Spatially Distributed Fire Warning Thresholds and its Application to Canadian Fire Weather Index and FFDI

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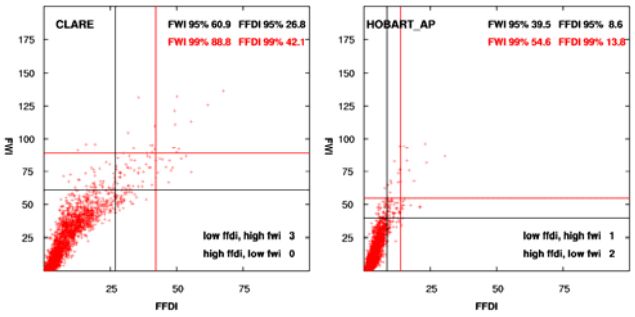
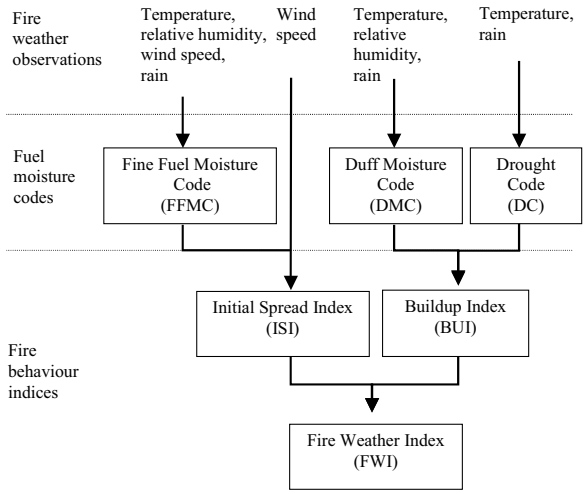
The Bureau of Meteorology's operational McArthur Forest Fire Danger Index uses a set of defined fire danger thresholds from low to extreme. The Australia wide threshold for a fire weather warning to be issued is 50. However, in Tasmania this threshold has been lowered to 24 because significant fire activity occurs with this level of FFDI. This poses the question of how statistically-extreme FFDI may vary across the country.

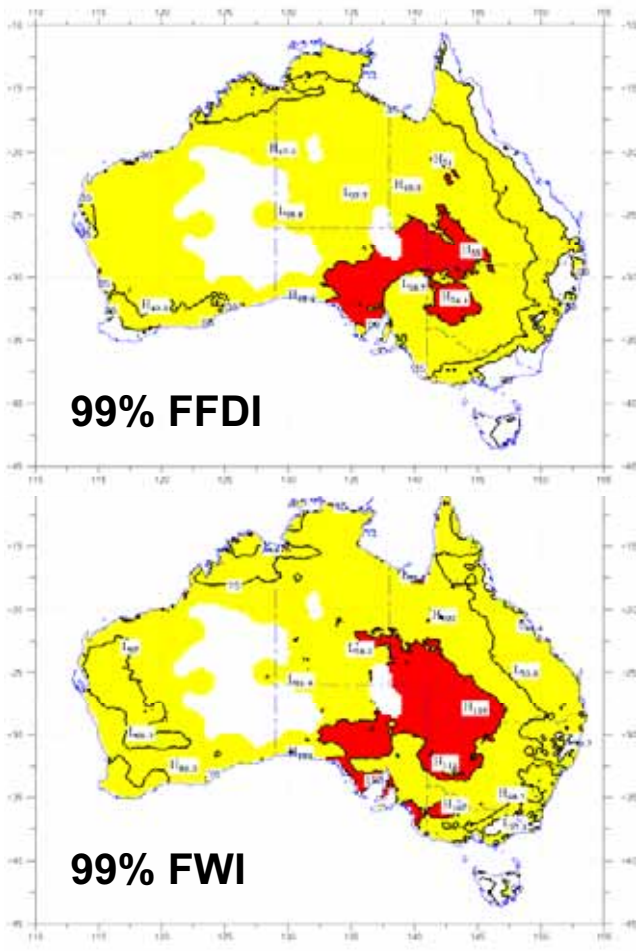
Using gridded analyses of rainfall and maximum temperature observations and numerical weather forecast fields of relative humidity, wind speed and noon temperature, daily fields of FFDI and of the Canadian Fire Weather Index have been calculated for the last six years. The FWI thresholds developed for Canadian vegetation and climate conditions are not applicable in Australian conditions, and so require calibration. Choosing a number of station points, plotting FWI against FFDI shows a strong correlation, but varying slopes, as seen for Clare and Hobart (below).



Description of the Canadian Fire Weather Index



Taking spatially and climatically varying factors into account a frequency approach could be taken to propose warning thresholds for fire danger indices. As an example, spatially distributed extreme threshold at the 99 percentile level for the FFDI and the FWI are shown below. Patterns are quite similar, but the greater sensitivity of FWI to wind speed is seen in coastal areas.



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