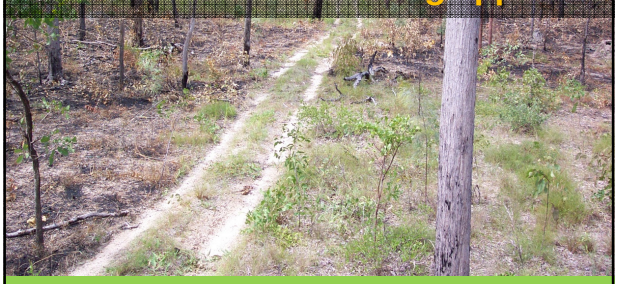
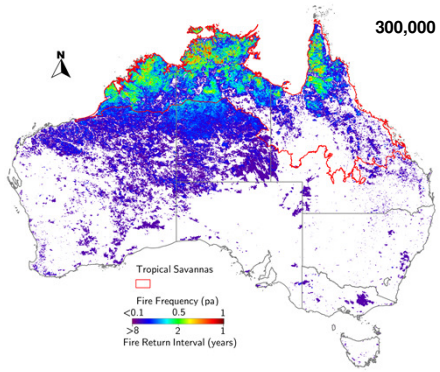
Estimating sub-pixel patchiness of wildfires in Australia using MODIS data and a linear un-mixing approach



Stefan W Maier
Charles Darwin University, Darwin, Australia

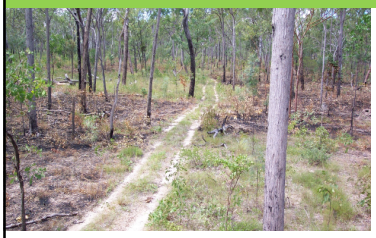
Fires in Australia – Fire Frequency (1997-2011)



Maier, S. W. & Russell-Smith, J. (2012). Measuring and Monitoring of Contemporary Fire Regimes in Australia using Satellite Remote Sensing. In *Flammable Australia: fire regimes, biodiversity and ecosystems in a changing world.*

Fire is not Fire

Spatial Scale of Patchiness



on-ground transects within fire perimeters:

83% (EDS) / 93% (LDS) burnt

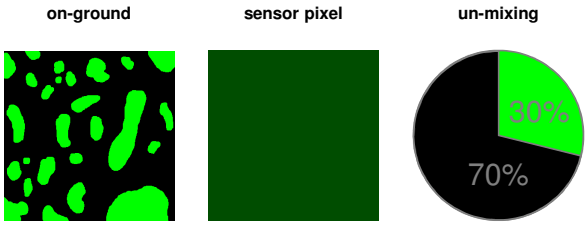
87% (EDS) / 89% (LDS) of unburnt patches are ≤ 5m

Oliveira, et al. (2015). Ecological Implications of Fine-Scale Fire Patchiness and Severity in Tropical Savannas of Northern Australia. *Fire Ecology*, 11, 10-31.

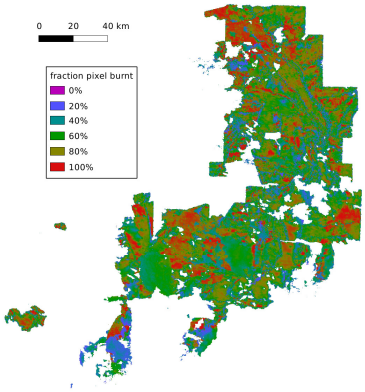
Temporal Constraints 1/2

Temporal Constraints 2/2

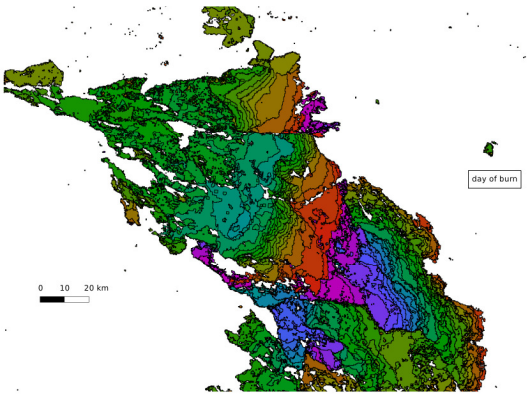
Spectral Un-Mixing



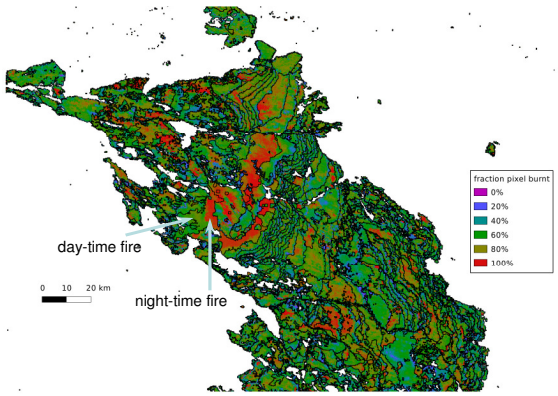
Example 1 Tropical Savanna Northern Australia



