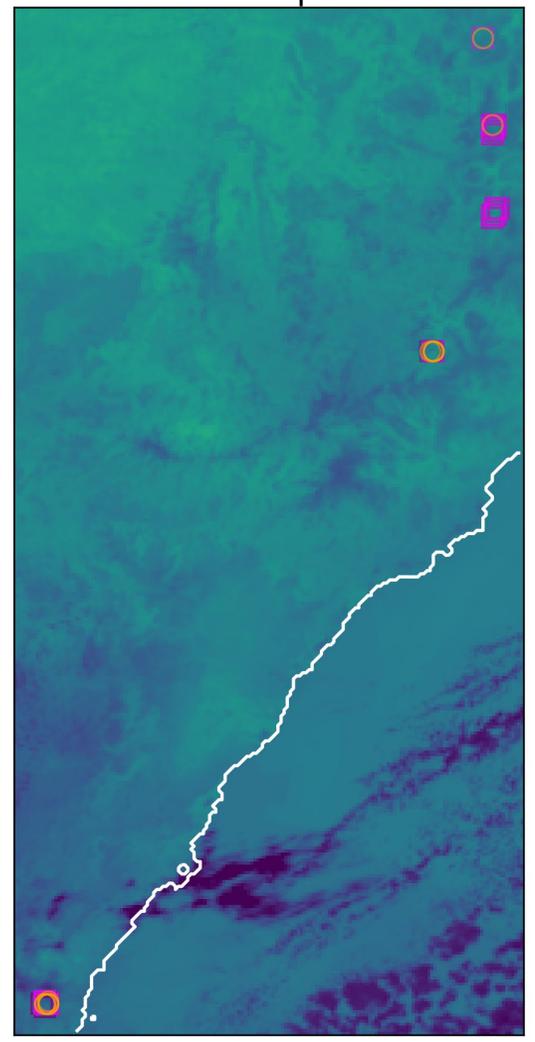
3.9  $\mu\text{m}$



275 MIR BT [K] 335

# Himawari-8

10.4  $\mu\text{m}$



265 TIR BT [K] 325



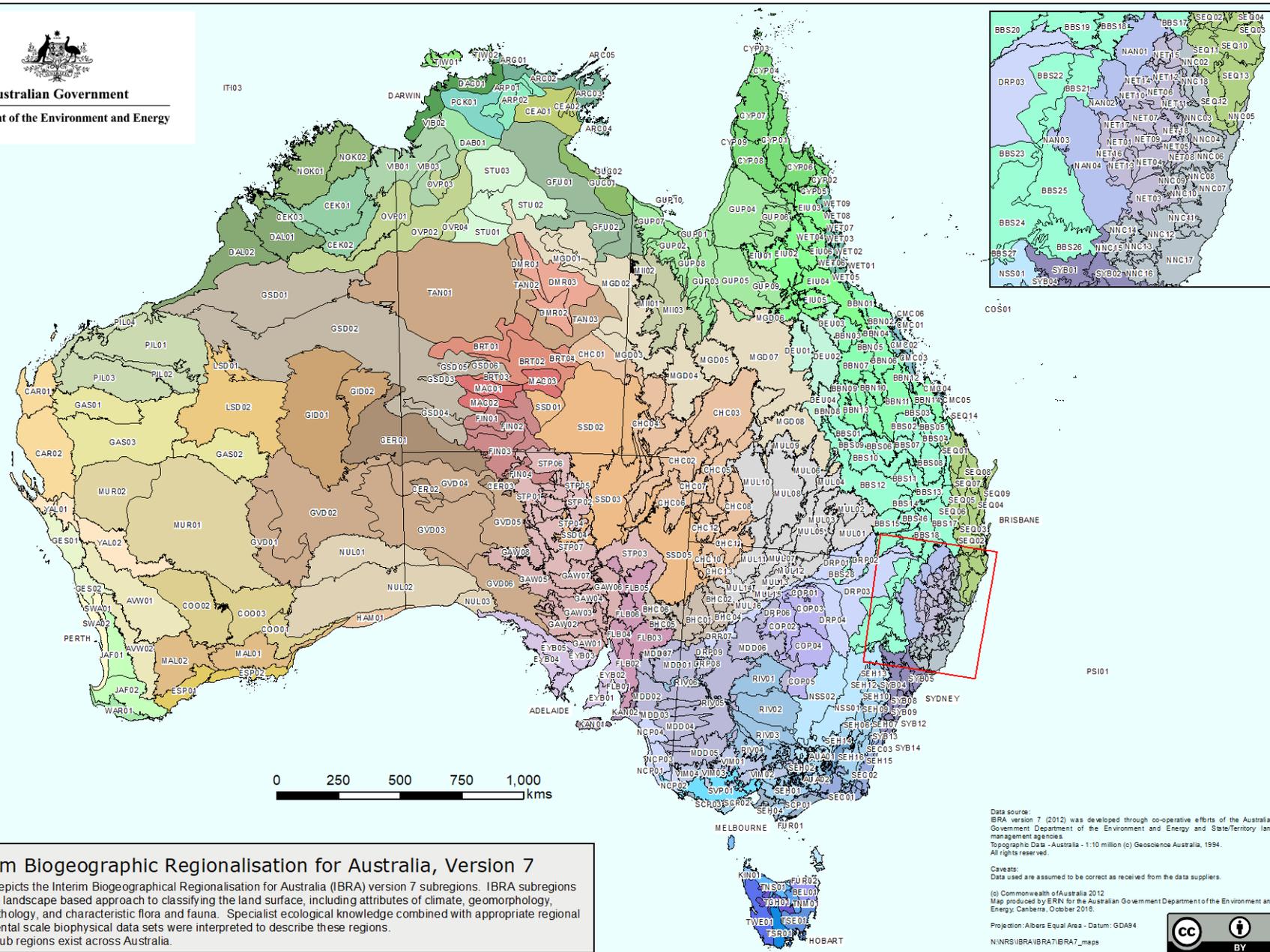


Australian Government  
Department of the Environment and Energy

# IBRA

## Interim Biogeographic Regionalisation for Australia

419 sub-regions



**Interim Biogeographic Regionalisation for Australia, Version 7**  
 This map depicts the Interim Biogeographical Regionalisation for Australia (IBRA) version 7 subregions. IBRA subregions represent a landscape based approach to classifying the land surface, including attributes of climate, geomorphology, landform, lithology, and characteristic flora and fauna. Specialist ecological knowledge combined with appropriate regional and continental scale biophysical data sets were interpreted to describe these regions. 419 IBRA sub regions exist across Australia.

