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**HAZARDS**CRC

# DETERMINING THRESHOLD CONDITIONS FOR EXTREME FIRE BEHAVIOUR

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NSW Rural Fire Service

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Australian Government  
Department of Industry,  
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THE UNIVERSITY OF  
MELBOURNE

# EXTREME FIRE BEHAVIOURS



Spotting/fire storm



Fire tornado/whirls



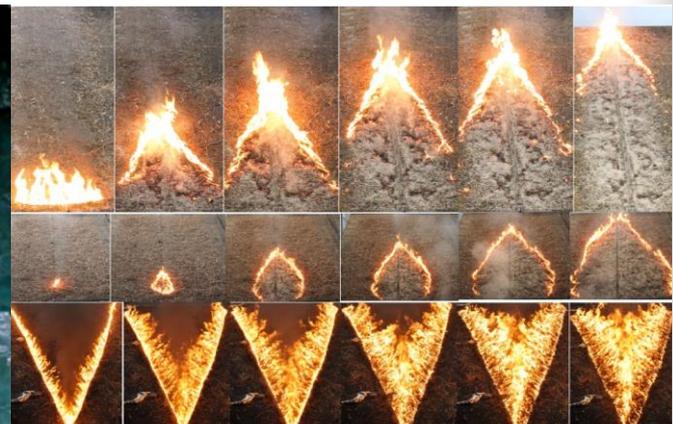
Pyro-convective events



Crown fires

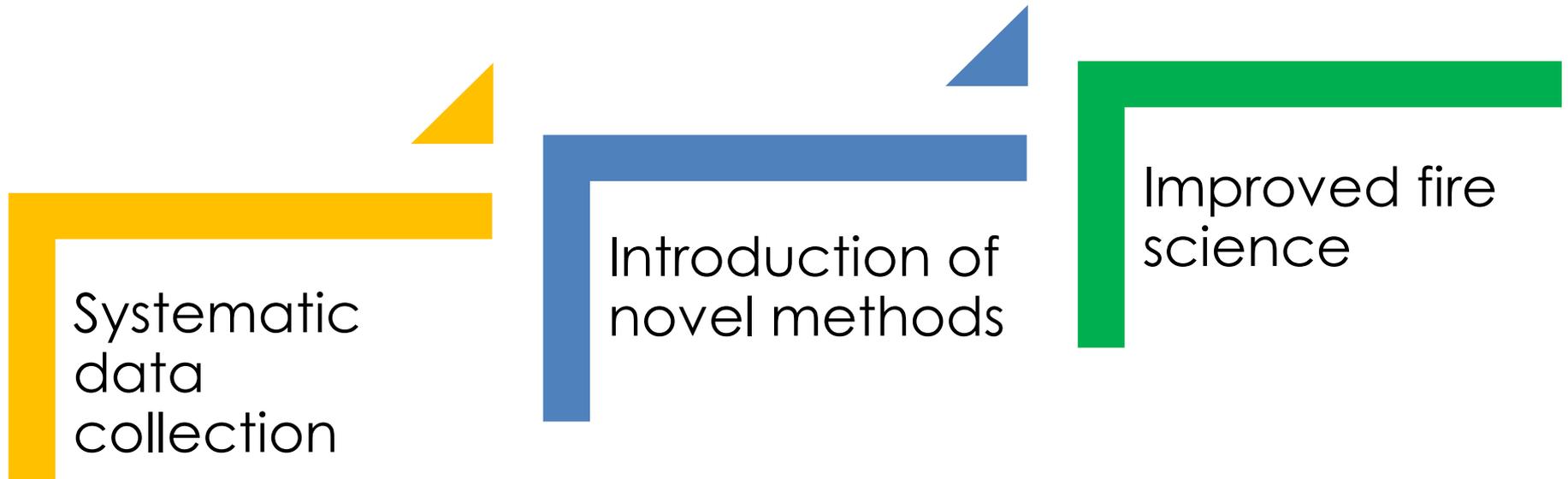


Conflagrations



Junction zones/Eruptive fires

# IMPROVING DATA OBTAINED FROM WILDFIRES



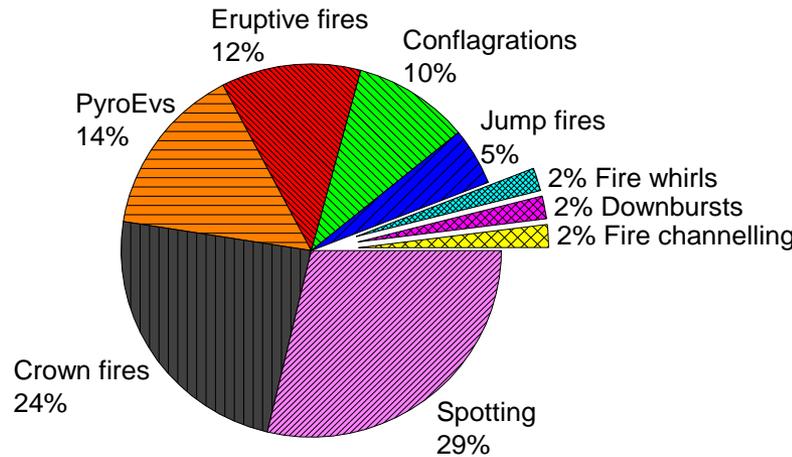
- Ground observations and operational information;
- Linescans;
- Forward Looking IR;
- Aerial observers;

- Satellites;
- Remote weather observations
- UAV observations;
- Vehicle/aircraft GPS tracks; and
- Suppression strategies.

