

# Improved predictions of severe weather to reduce community risk

RAF Perth / 2019

Jeff Kepert, Kevin Tory, Dragana Zovko Rajak, Serena Schroeter, / Bureau of Meteorology

 @bnhcrc  @bnhcrc

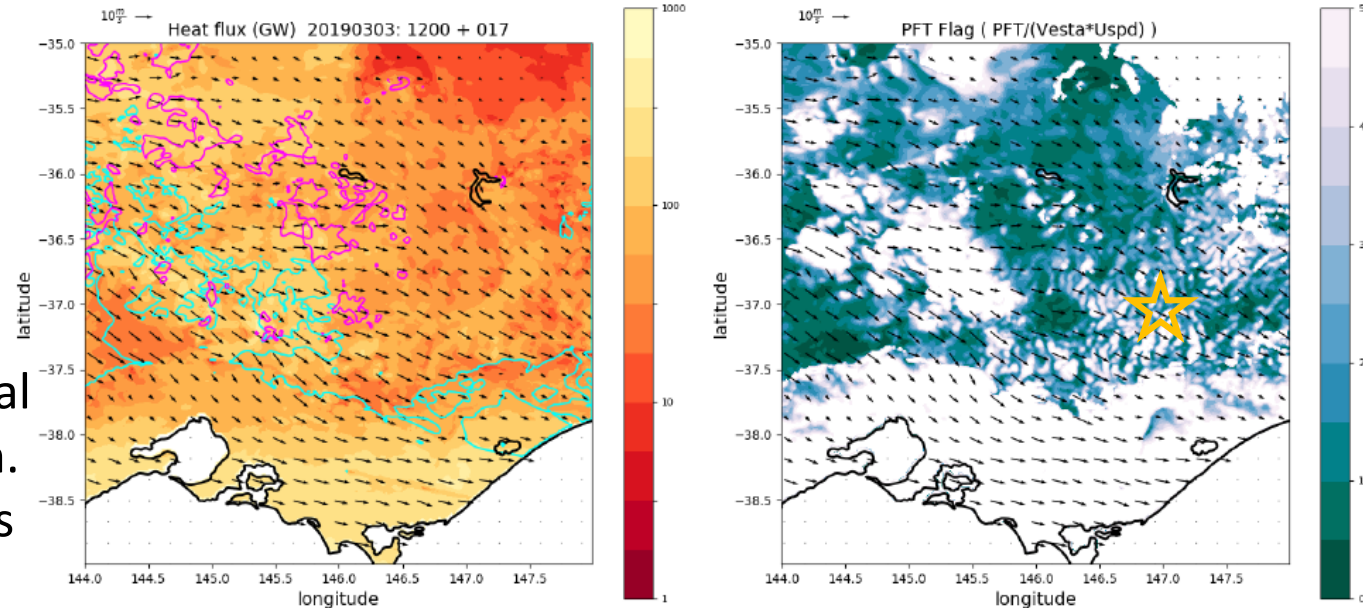


Inglewood Fire 5 Dec 2016: Nick McCarthy

# Pyrocumulonimbus

## Highlights:

- PyroCb Firepower Threshold incorporates essential elements of plume dynamics and cloud formation.
- A PFT flag now identifies when the environment is conducive to hot fires and plume development.
- PFT and PFT-flag have now been successfully tested on well over 30 cases, including recent Arctic cases in Siberia and Canada.
- Preparation for near-realtime trial this summer has begun – will help refine tool and inform best use.
- Draft paper has begun
- Invited presentations:
  - Fire Behaviour and Fuels,
  - NSW RFC fire-weather training,
  - NSW RFS Fire Behaviour Analyst training
- Contributed to BoM fire weather training module



# PFT Utilization

The near-realtime trial is a significant utilization activity that will:

- Help refine and validate the science
- Help learn how best to use and interpret the data
- Begin to build user familiarity with the PFT and the underpinning concepts

Subsequent utilization ideas:

- Training for fire weather forecasters and fire behaviour analysts
- PFT fields to be ingested into Bureau forecast visualisation system
- Investigate how to best provide information to fire agencies
- Adapt conventional thunderstorm diagnostics to predict pyroCb downbursts, lightning, hail, tornadoes...



