

Improved predictions of severe weather to reduce community risk

RAF Brisbane / **2018**

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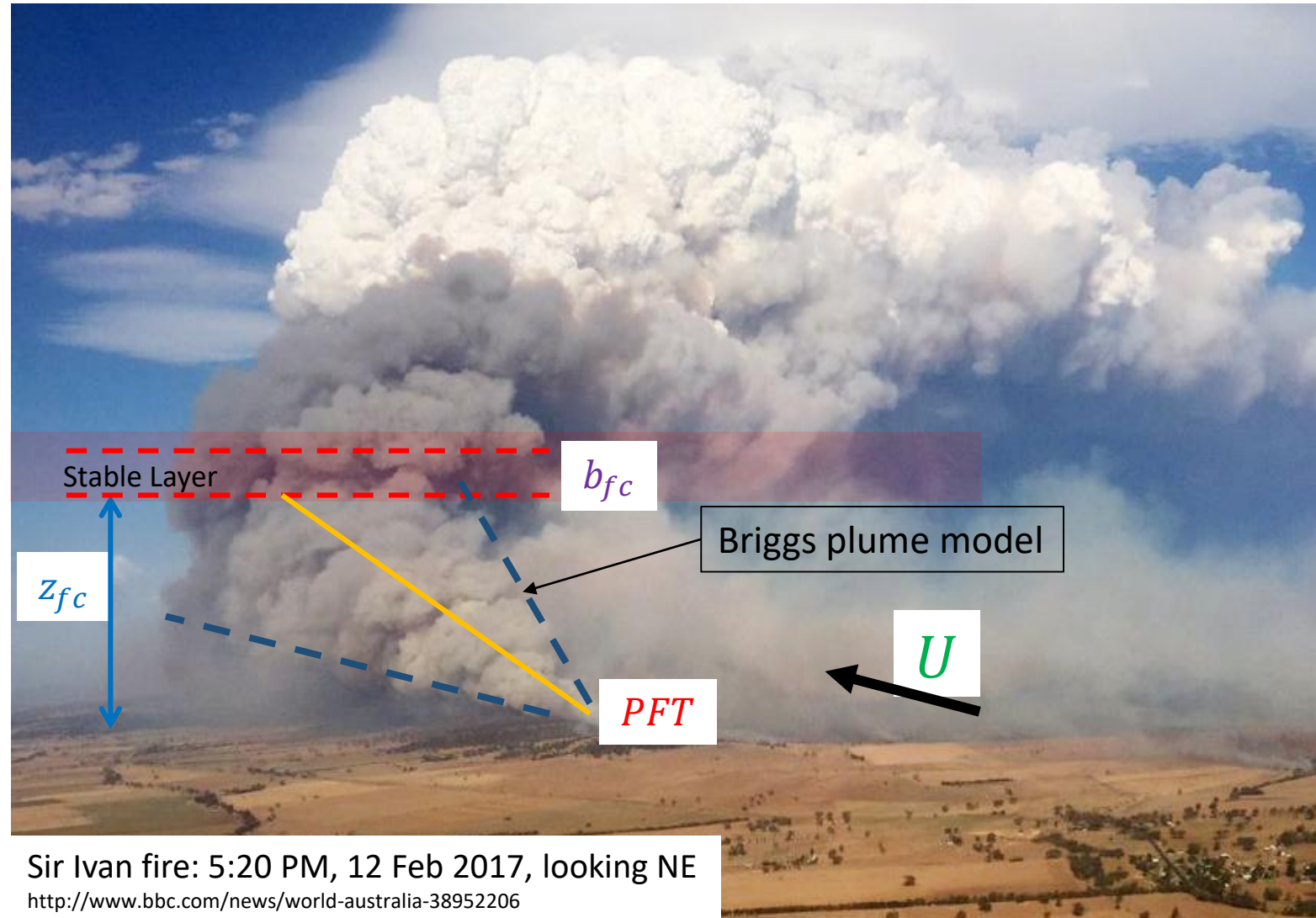
Inglewood Fire 5 Dec 2016: Nick McCarthy

Overview

- 1) Project is mostly up-to-date
- 2) One subproject ahead of schedule, two running a bit behind
- 3) Journal articles: Two published, two in early-stage preparation
- 4) Many conferences and presentations, etc.
- 5) Subprojects:
 - a) Pyrocumulonimbus prediction
 - b) Ember parameterization
 - c) South Australian Tornado outbreak
 - d) B.L. roll case ← Due to begin mid-next year

