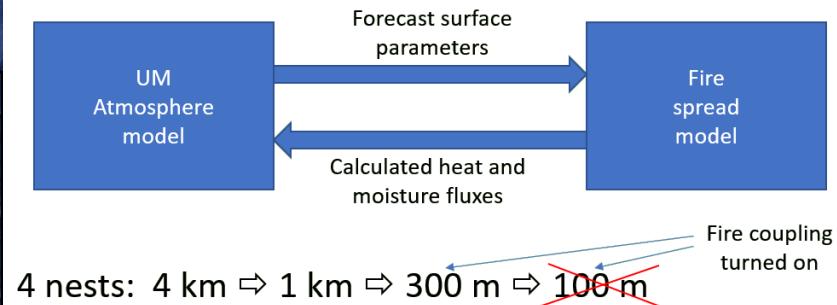




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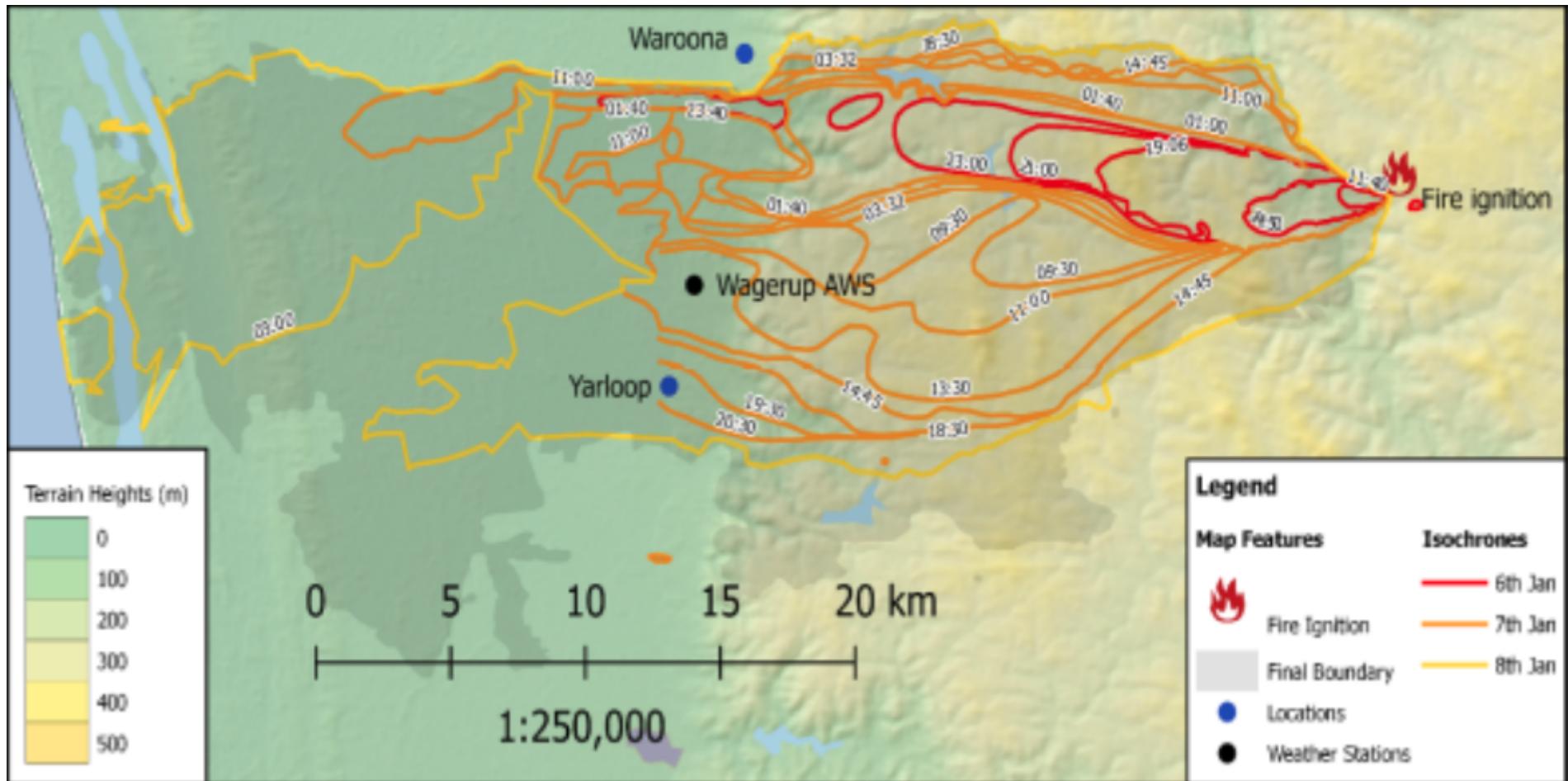
# ACCESS-Fire modelling