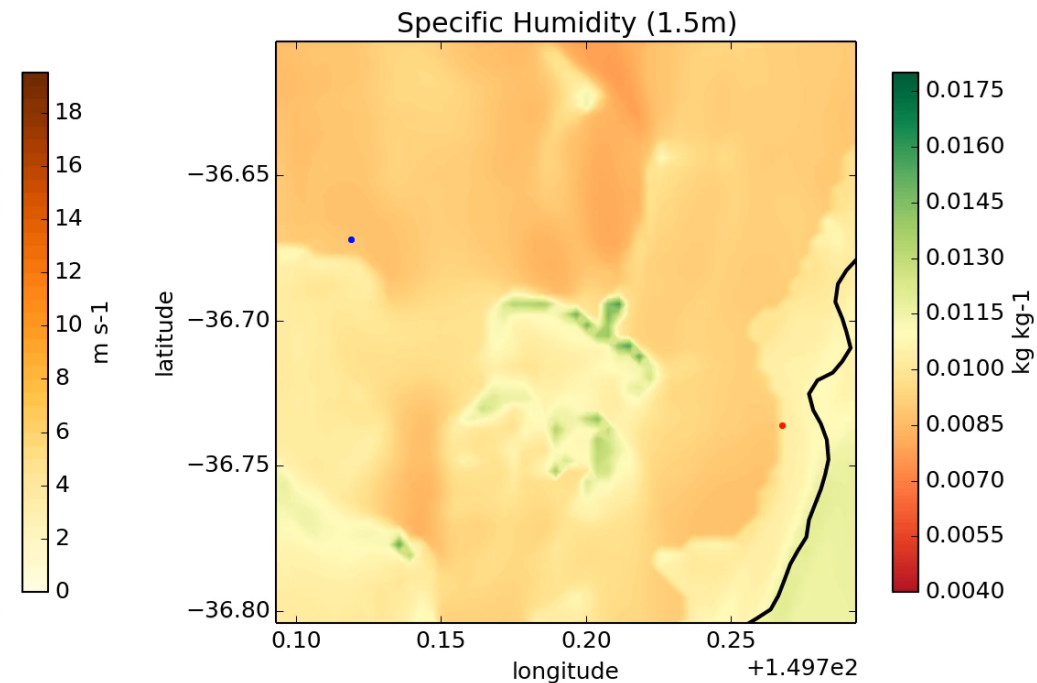
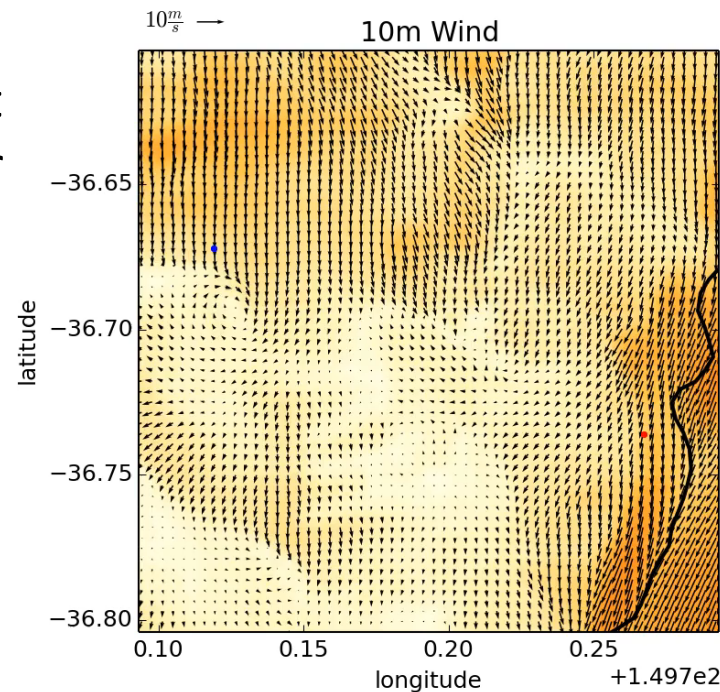