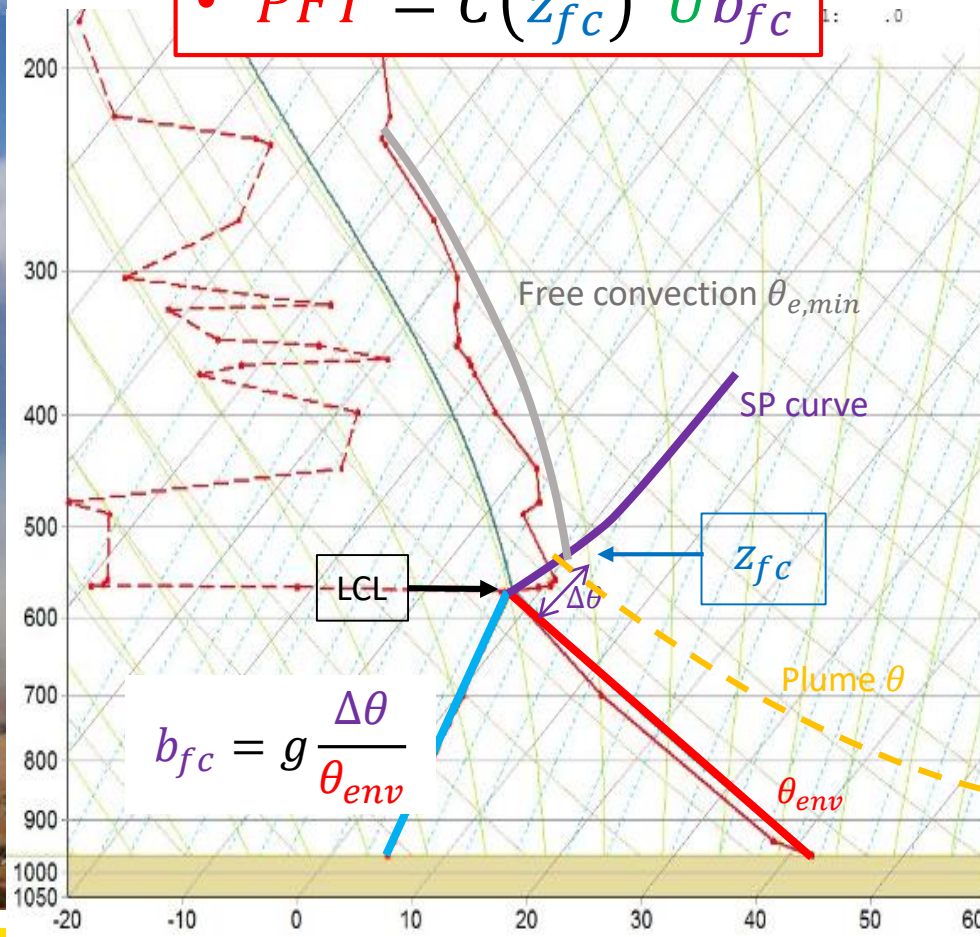


Pyrocumulonimbus



PyroCb Firepower Threshold

$$PFT = C(z_{fc})^2 U b_{fc}$$

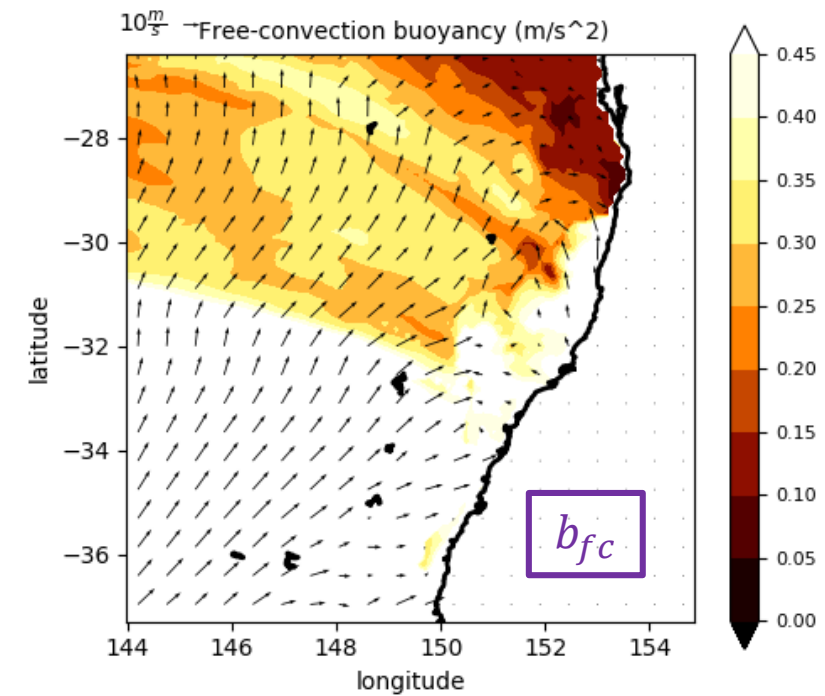