- Three model runs currently under analysis
  - Two of the Waroona/Yarloop fire, one of the Sir Ivan fire
  - Fire intensity and spread based on prescribed fuel loads and modelled meteorology
  - Modelled meteorology affected by heat flux from the fire
- 
- Model CAN reproduce PyroCB (fire driven storm creation)
  - Process is sensitive to modelled boundary layer stability
  - Realistic fire spread is also achievable



# Rate of spread



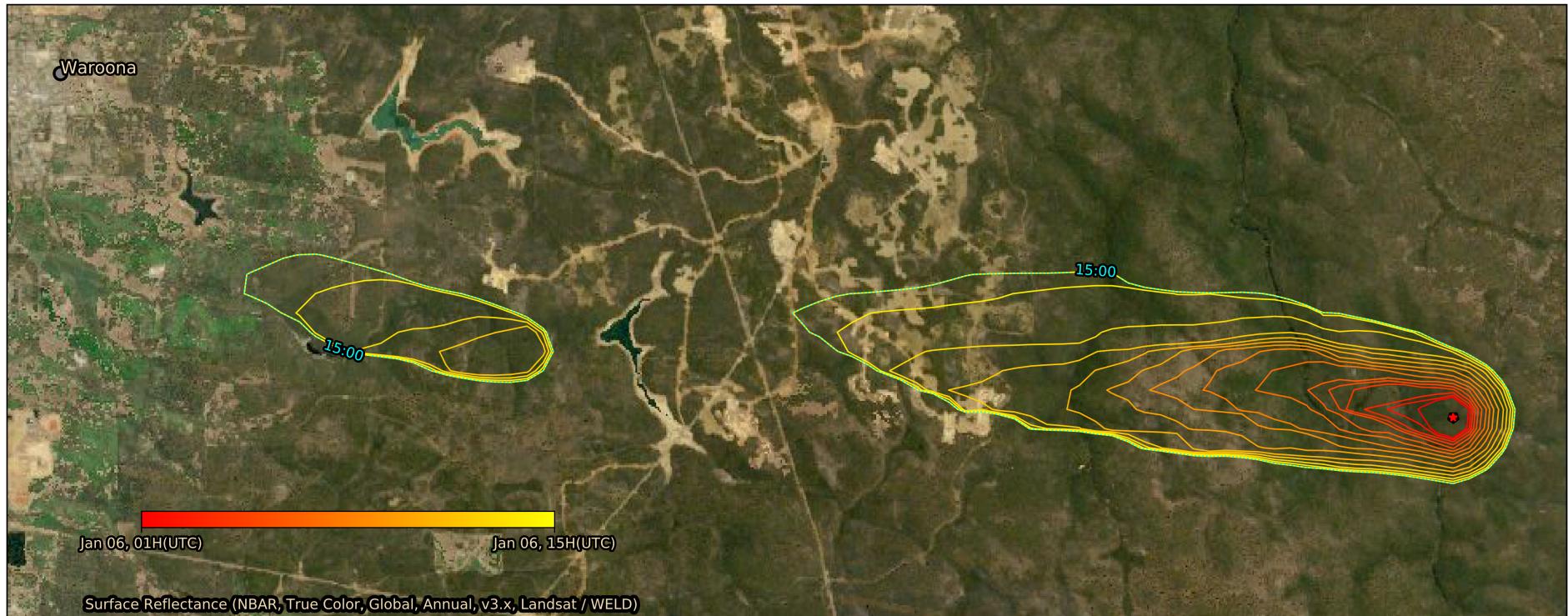
On day 1

- escarpment reached, due to spotting (likely) driven by PyroCB
- quick westward run at the base of the scarp in the late evening

What do we see in the model?