# High-resolution case studies

## Tathra Fire Case Study:

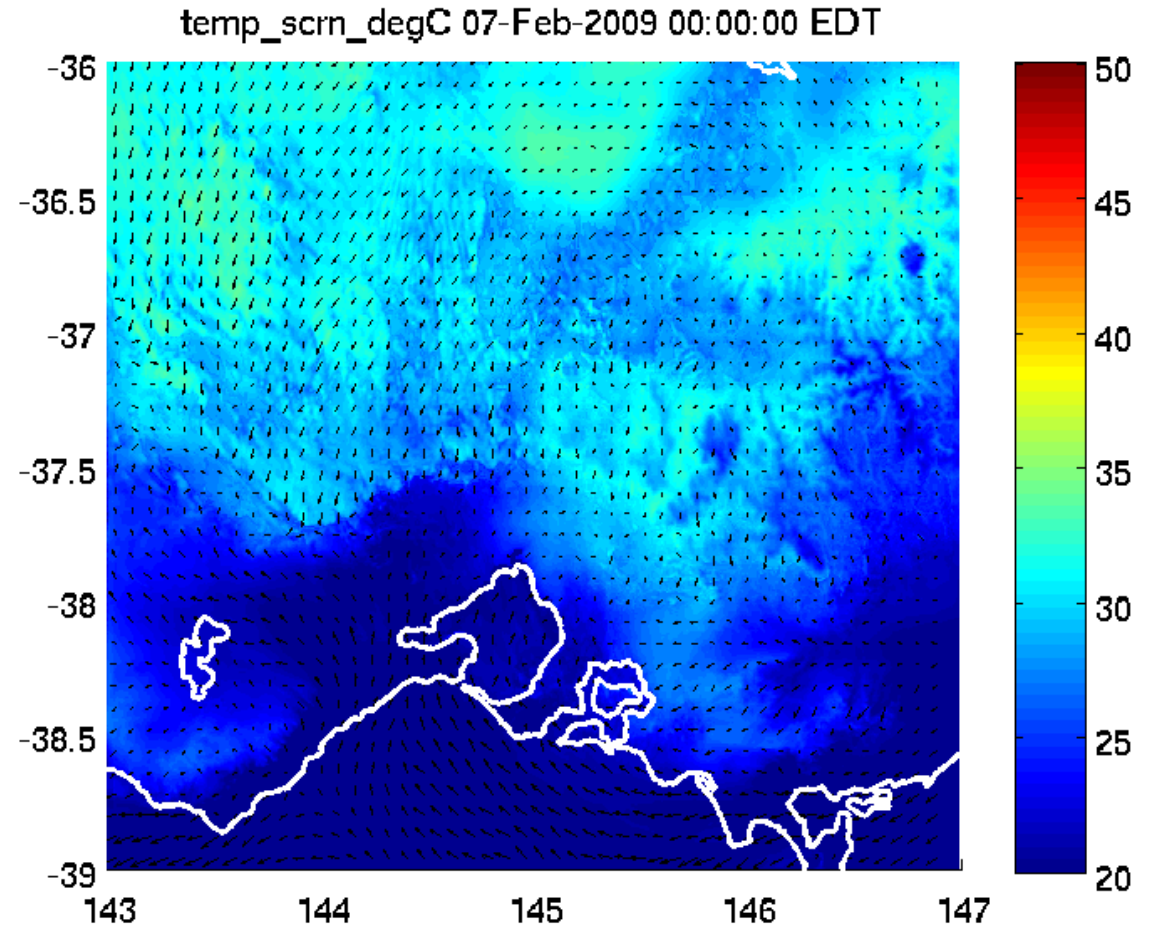
- About 60 houses lost
- Occurred in lee of ranges
- Mountain waves present but possibly not dominant factor
- Evidence of roll-like features with strong erratic winds about the time the river was crossed

2018-03-17 23:35:00 UTC



# Quick-look case studies

- Modelling infrastructure has been improved
- Computer power has grown
- Our diagnostic suite has developed
- Feasible to set up a semi-automated suite that can provide quick turn-around case studies of severe events
  - Run model to 400 m resolution, centred on event
  - Output and visualise standard suite of diagnostics
  - Would supplement existing post-event analysis tools
  - Would help identify cases for in-depth study



# Ensemble Utilization

## SA Tornado Case Study:

- Ran 6-member, 400-m ensemble
- New model diagnostic for tornado potential
- Paper almost done
- Dragana on maternity leave

## Utilization:

- Ensembles are here!
- Training
- Operational simulation
- Setting operational policy