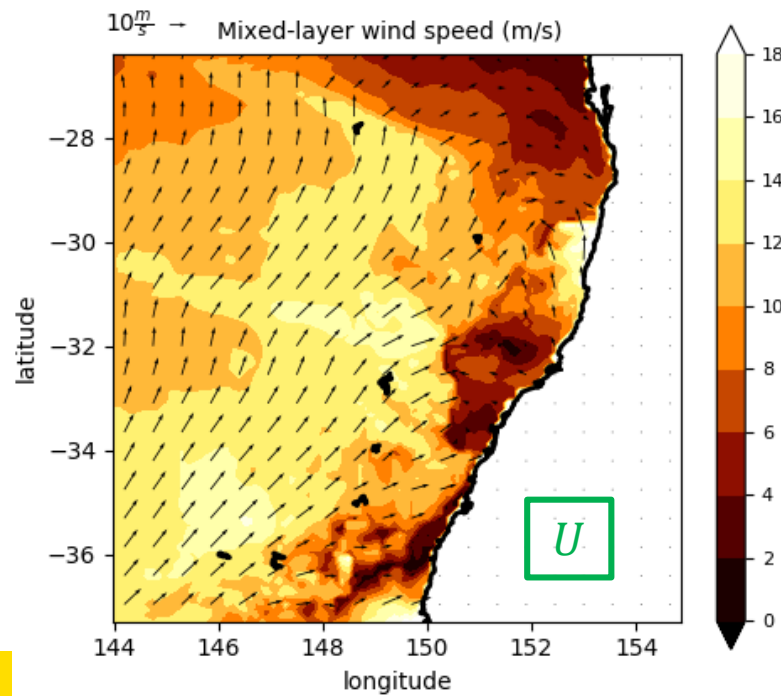
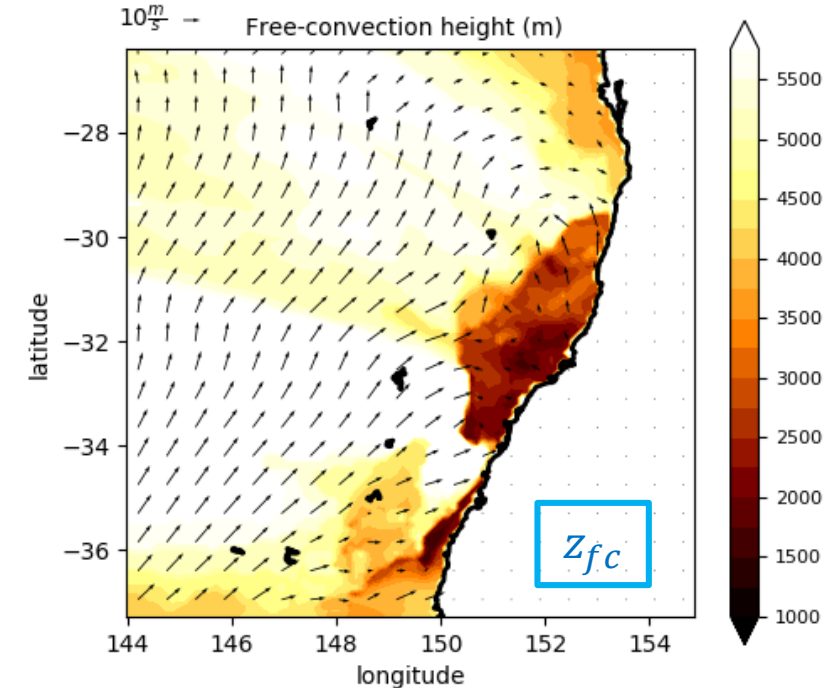
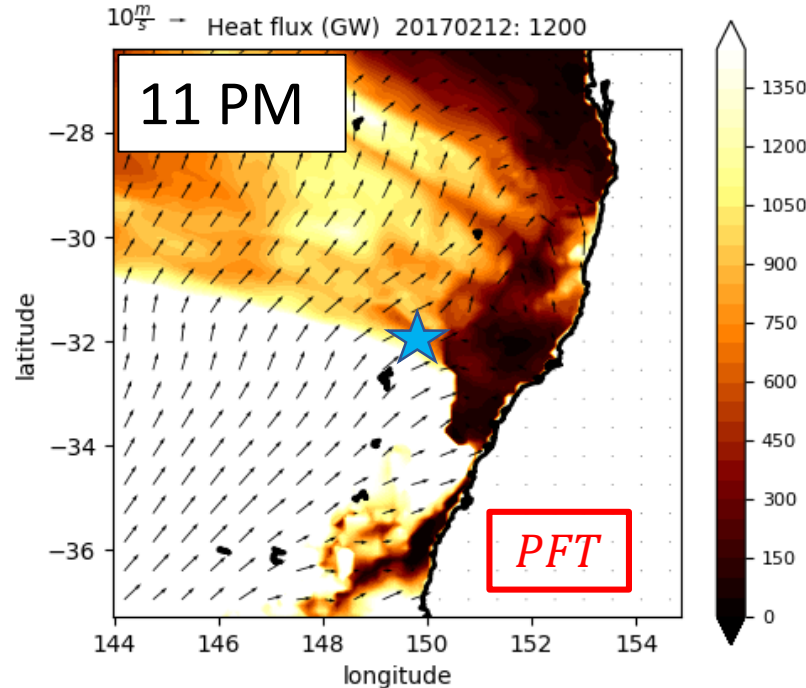