# Rate of spread



- 15 hours of burning (Jan 6: 0900-2300)
- Spotting is prescribed (not built into fire model)
- Shape is relatively well represented

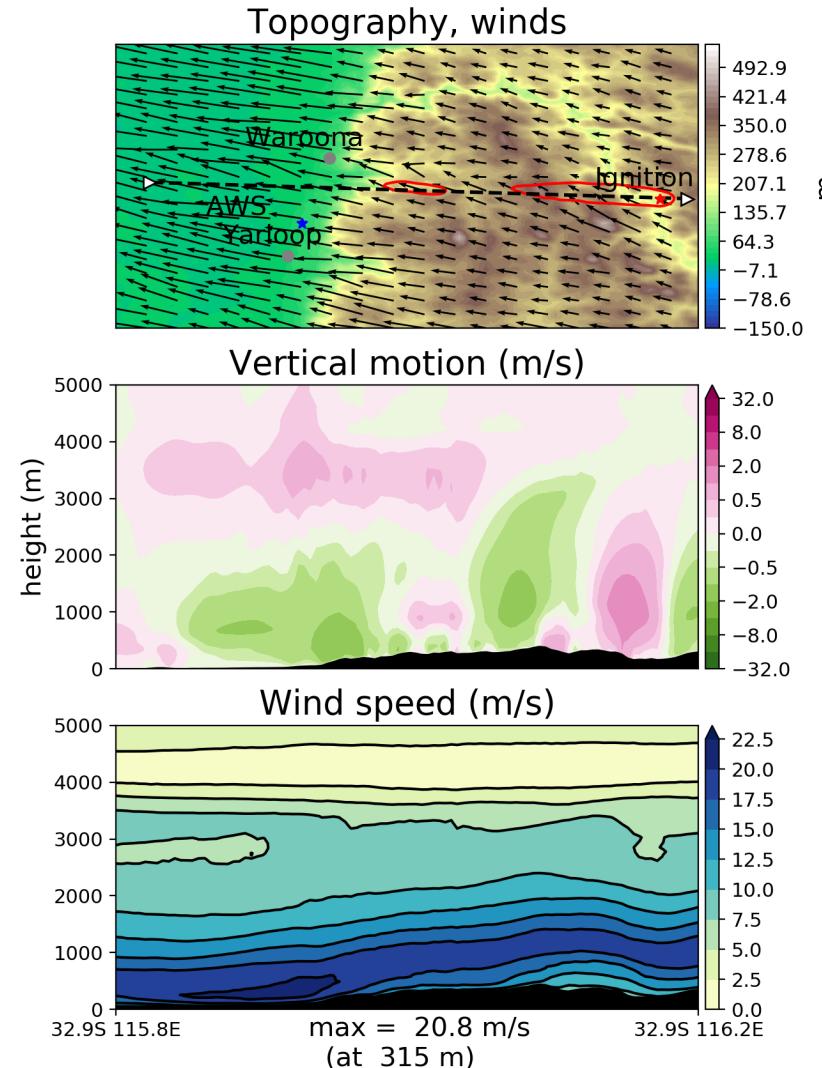
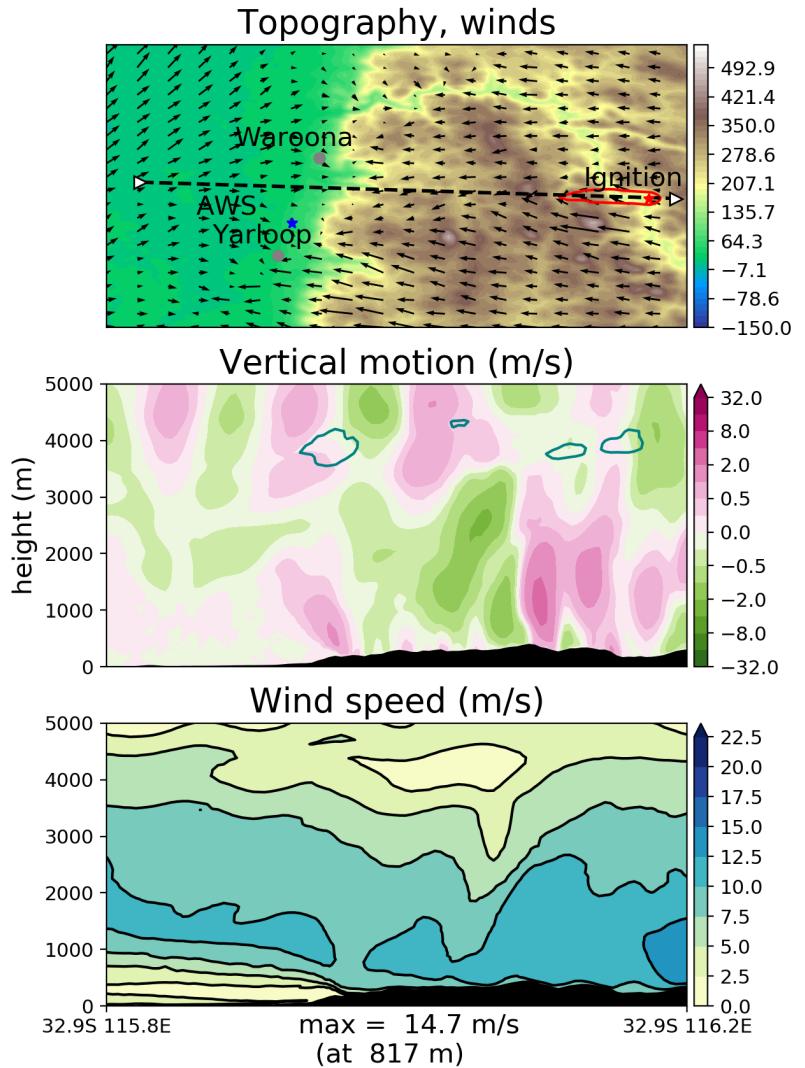
- Fire spread affects and is sensitive to surface winds, which require careful tuning
- Too much instability causes runaway fire dynamics (spread is too fast)
- Too much resistance to instability can dampen physical effects (e.g., PyroCB)