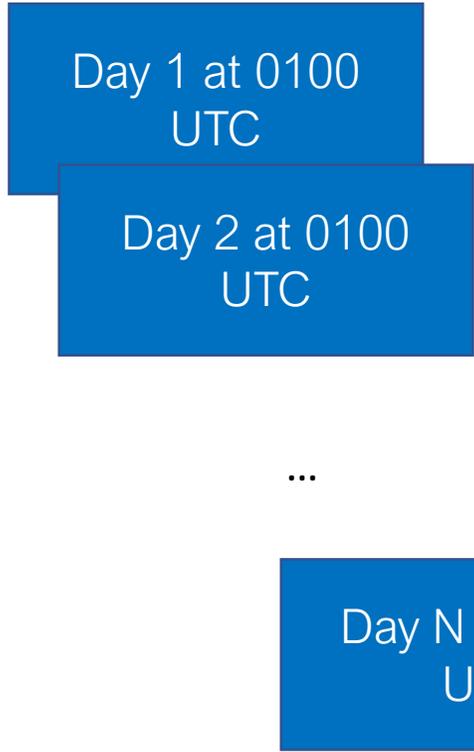
Data source:  
 IBRA version 7 (2012) was developed through co-operative efforts of the Australian Government Department of the Environment and Energy and State/Territory land management agencies.  
 Topographic Data - Australia - 1:10 million (c) Geoscience Australia, 1994. All rights reserved.  
 Caveats:  
 Data used are assumed to be correct as received from the data suppliers.  
 (c) Commonwealth of Australia 2012  
 Map produced by ERIN for the Australian Government Department of the Environment and Energy, Canberra, October 2016.  
 Projection: Albers Equal Area - Datum: GDA84  
 N:\NRS\IBRA\IBRA7\IBRA7\_maps



Take one region: i.e. RIV02



Sample last N days at same timepoint



Multiple channels

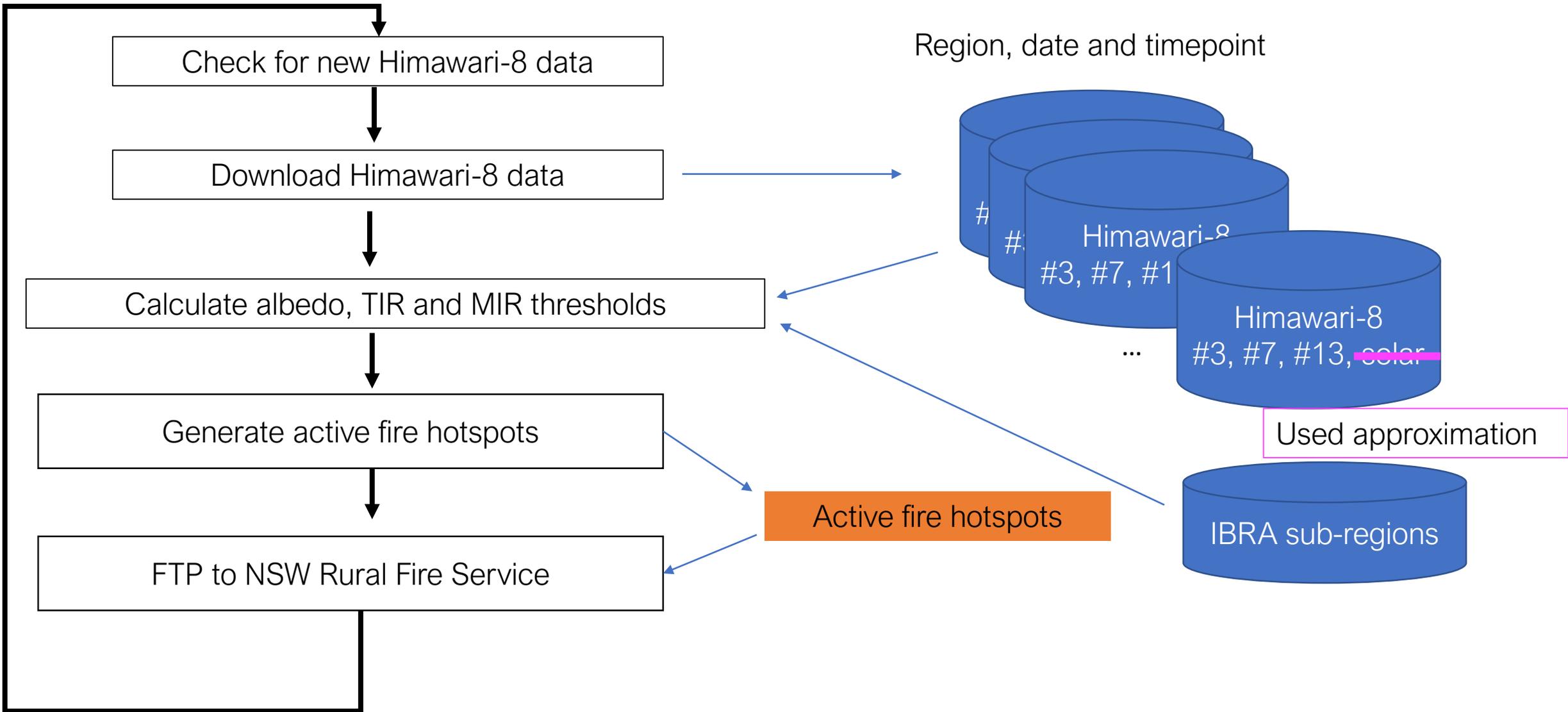
0.64  $\mu\text{m}$

3.9  $\mu\text{m}$

10.4  $\mu\text{m}$

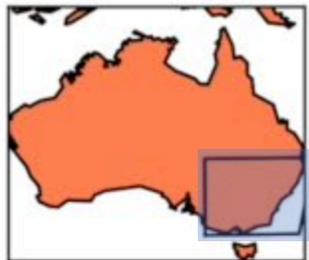
Work out likely MIR hotspots not associated with cloud