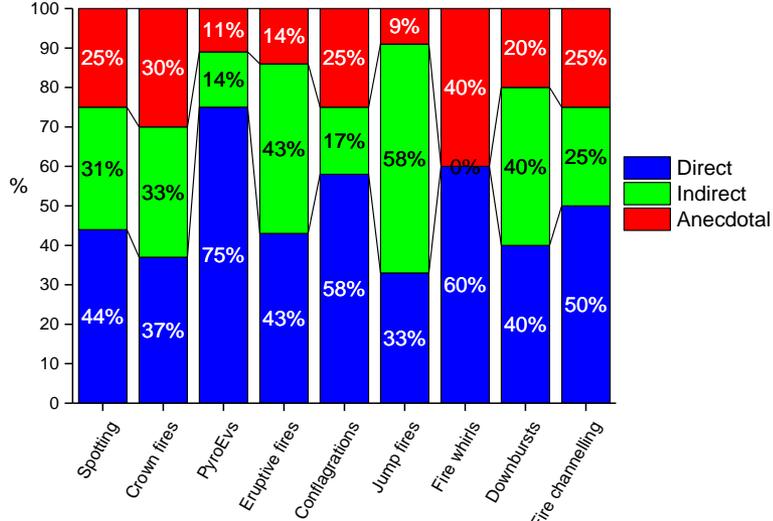
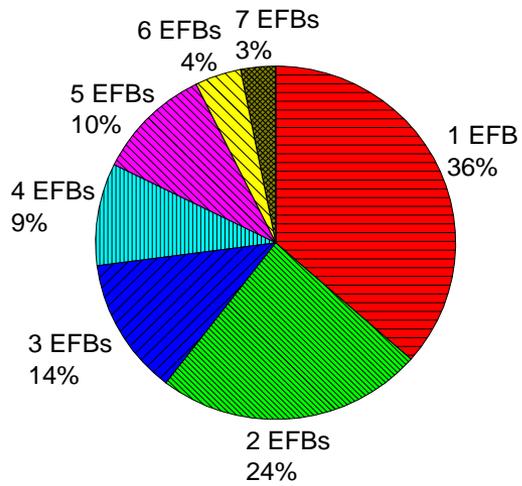
Filkov AI, Duff TJ, Penman TD (2018) Improving fire behaviour data obtained from wildfires. *Forests* **9**. doi:10.3390/f9020081