# Wind speeds

2016 Jan 06 10:40 (UTC)

2016 Jan 06 14:10 (UTC)

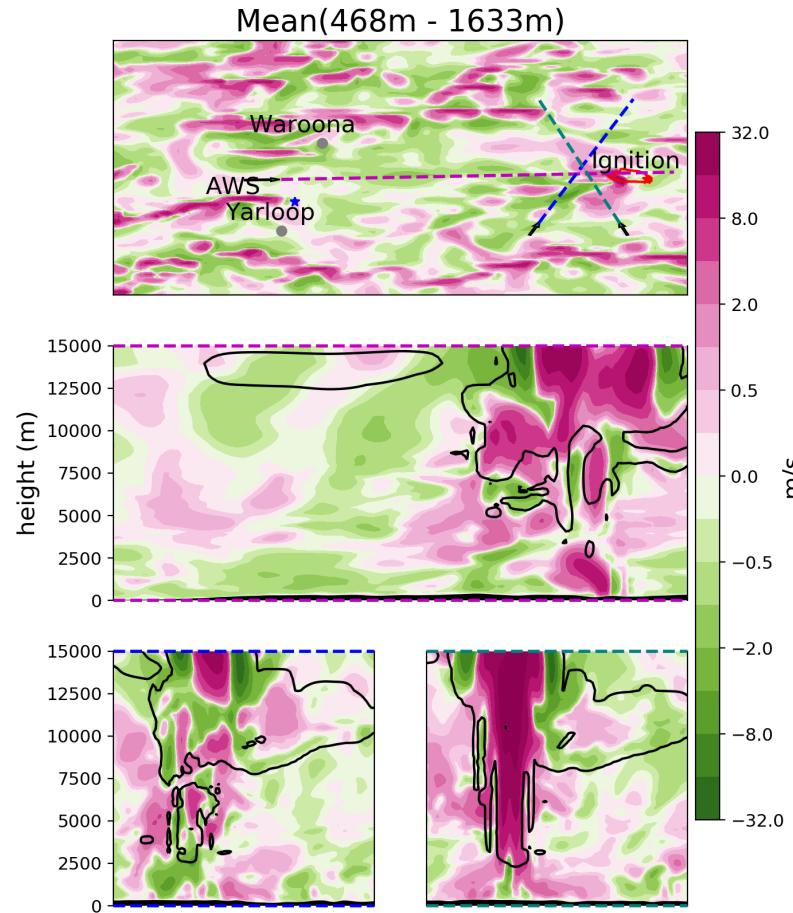


- Vertical wind speeds are affected by the fire
- High horizontal wind speeds seen at base of scarp

