


ARE BIG FIRES INEVITABLE?

Perspectives from the HighFire Risk Project

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An aerial photograph showing a massive fire with a complex, swirling pattern of smoke and fire. The smoke is dark and dense, forming a large, irregular shape that resembles a maelstrom. The fire is visible as a bright orange and red area at the bottom of the frame. The surrounding landscape is a mix of green and brown, indicating a forested area.

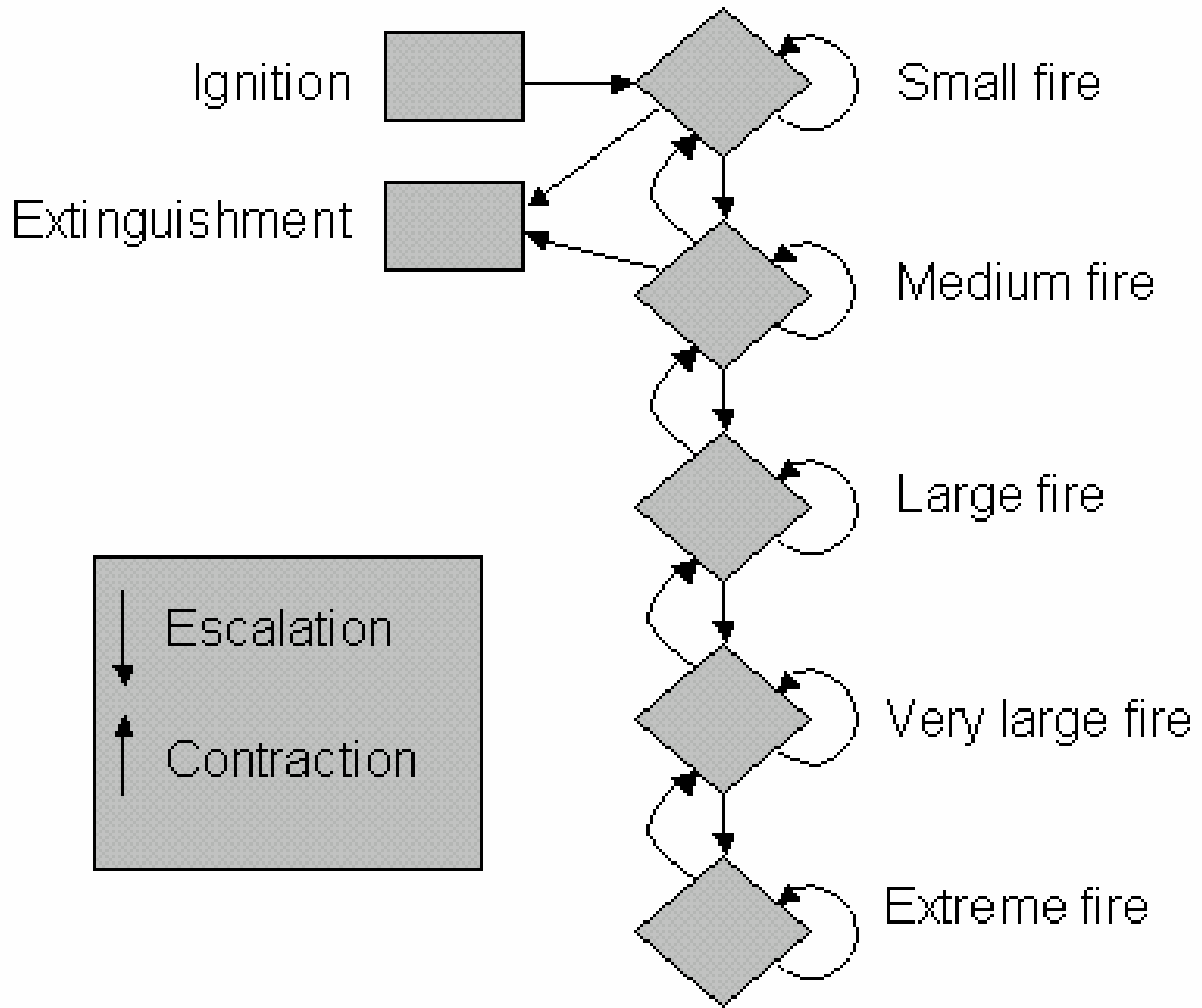
The Maelstrom (Flea Creek, Brindabella and Bendora Fires), 18 Jan 2003. Photo: Target Air Services Pty Ltd