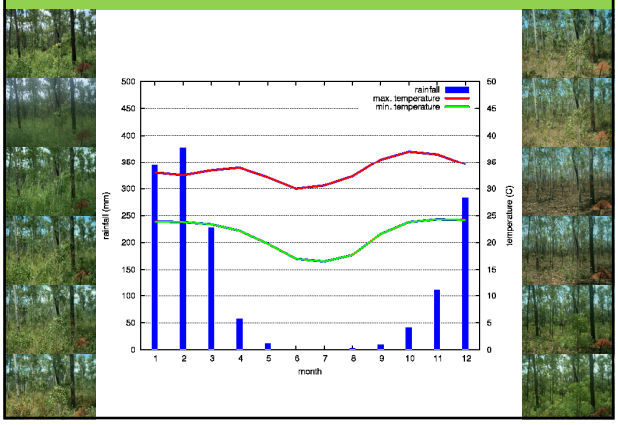
Example 2 Tropical Savanna Northern Australia – Day of Burn



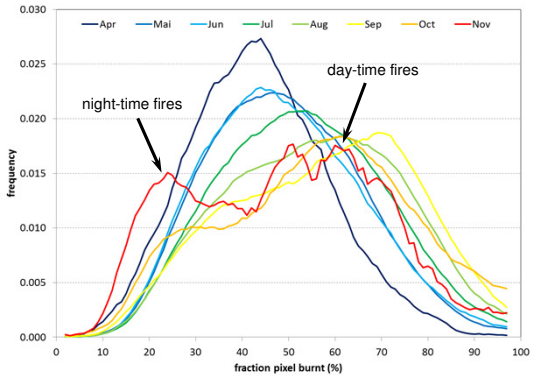
Example 2 Tropical Savanna Northern Australia – Fraction Pixel Burnt



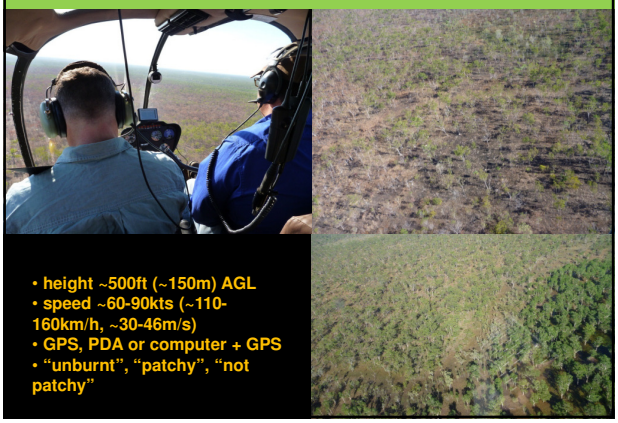
Example 3 Tropical Savanna Northern Australia – Background



Example 3 Tropical Savanna Northern Australia – Seasonality

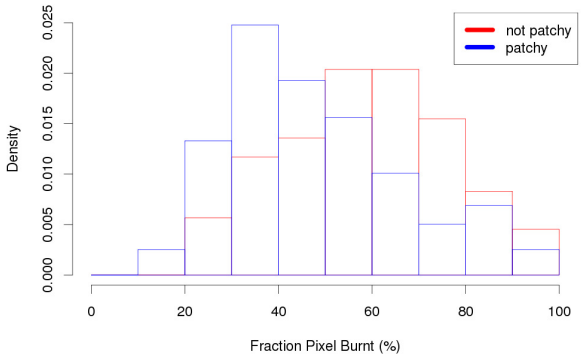


Qualitative Validation – Helicopter Transects



- height ~500ft (~150m) AGL
- speed ~60-90kts (~110-160km/h, ~30-46m/s)
- GPS, PDA or computer + GPS
- "unburnt", "patchy", "not patchy"

Qualitative Validation – Results



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