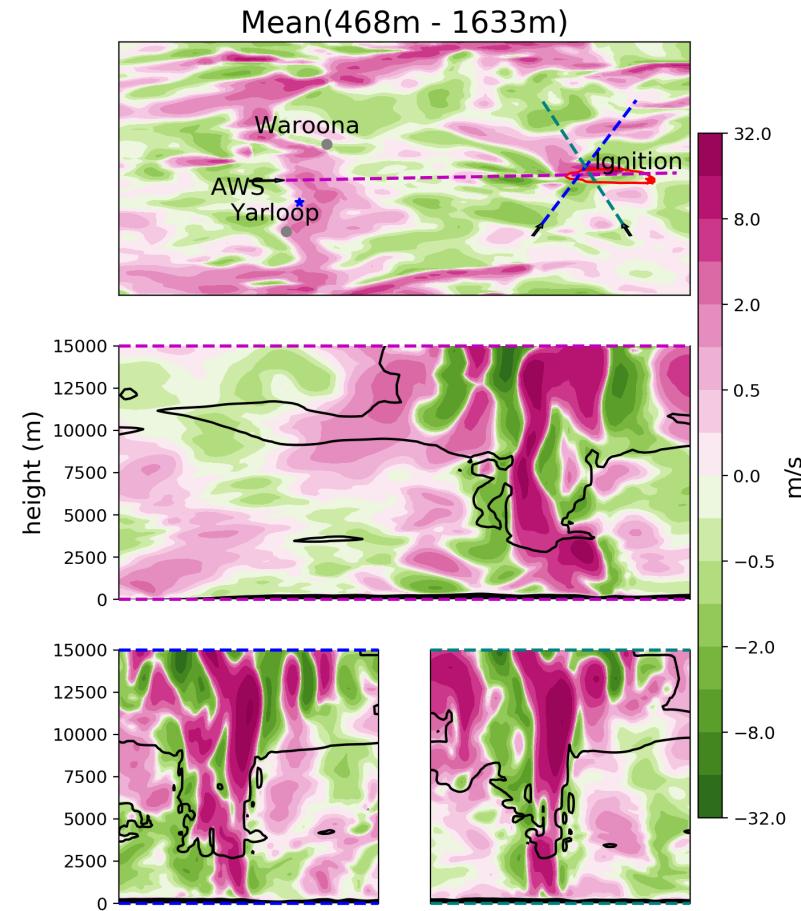


# PyroCB

Vertical motion 2016 Jan 06 04:01 (UTC)



Vertical motion 2016 Jan 06 07:01 (UTC)