- Black Mountain Tower





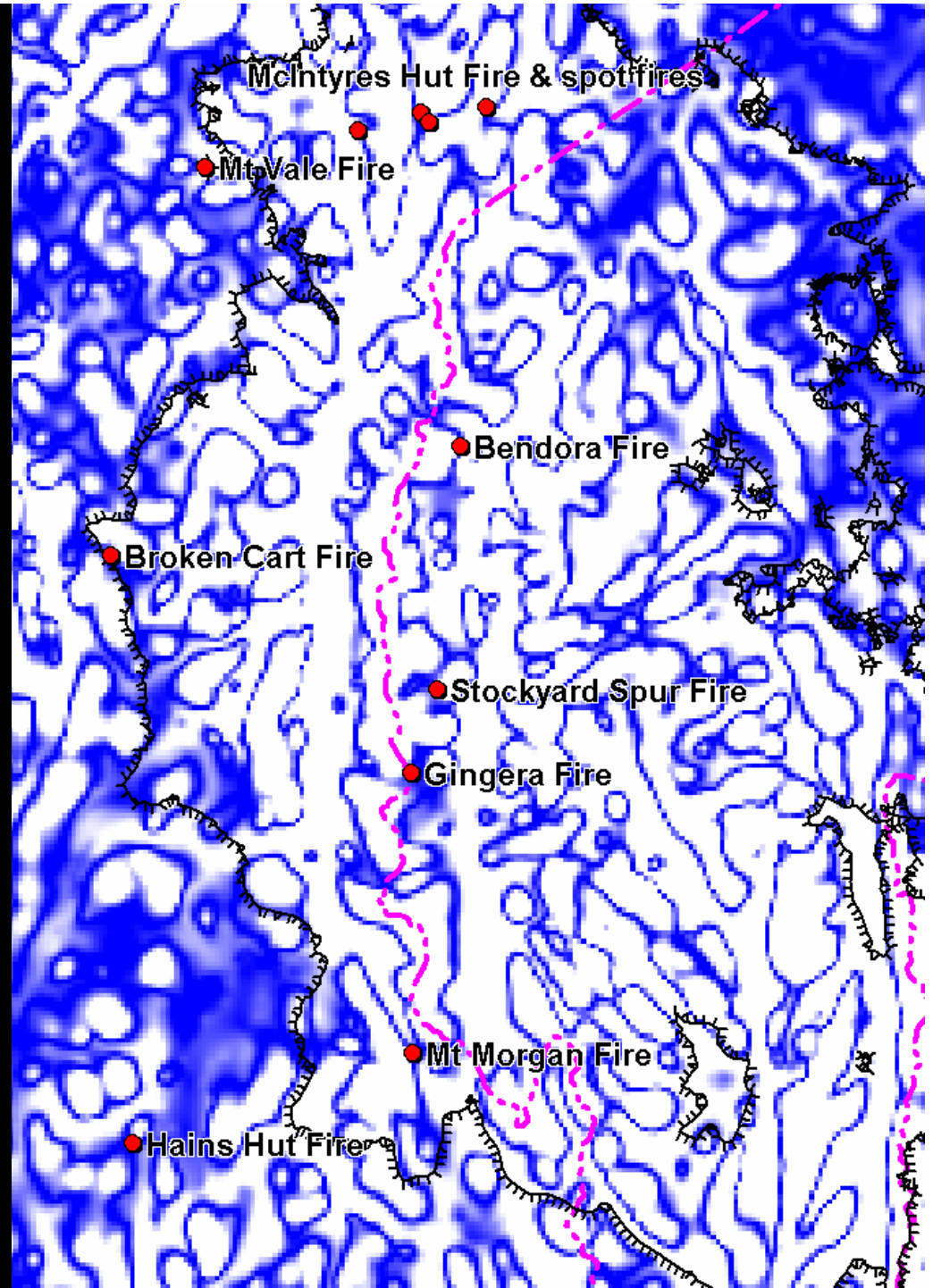
Rapid escalation of a spot fire in 5 minutes. Helicopters marked. [Wilkes]