# FREQUENCY OF EXTREME FIRE BEHAVIOURS IN FOREST ENVIRONMENTS

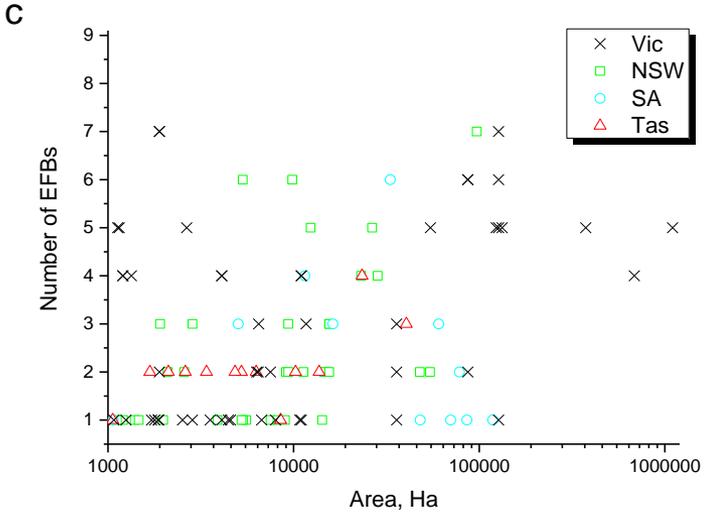
Relative frequency of each EFB form



Percentage of fires with different quantities of different EFBs

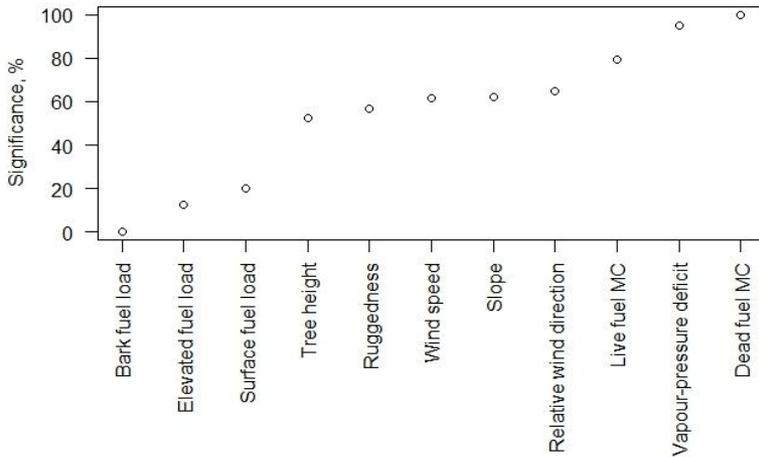


Comparison of EFBs distributions for different data type

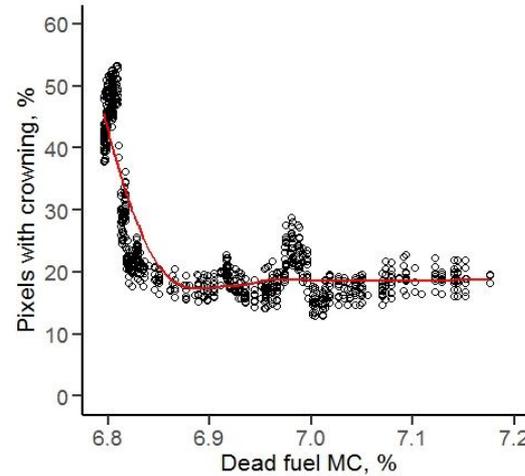


Number of EFBs versus fire area for four states

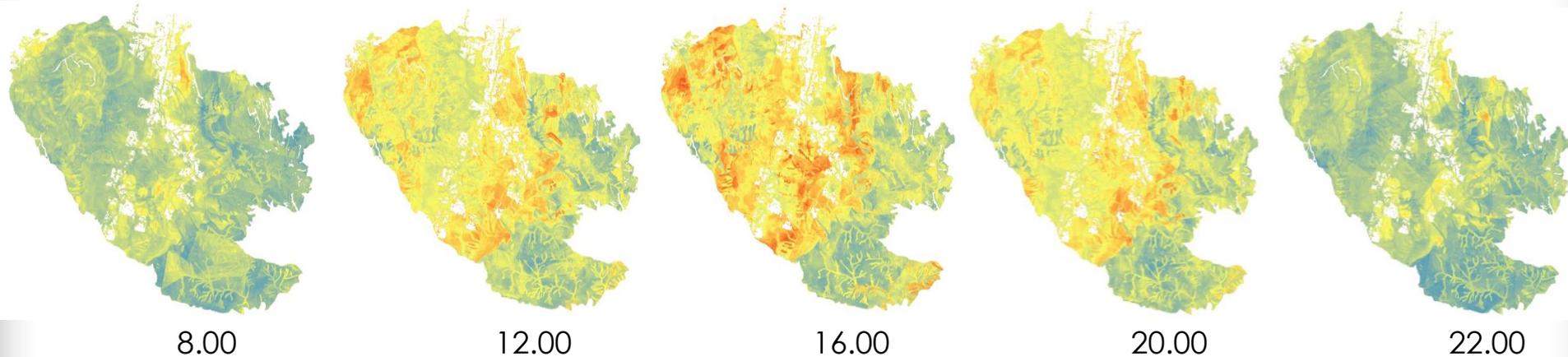
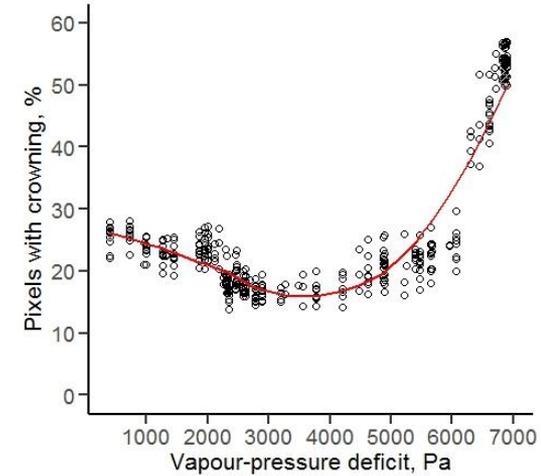
# THE DETERMINANTS OF CROWN FIRE RUNS DURING EXTREME WILDFIRES IN BROADLEAF FORESTS IN AUSTRALIA



*Importance of predictor variables for the prediction of crown fire extent*



*Influence of predictor variables on crown fire extent*



*Four hour forecast for Murrindindi fire on February 7<sup>th</sup>*

# UTILISATION OUTPUTS

## Obtained

- *Set of suggested optimal data collection protocols*
- *Prioritisation of extreme fire behaviours*
- *Model for forecasting of crown fire potential at hourly to daily scales*

## Expected

- *Development of guidelines for identifying environmental conditions causing the extreme fire behaviour phenomena during operational fire behaviour analysis.*
- *Development of quick-reference materials for operational guidance*

**THANK YOU!**