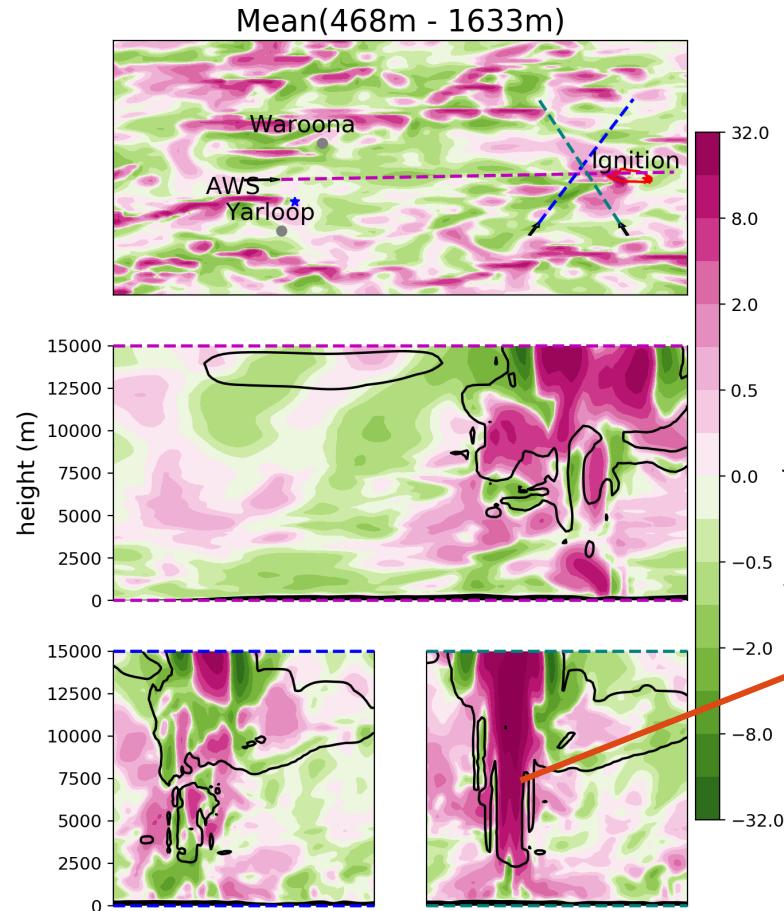


- Strong vertical updraft throughout the troposphere over the fire front
- Cloud formation and downdrafts can be seen nearby

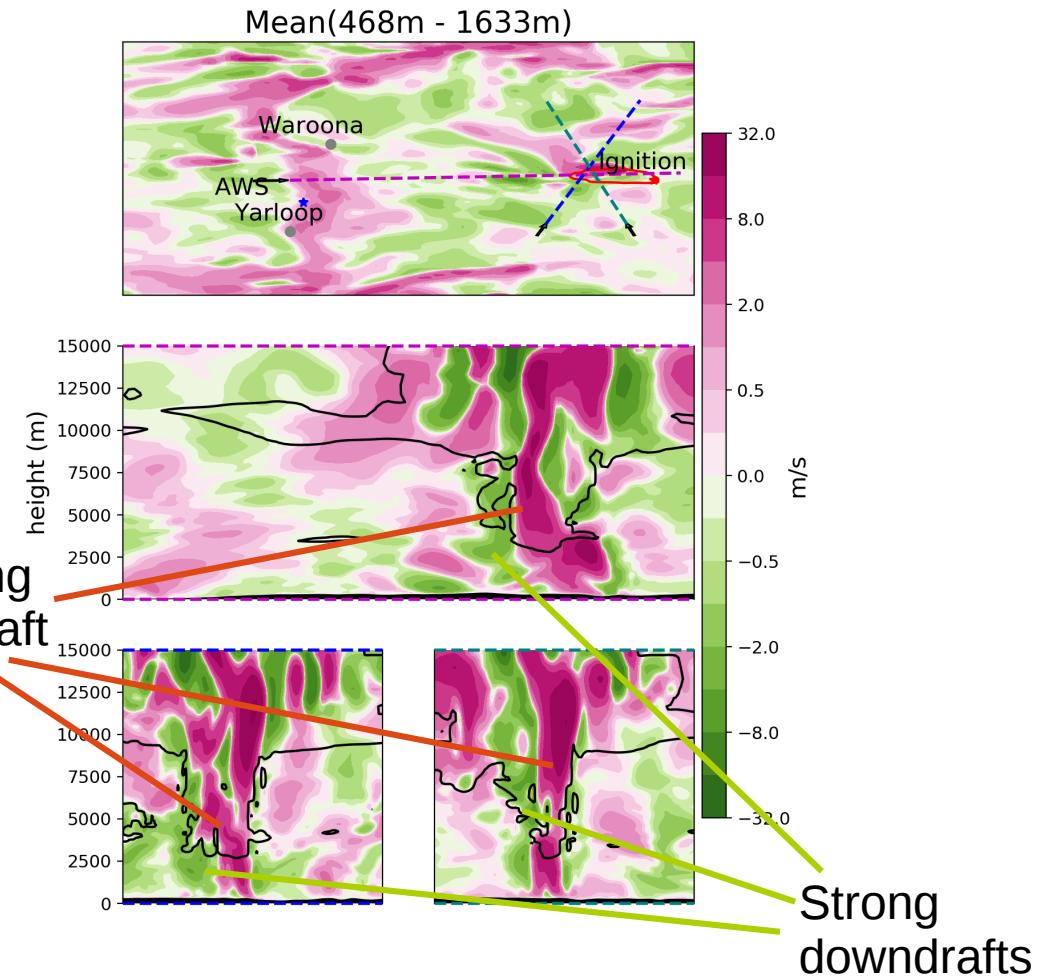


# PyroCB

Vertical motion 2016 Jan 06 04:01 (UTC)