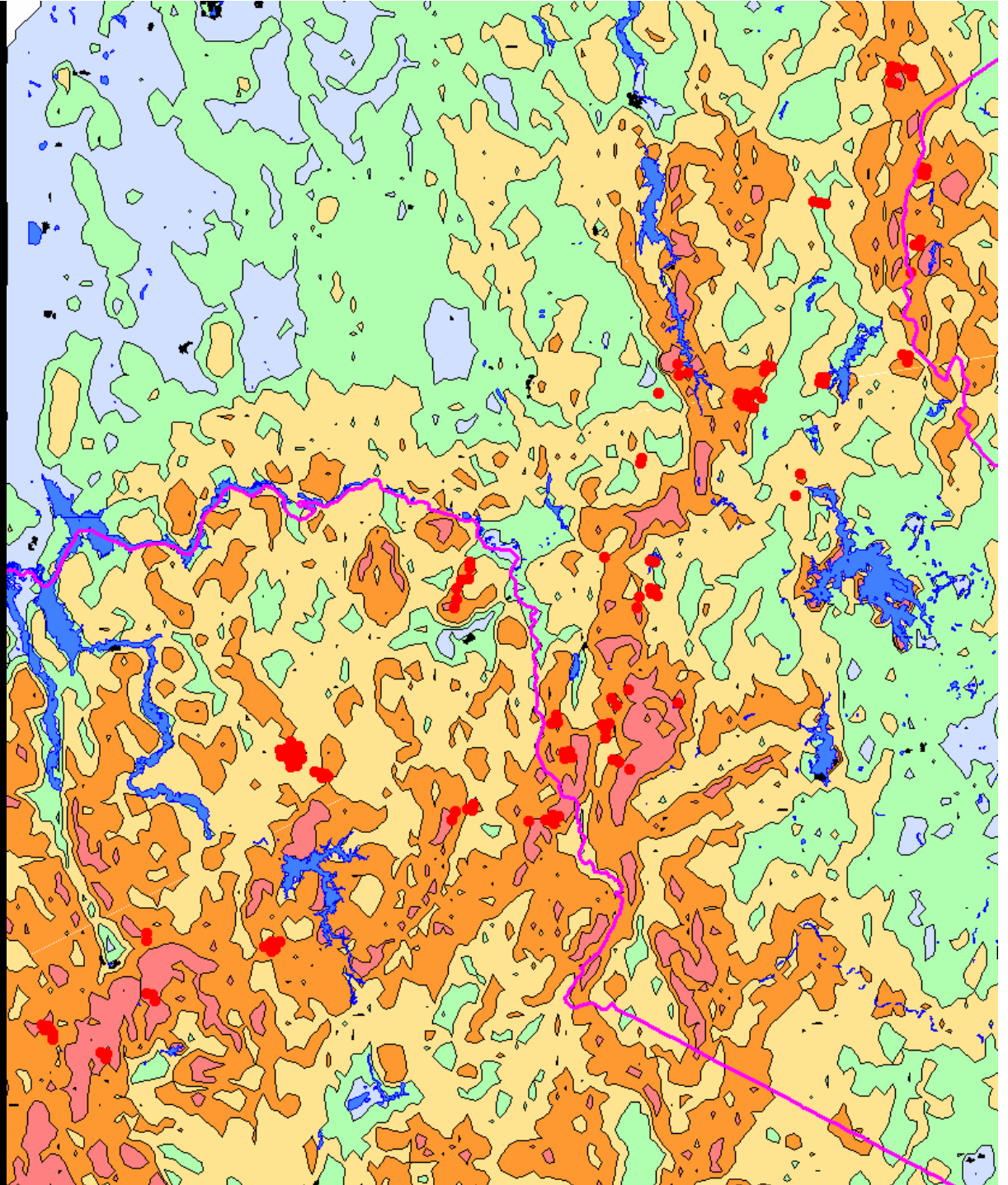
PROCESSES

- Ruggedness: in ignition and as a limiter
- Nocturnal low-level jets
- Dry slots
- Unusual combustion
- Violent pyro-cumulonimbus
- Mountain wind waves
- Föhn-like winds
- Dynamic channelling
- Terrain chimneys
- Plume-driven fire