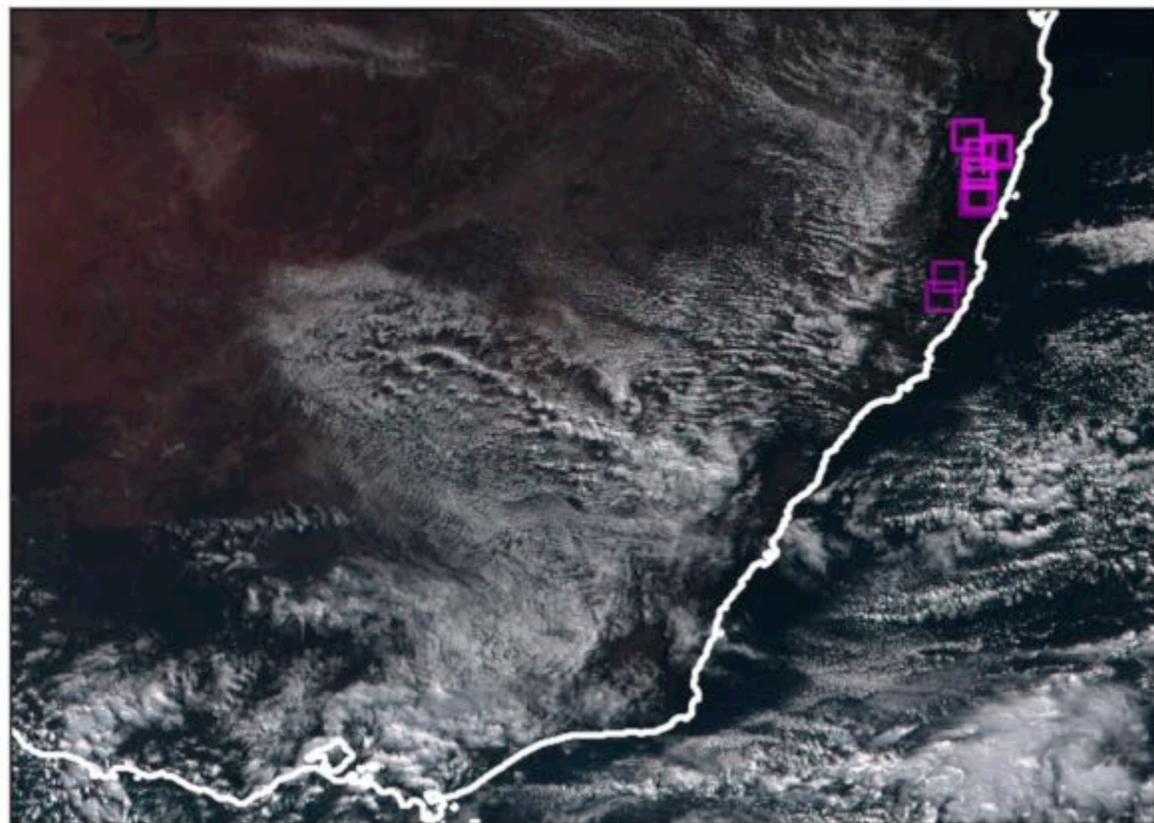


2019 mid-march to mid-July with break in middle

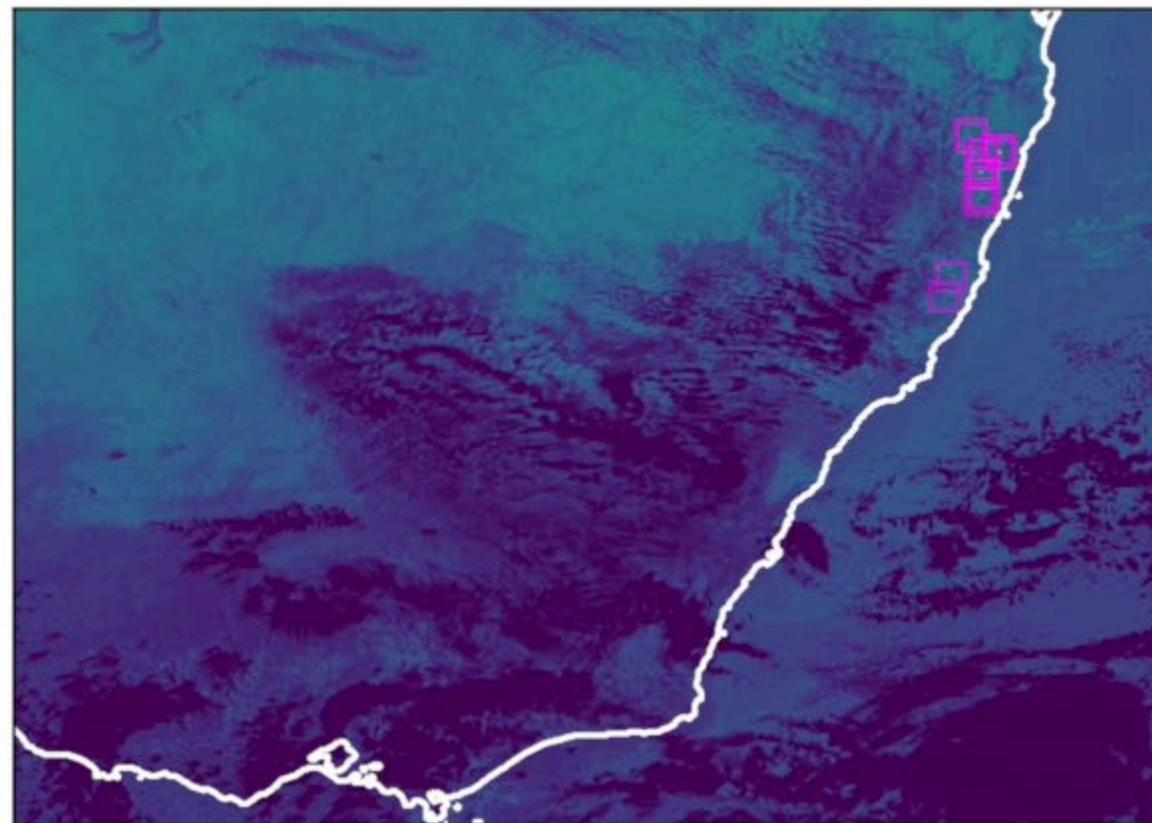


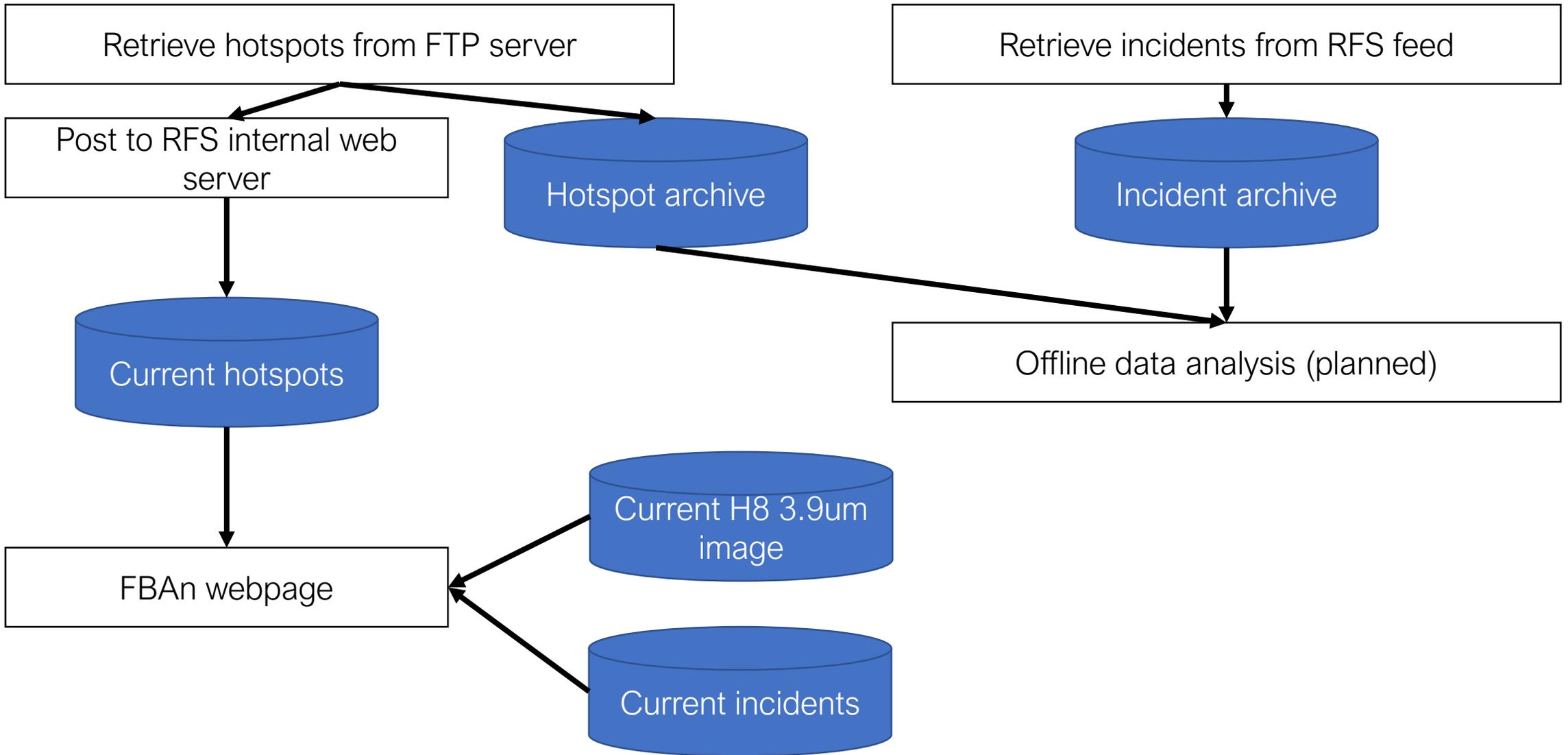


True Color

