

National Environmental Science Programme

#### Met Office

Global mean temperature difference from 1850-1900 (°C)





### Climate change and fire weather in northern Australia

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# Forest fire danger index

- Used for daily fire danger rating, based on fire weather conditions
- Combines
  - maximum temperature
  - drought factor, rainfall
  - wind speed
  - relative humidity
- Range 0 to 100+, severe 50-74, extreme 75-99, catastrophic >100
- Does not include ignition source or fuel load
- Grassland fire danger index (GFDI) includes grass curing, more relevant to NA savanna





Earth Systems and Climate Change Hub



### **Observed trends in fire weather**



There has been an increase in the number of days with dangerous weather conditions for bushfires.

This is based on the change in the annual (July to June) number of days between the two periods:

July 1950 – June 1985 and July 1985 – June 2020, that the Forest Fire Danger Index exceeds its 90th percentile.



State of the Climate, 2020

### Max T deciles for Dec 2019

 Record high temperature across Australia in 2019, due to climate change



 Record low Australian rainfall in 2019, mainly due to natural variability

# Future fire danger

Projected changes in the number of days with dangerous fire weather conditions

- From global climate models (GCMs) and regional climate models (CCAM, WRF)
- shown for two measures of severity
- high emission scenario
- 2060-79 relative to 1990-2009

Also need to account for changes in ignition sources and fuel loads

 Projected increase in dry lightning in some regions



# **Climate change impacts on fires**

Changing fire seasons



Drier fuel

Increased chance of lightning



### References

- NESP ESCC Hub brochure *Bushfires and climate change in Australia, 2019* <u>http://nespclimate.com.au/wp-</u> content/uploads/2019/11/A4\_4pp\_brochure\_NESP\_ESCC\_Bushfires\_FINAL\_Nov11\_2019\_WEB.pdf
- Bushfires and climate change Q&A with Dr Michael Grose, ECOS, 2020 <u>https://ecos.csiro.au/bushfires-and-climate-change-qa/</u>
- CSIRO & Bur of Met State of the Climate 2020
   <u>https://www.csiro.au/en/Showcase/state-of-the-climate</u>
- Aust Academy of Science The science of climate change: Questions and answers, 2015 <u>https://www.science.org.au/climatechange</u>

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