Local-scale model of lightning-ignition prone areas (blue) and fires early in Jan 03 event (red). [McRae, BCRC]

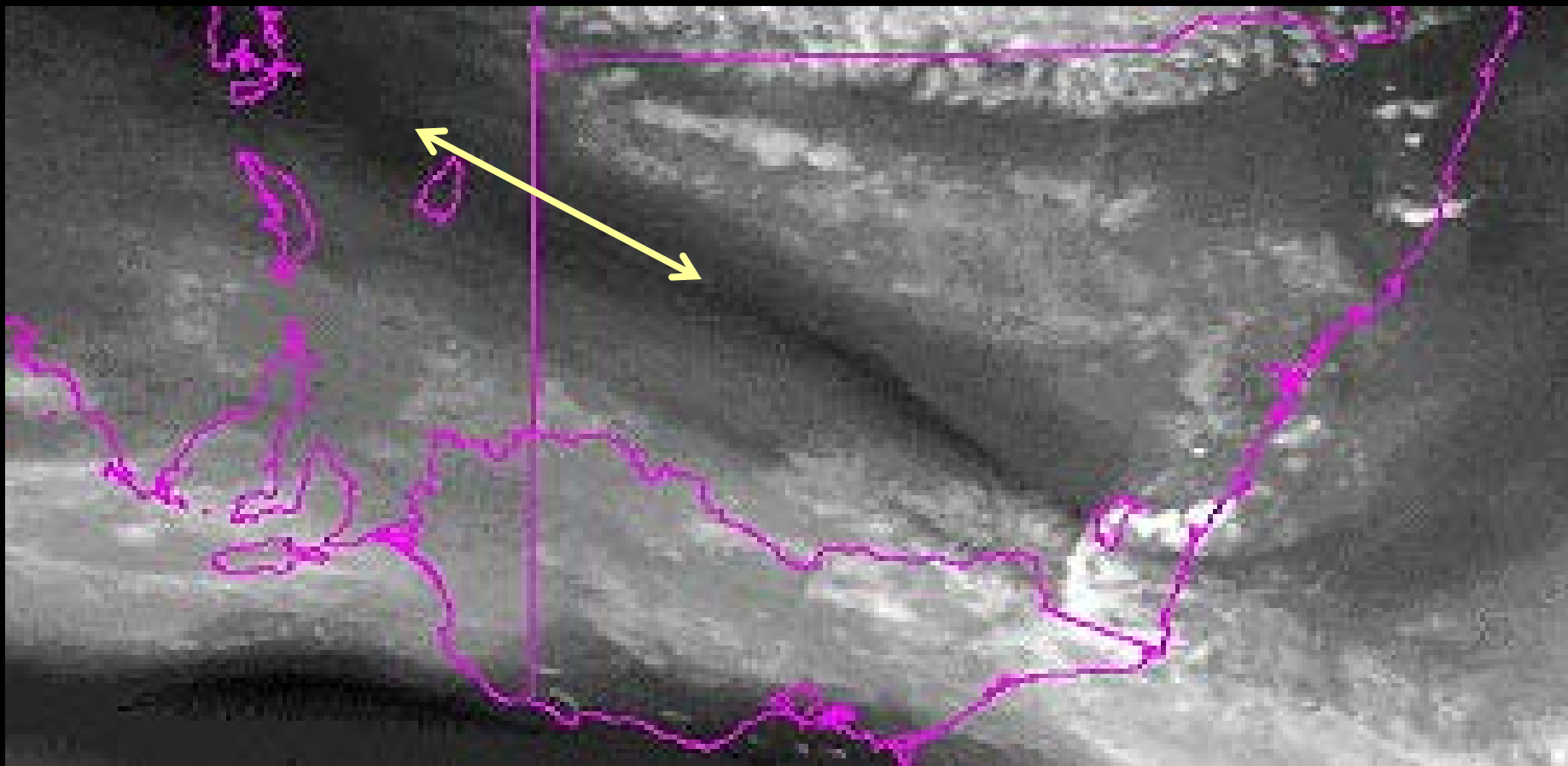


Ruggedness model of lightning-ignition prone areas (yellow, orange & red) and fires early in Jan 03 event (red dots). [McRae, BCRC]