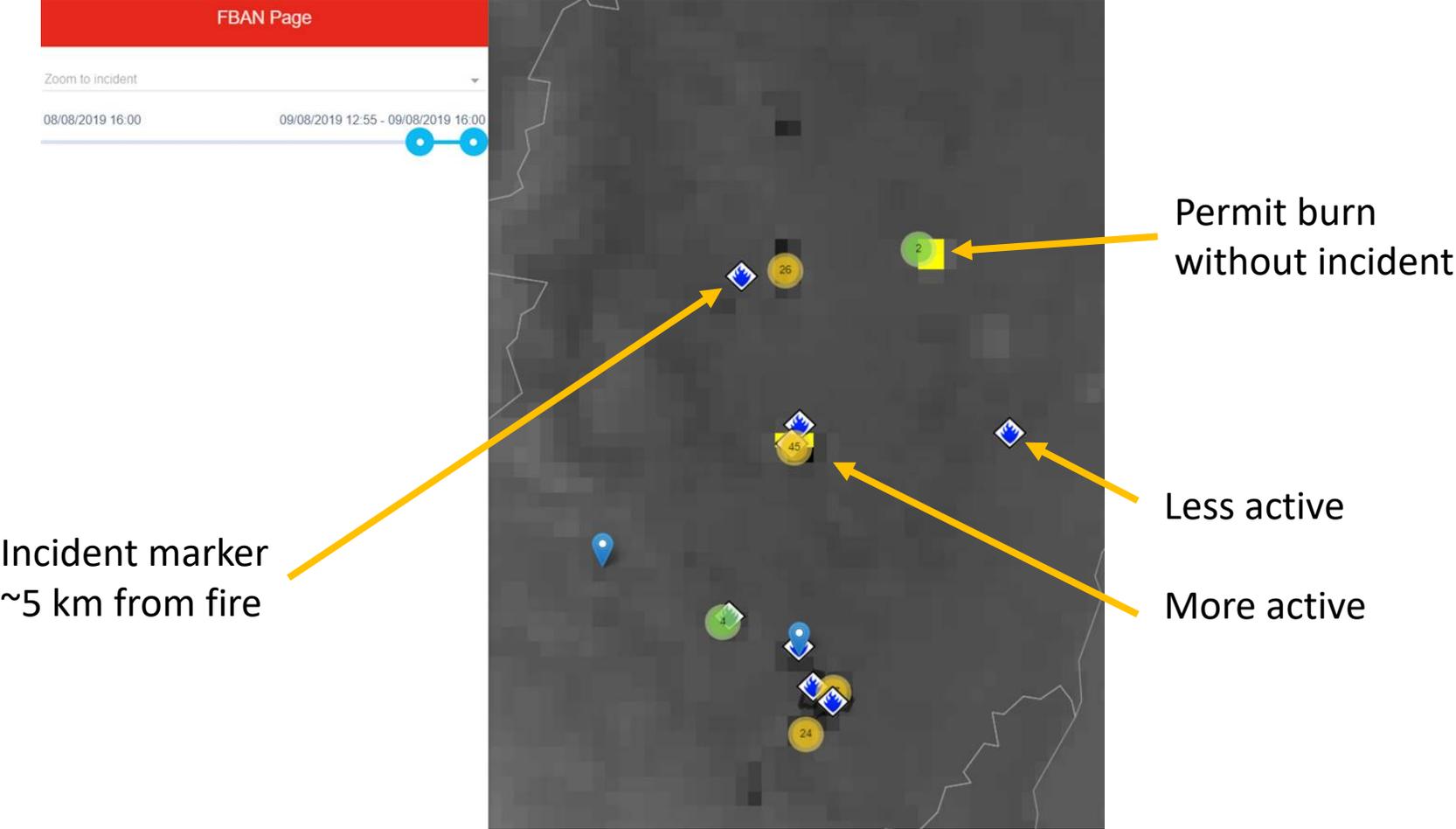


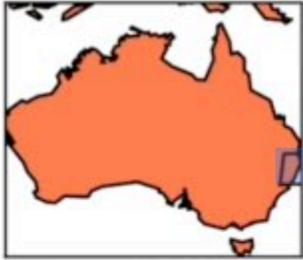
MIR (3.9  $\mu\text{m}$ ) 10:00 10/08/2019 AEST



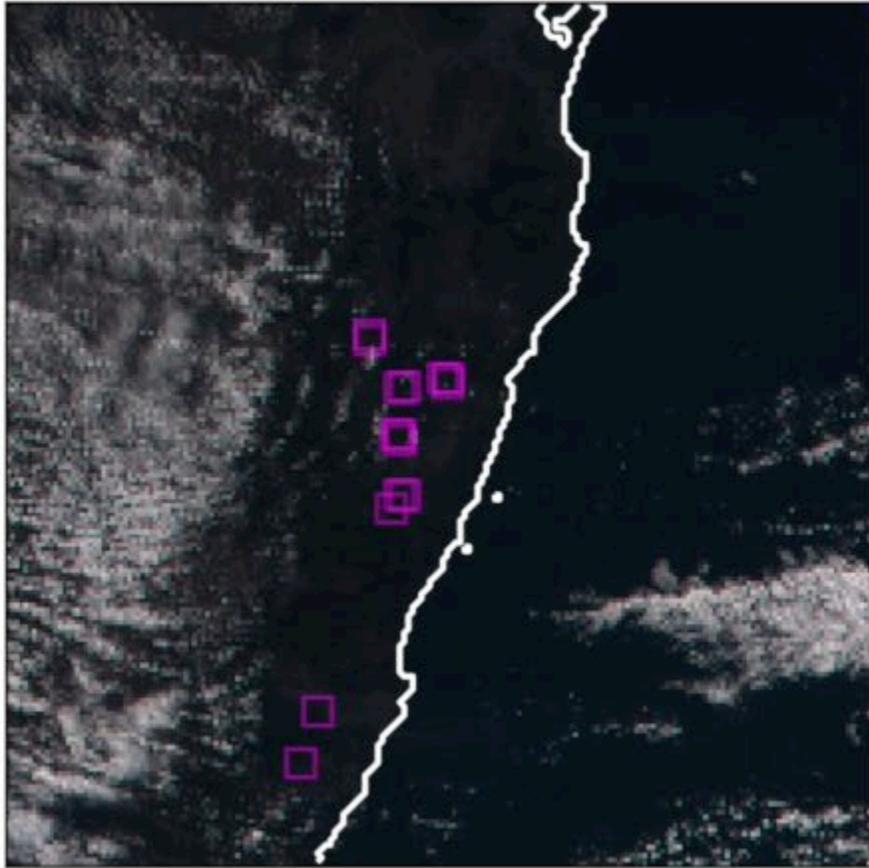


“An operational user's view of hotspot markers overlaid on the most recent Himawari-8 #7 band image. Controls on the left allow temporal filtering of hotspots. Users can click on hotspot markers to display information about the detection.”