Sir Ivan Fire

$$PFT = C(z_{fc})^2 U b_{fc}$$

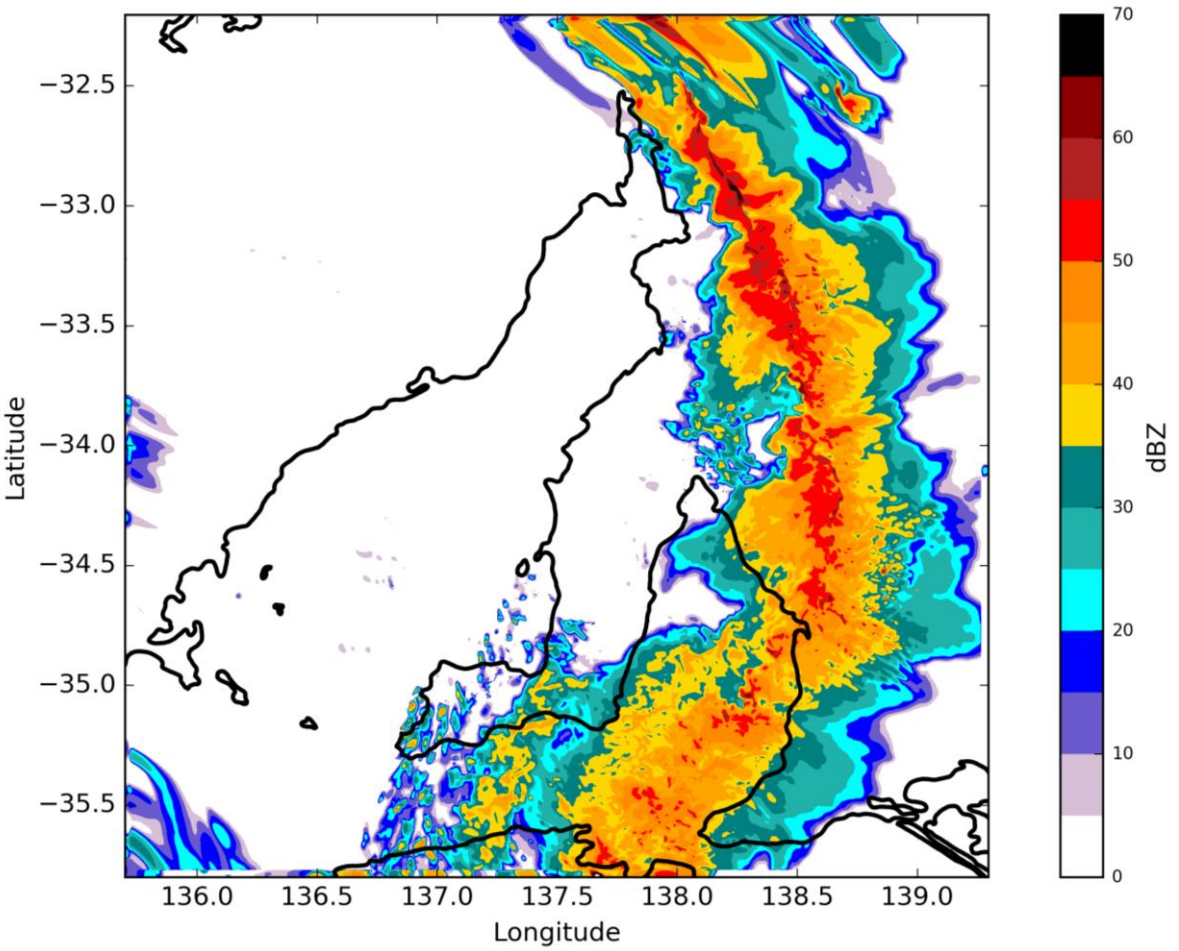
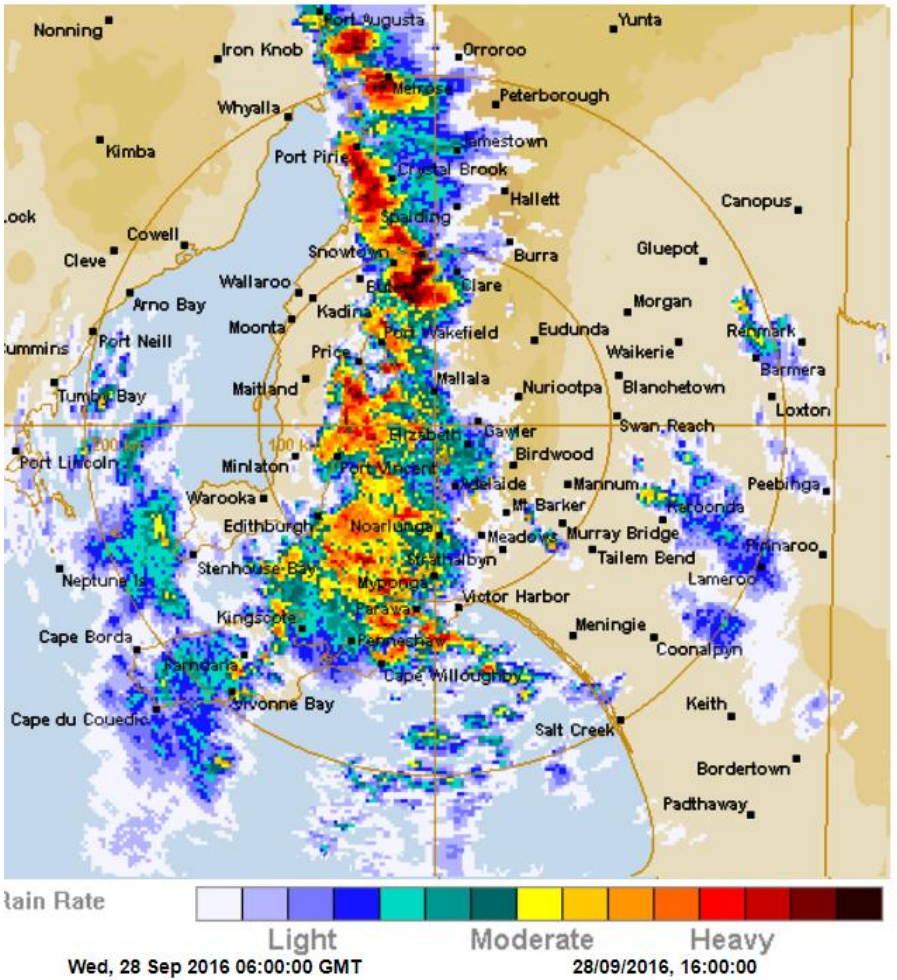
5 PM

- First lightning reported 15 mins earlier
- PyroCb convection ceases 30 mins later