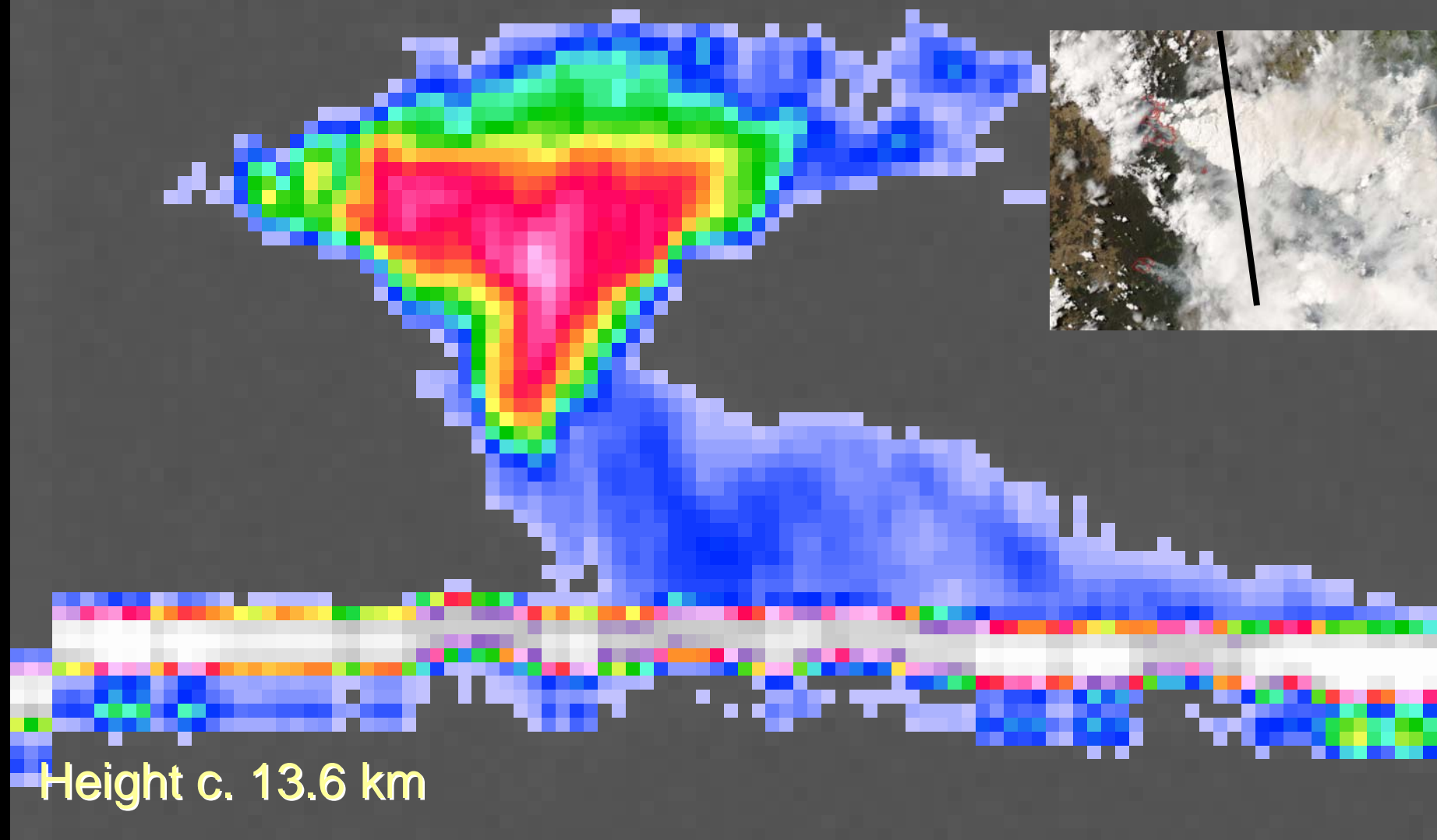
Early stages of
Gingera Fire, 10
Jan 03 [McRae]



Water vapor imagery, showing dry slot passing over Canberra Fires, 18 Jan 03, Mills, BoM]