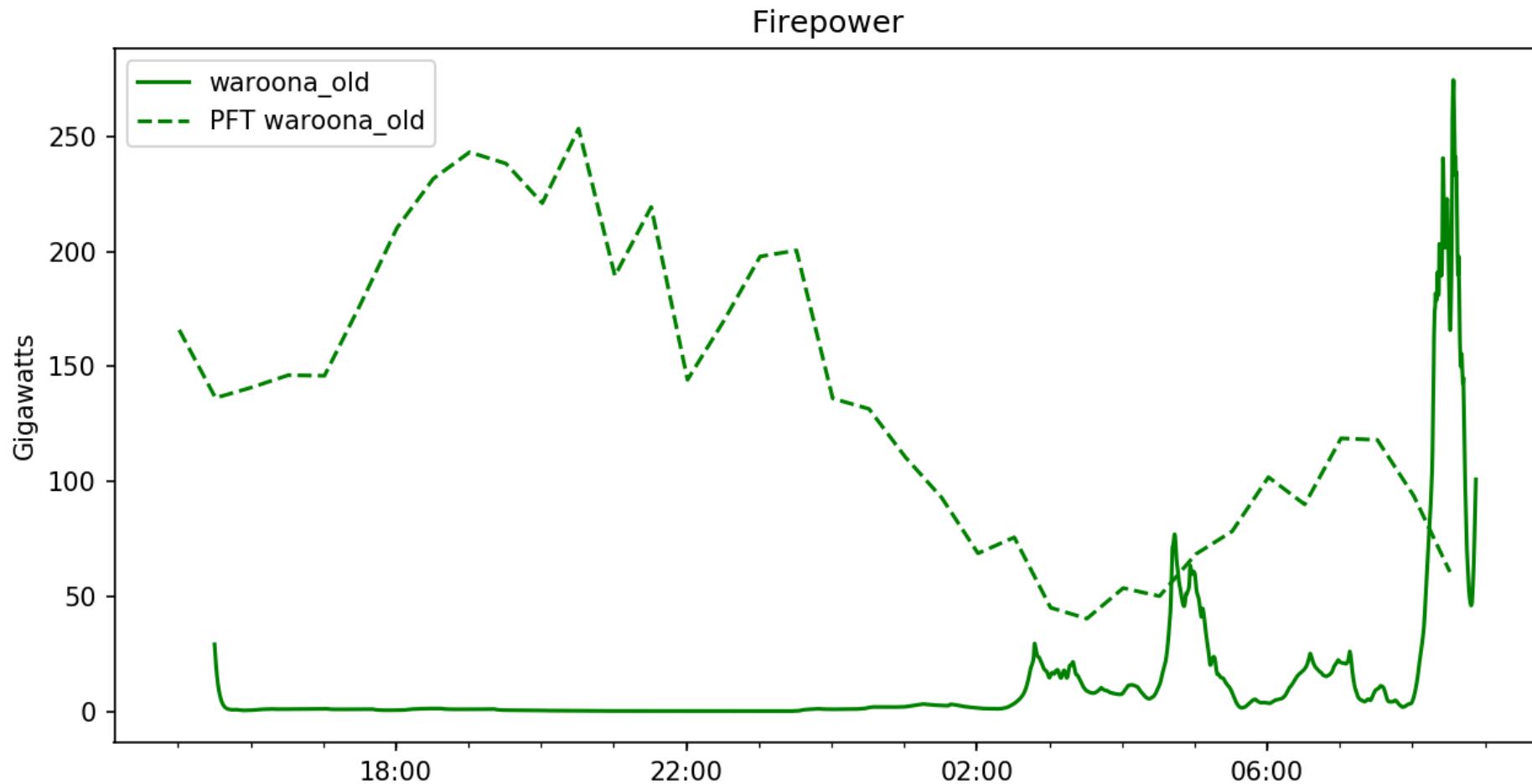
Vertical motion 2016 Jan 06 07:01 (UTC)



- Strong vertical updraft throughout the troposphere over the fire front
- Cloud formation and downdrafts can be seen nearby