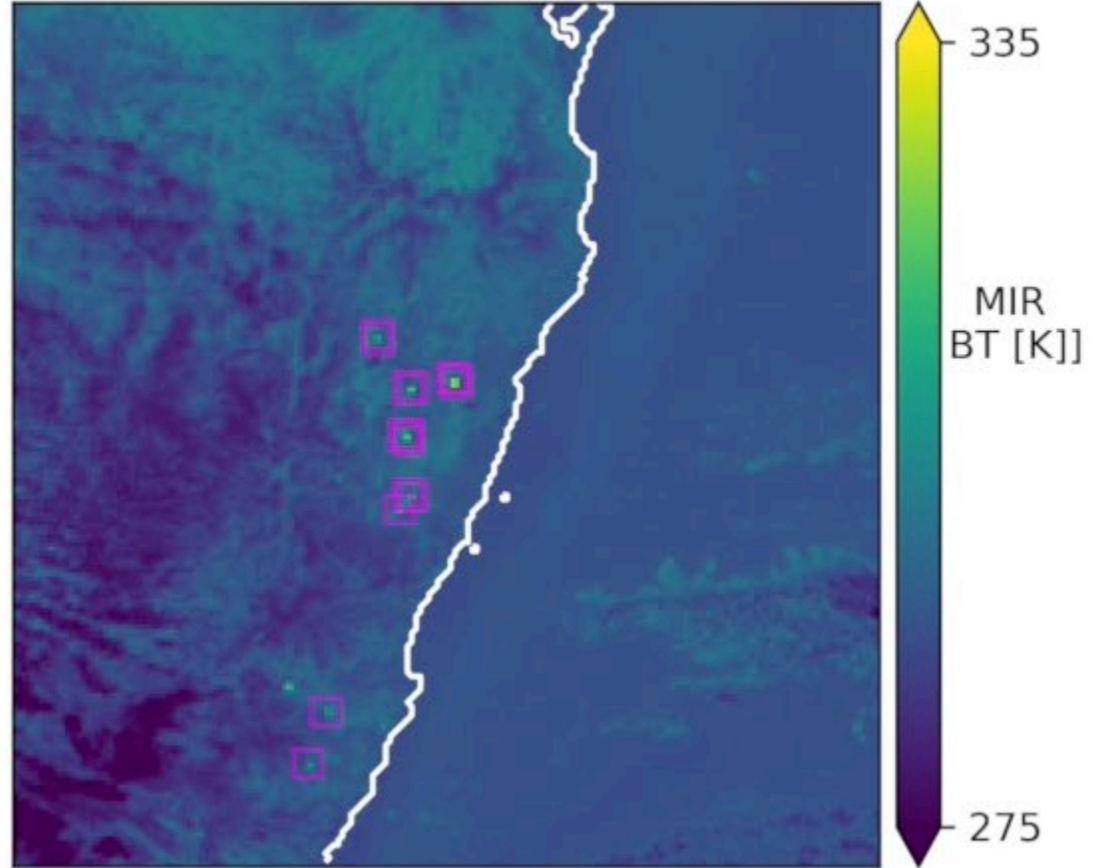


True Color

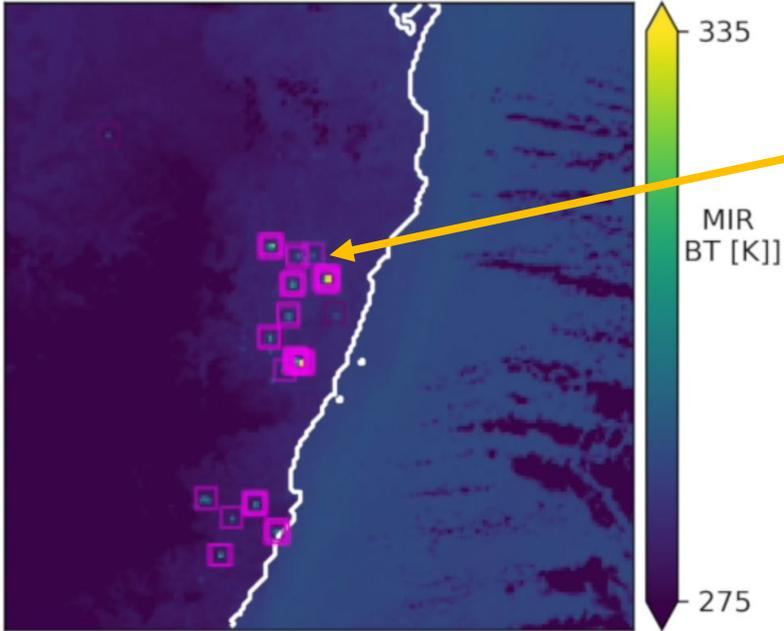


MIR (3.9  $\mu\text{m}$ )