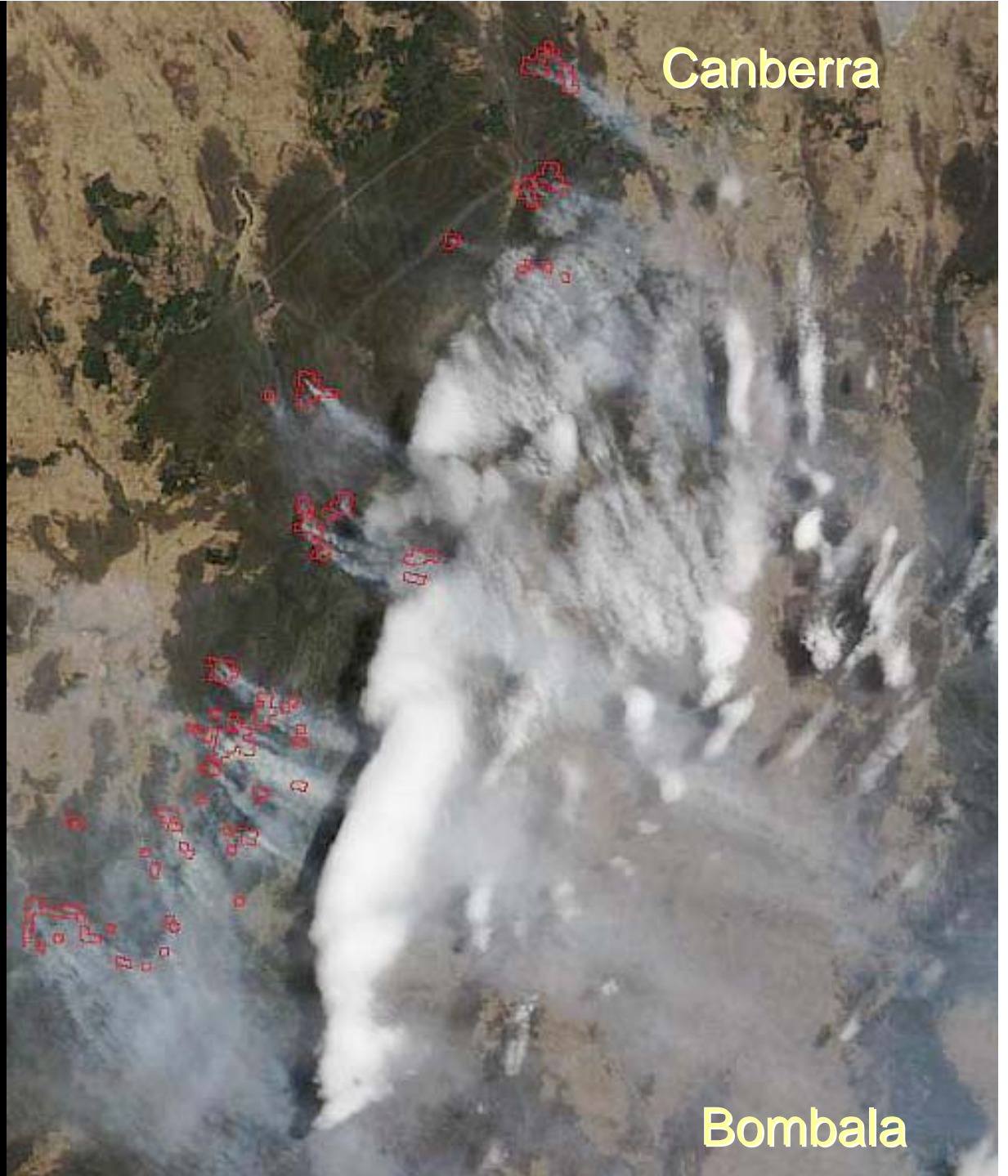


Intense ember storm on Canberra' s edge, 18 Jan 03 [Win TV].




Radar cross-section of pyroCb, Wollemi Fire, NSW [CloudSat]

Mountain wind waves in proximity to complex fires, 17 Jan 03. [MODIS]





Alpine fire driven by
a Föhn-like Wind,
May 05. [McRae]



A canyon that experienced eruptive fire behaviour – 4 years of regeneration. [McRae]

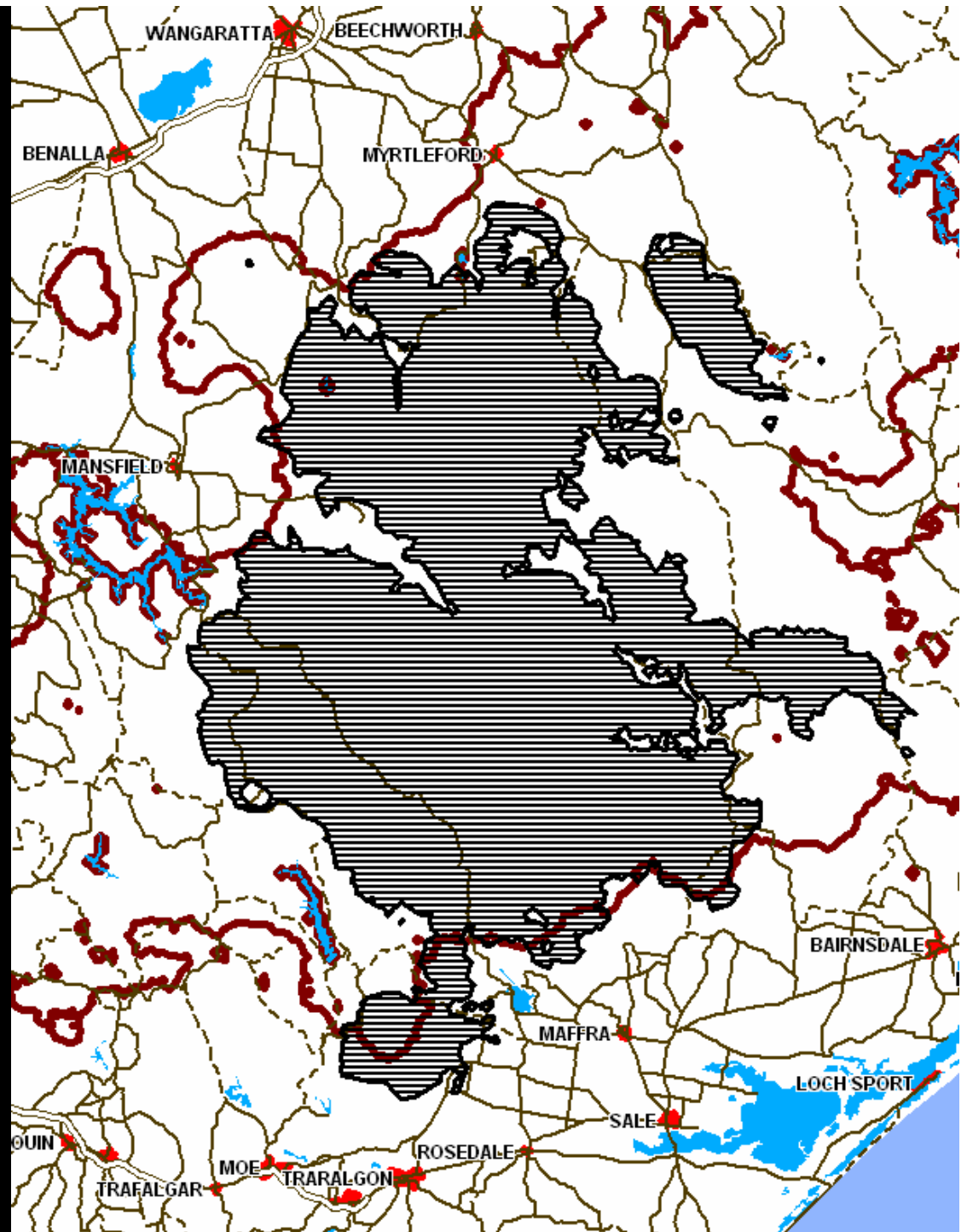


Aerial view of lee-slope channelling event accelerating fire laterally, 18 Jan 03 [Wilkes]

Detail of pyroCb at
20,000ft. [T.A.S.]