# Firepower vs PFT



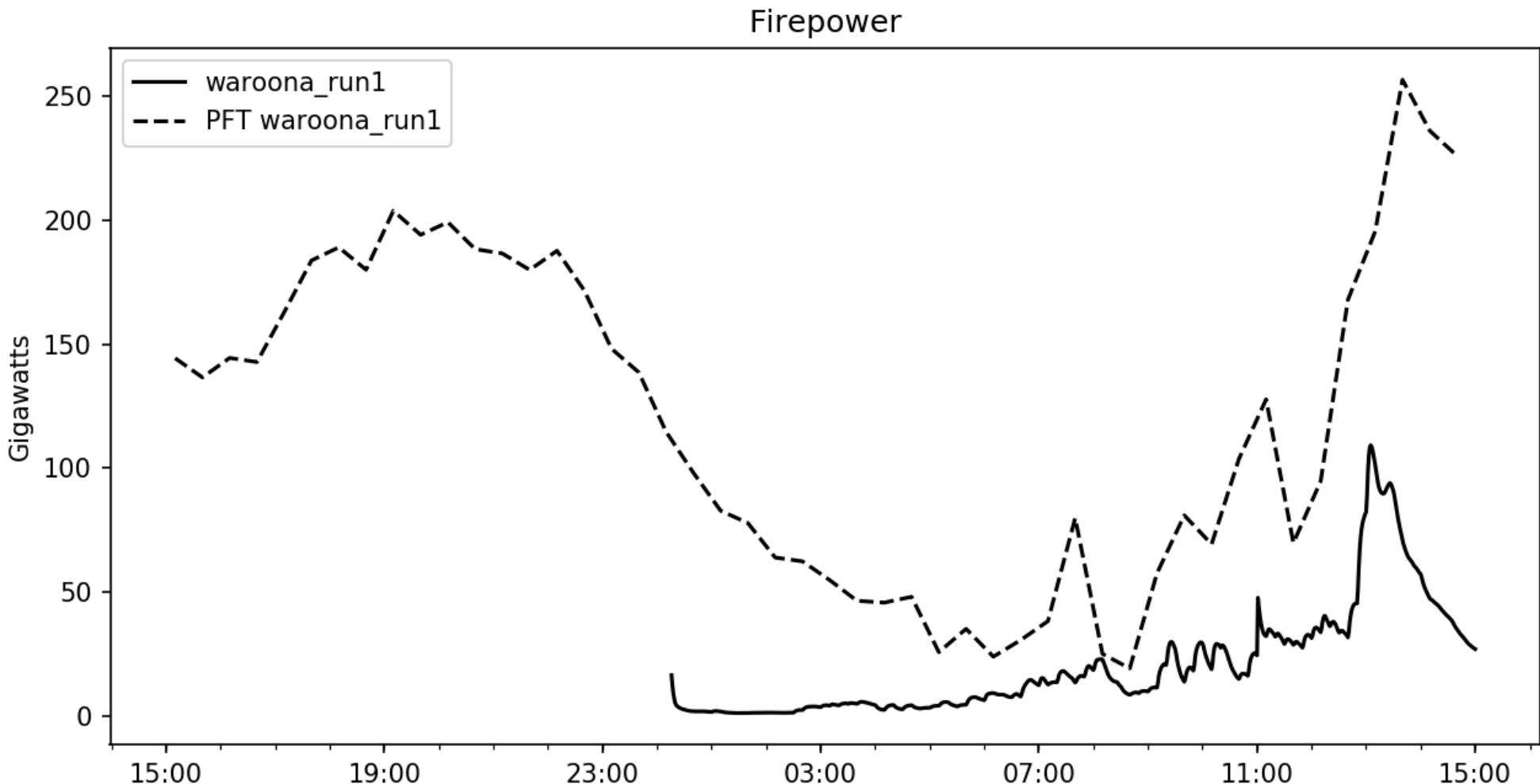
- Original run (lower BL stability) overshoots PFT threshold at 12:30 and 1630 LT



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# Firepower vs PFT



- Newer run (higher BL stability) does not overshoot PFT
- PyroCB can be seen in the original run from about 1200



# Upcoming

- Tweaked model runs
  - Determine best BL and fire spread parameterisations
  - Capturing downslope wind effects
  - Extended run times (second day)
- Model PFT analysis
  - Entrainment analysis using model meteorology
  - Verify PFT estimation utility
  - PyroCB prediction could help inform FDI
- Analysis of potential ember storms and firebrand transport
  - Dispersion modelling based on ACCESS winds
  - Visualisation of potential transport
- Publication and case studies
  - Inform FDI
  - Highlight model sensitivities