10:00 10/08/2019 AEST

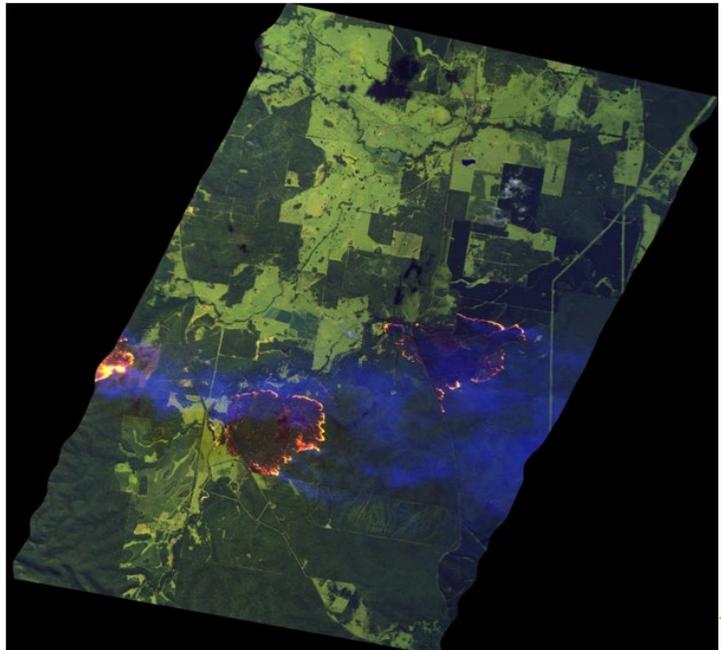
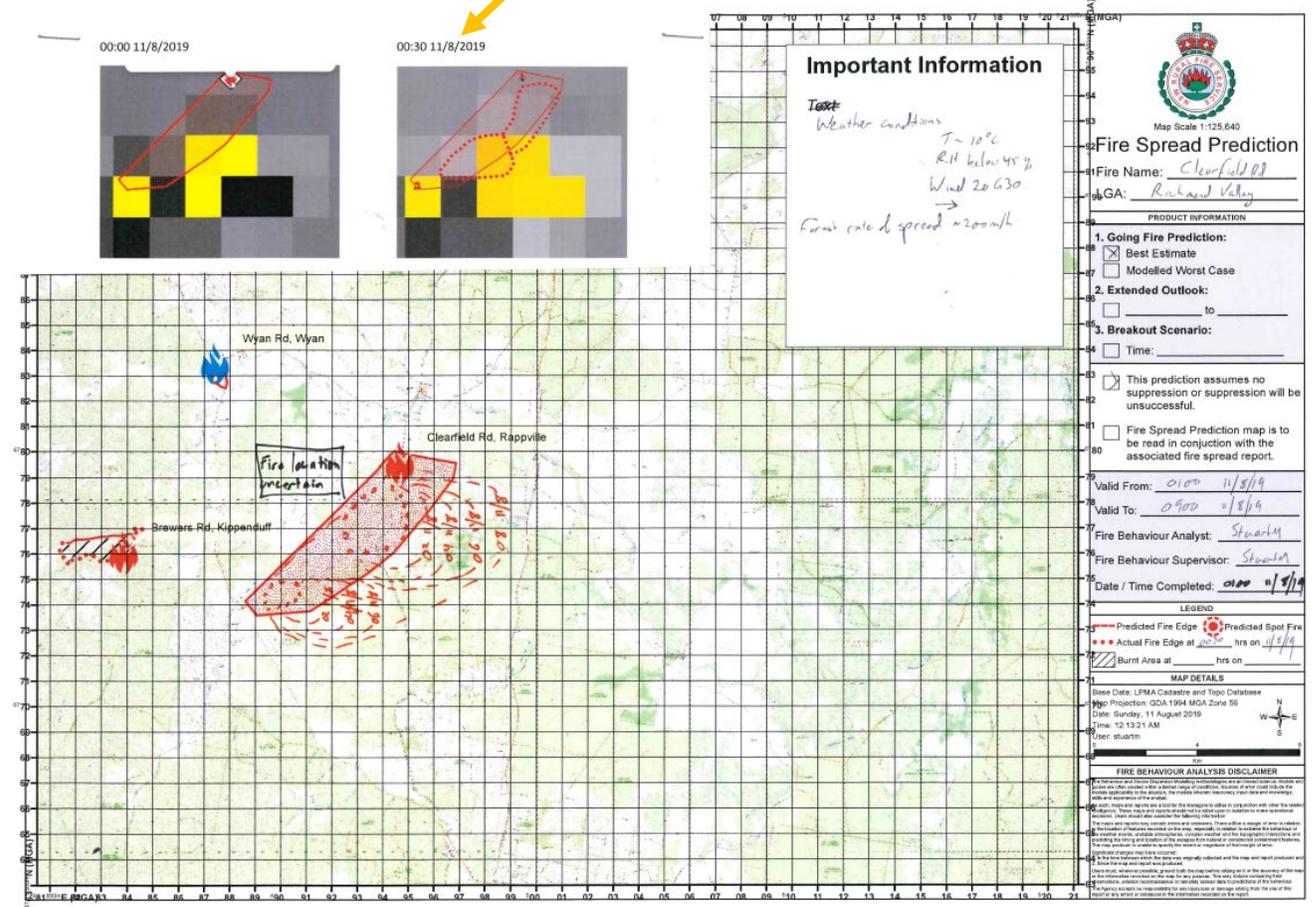


20:10 10/08/2019



New fire detected at 20:10

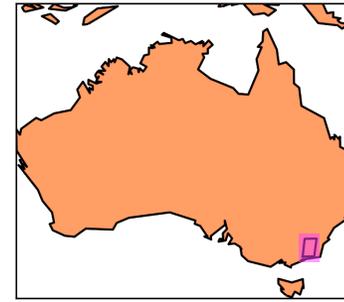
Hotspots used to validate location and direction of spread



← Linescan image 10:00 next morning

# Polar & H8IBRA inter-comparison

Within 1-pixel, within 10-minutes ...