Comparison of evolution of Dec 06 Alpine Fires [MODIS data] and rugged areas (brown outline). [McRae, BCRC]



Infrared from distant fires at Thredbo reflected off clouds in their convection columns and off high-altitude lenticularis clouds. [Aust Govt].

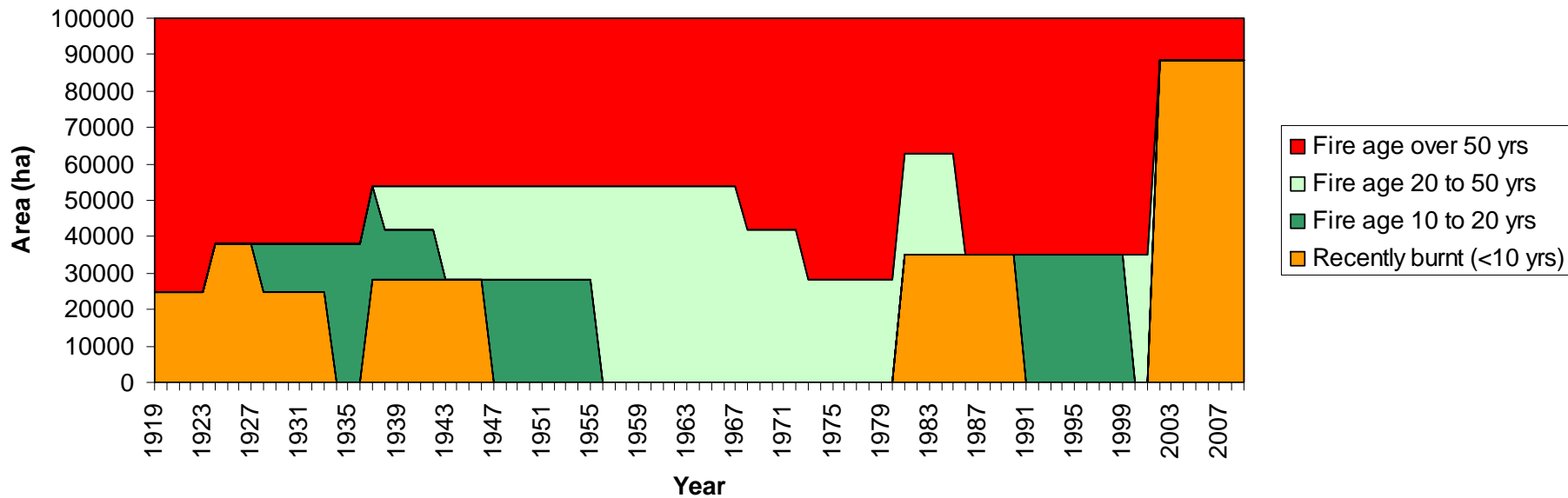


Lenticularis

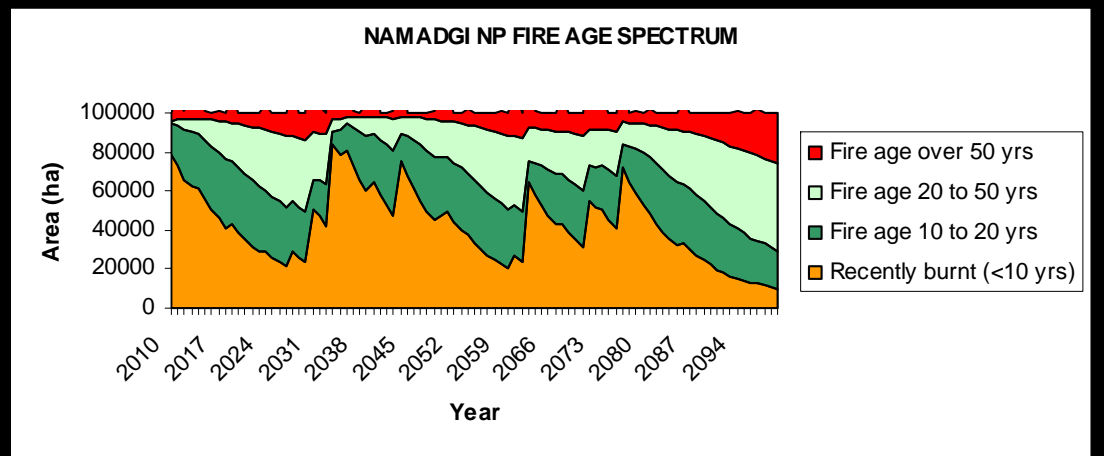
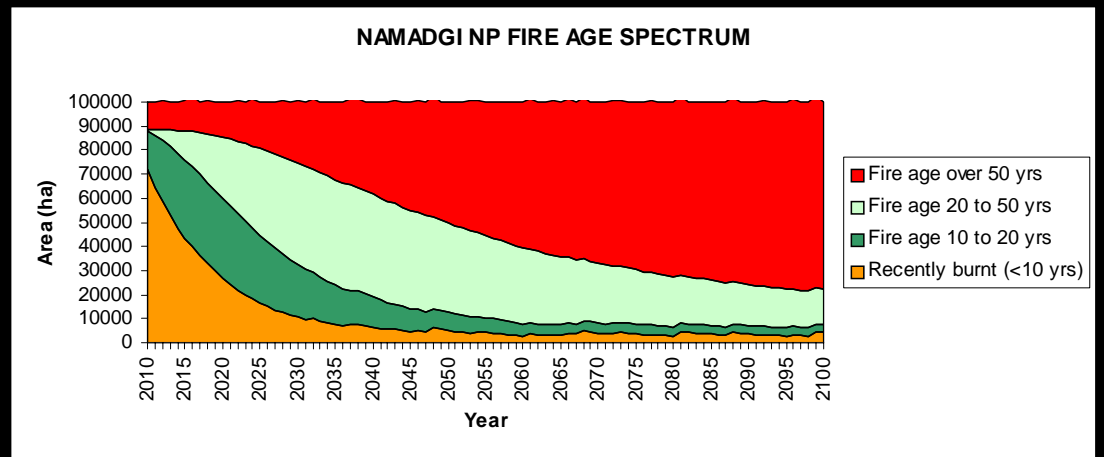
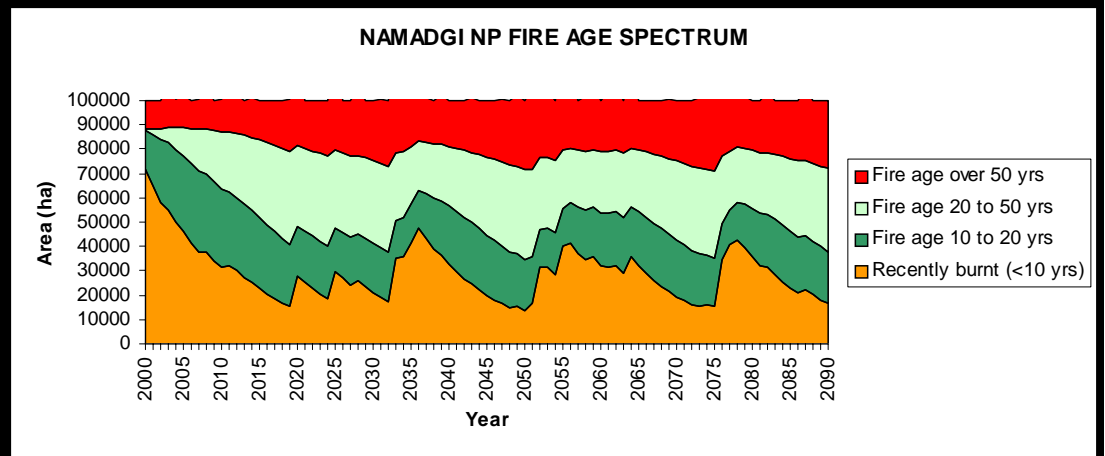
Pyro-Cu bases

Fires

NAMADGI NP FIRE AGE SPECTRUM



- Model runs showing effects of (1) optimal burning, (2) too little burning and (3) too much burning.