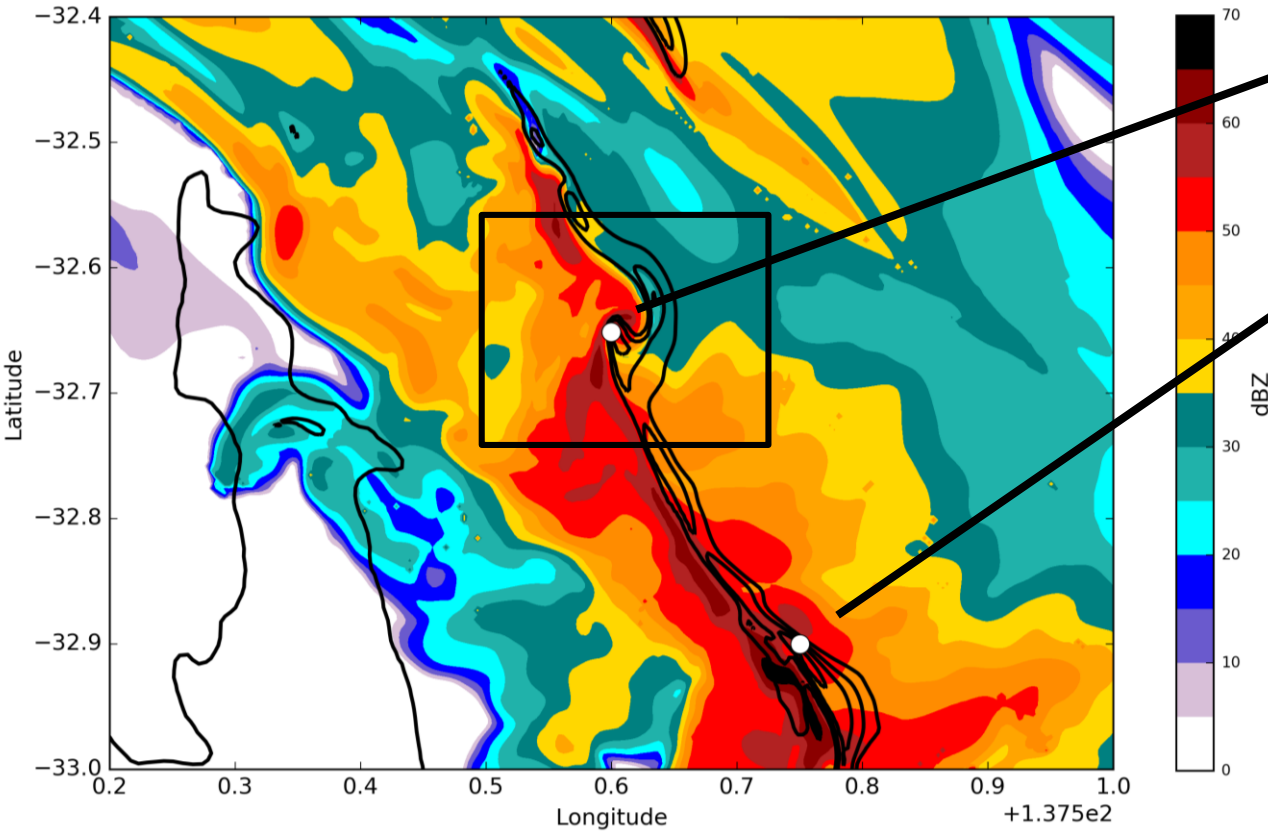
SA Tornado Outbreak

Actual rainfall rate (left) and 400-m simulated radar reflectivity (right)



0600 UTC 28 September 2016

Simulated radar reflectivity and upward vertical velocity (black contours)



- Hook-echo pattern (black box) indicates meso-cyclone and coincides with the location of one of the observed tornadoes.

Utilisation

Pyrocumulus

- Diagnostic can be derived from NWP data, will trial internally this summer with a view to a broader trial next year (highly feasible)

Tornado Outbreak

- Successful forecast is very exciting, what does this teach us about tornado predictability? (a bit blue sky-ish)

Ember transport

- Rejuvenated effort next year, aim to demonstrate prototype by end of year (feasible)

- Pyromaniac Cloud video released

<https://iview.abc.net.au/programs/weird-weather/RA1806H004S00>



ALL EPISODES



Weird Weather

How A Bushfire Can Turn A Cloud Into A Pyromaniac

Did you know that some of the most extreme bushfires can create pyromaniac clouds that make them that much more ferocious? They're called pyrocumulonimbus. Nate explains more weird weather.

ABC NEWS This episode was published 2 months ago.

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