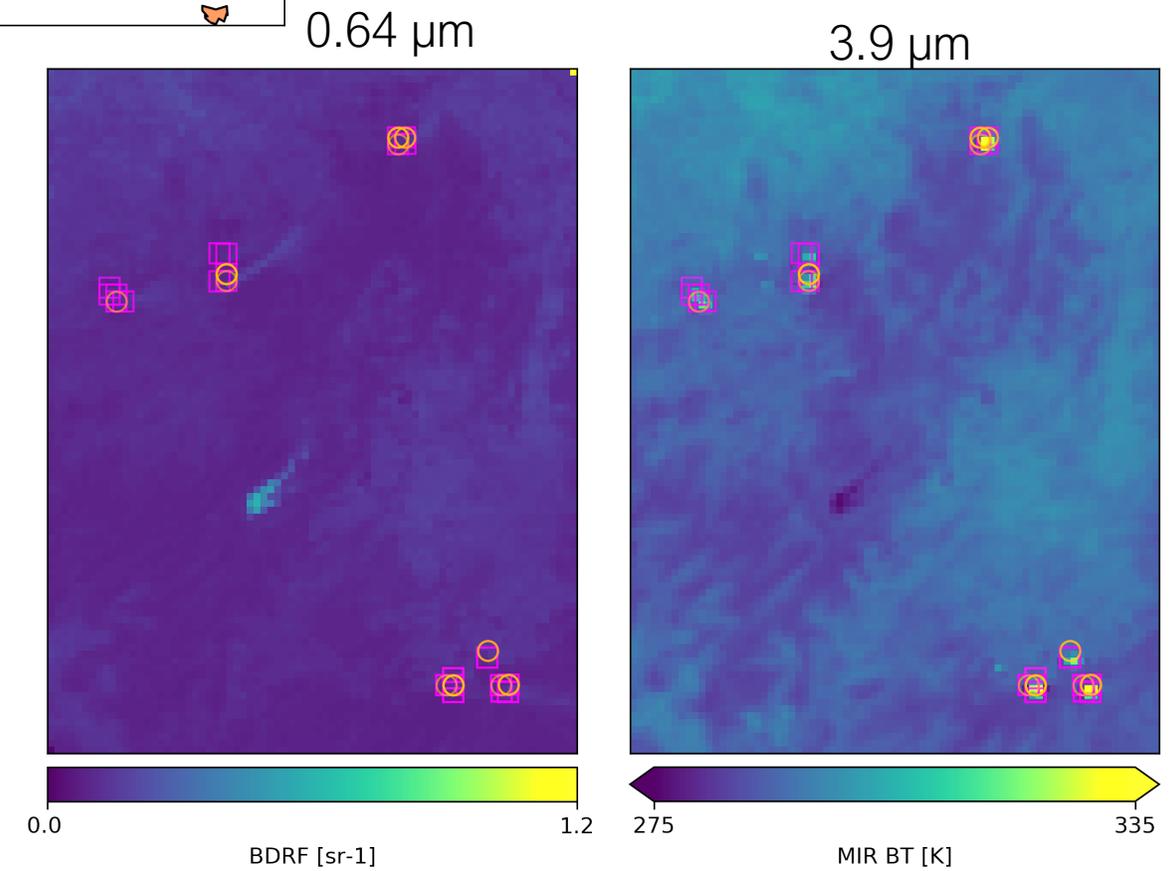


Single example

□ H8IBRA      ○ VIIRS  
 (FRP > 30 MW)  
 conf = h or n

Polar platform	Confidence, (FRP > 30 MW) (FRP > 0 MW)	%Polar found	%H8IBRA found
VIIRS	conf = (h or n)	81% (28%)	79% (94%)
Aqua	conf > 49	75% (36%)	83% (90%)
Terra	conf > 49	77% (26%)	89% (92%)

2019 mid-march to mid-July with break in middle



14/05/2019 @ 14:08 AEST



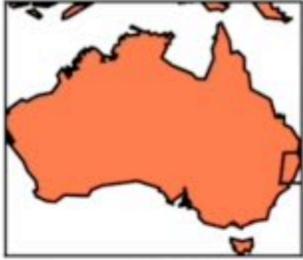
# Wrap Up

- The trial helped to focus the research
- Invaluable tool for communication between stakeholders

## Next steps:

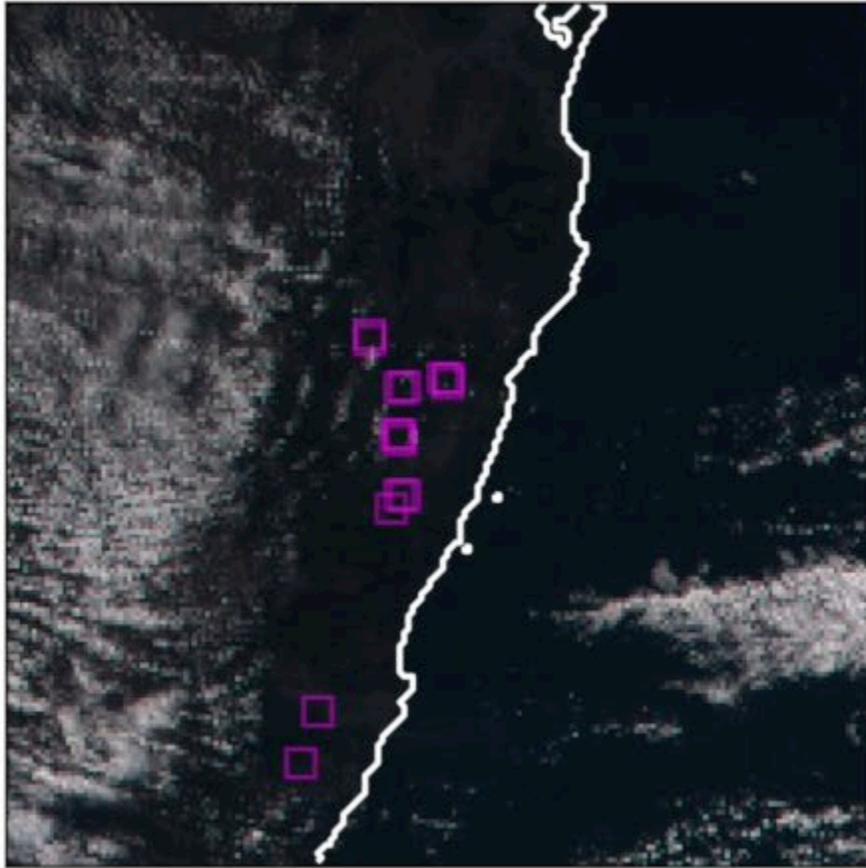
- Further inter-comparison
- Expand trial into other seasons and regions within Australia?
- Aid rural fire services to adapt to such high-frequency data feed





# QUESTIONS?

True Color



MIR (3.9  $\mu\text{m}$ )

10:00 10/08/2019