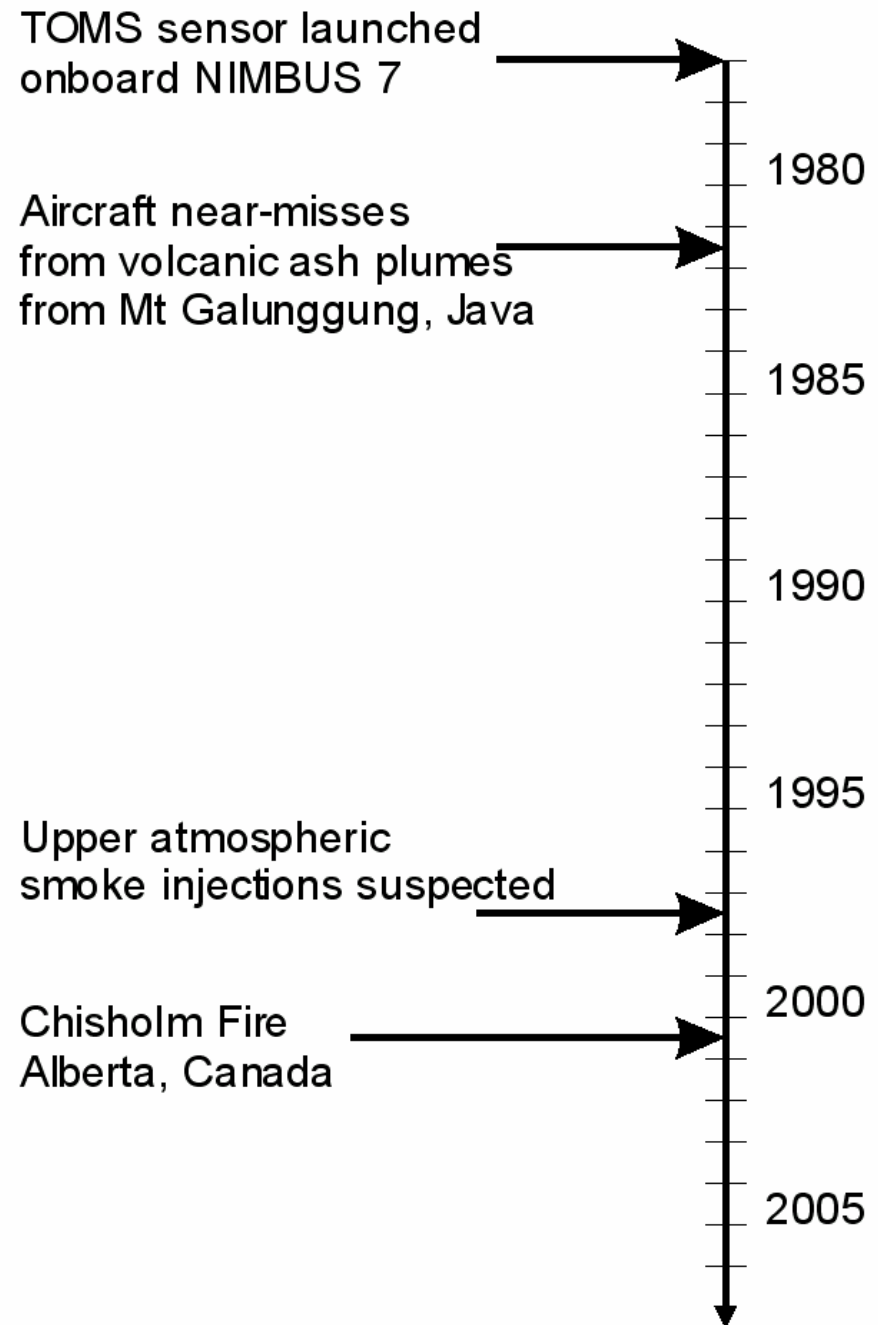


SUMMARY

- In particular, the high country exhibits the following characteristics:
 - A landscape that is prone to multiple ignitions in places where fire suppression is most difficult.
 - A landscape that is prone to a range of processes that can affect the probabilities of fire escalation.
 - A landscape that stores the effects of past large fires in the landscape-scale fuel-age distribution
 - the last big fire primes the landscape for the next one.

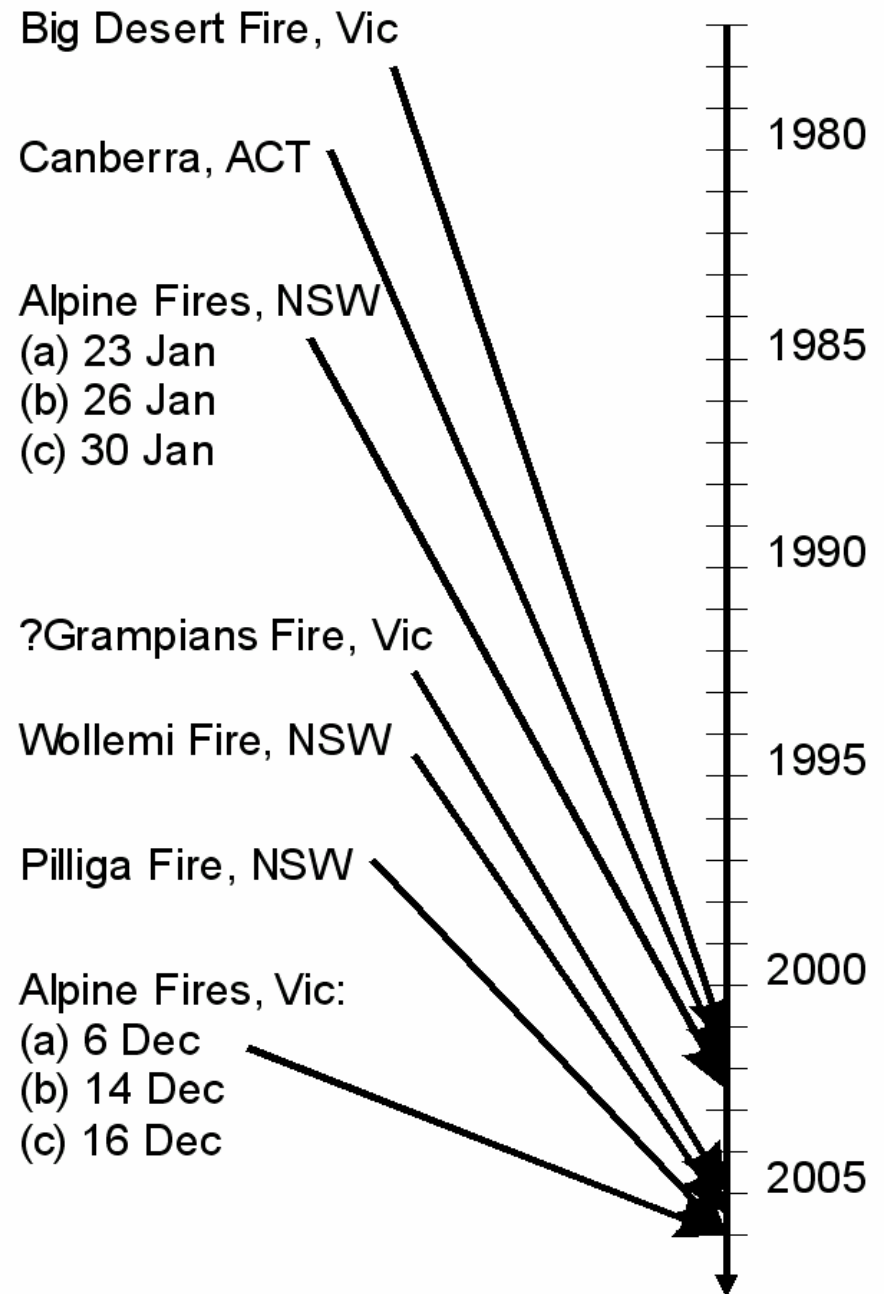
Global pyroCb hunt

- Chisholm = first confirmed pyroCb and UTLs injection



Aust pyroCb data

- Canberra = first well observed case study & first validation of “nuclear winter” hypothesis.
- 1983 Ash Wednesday did not earn a place on this list.



QUESTIONS?