

Bureau of Meteorology Atmospheric high-resolution Regional Reanalysis for Australia (BARRA)

Kununurra, Western Australia
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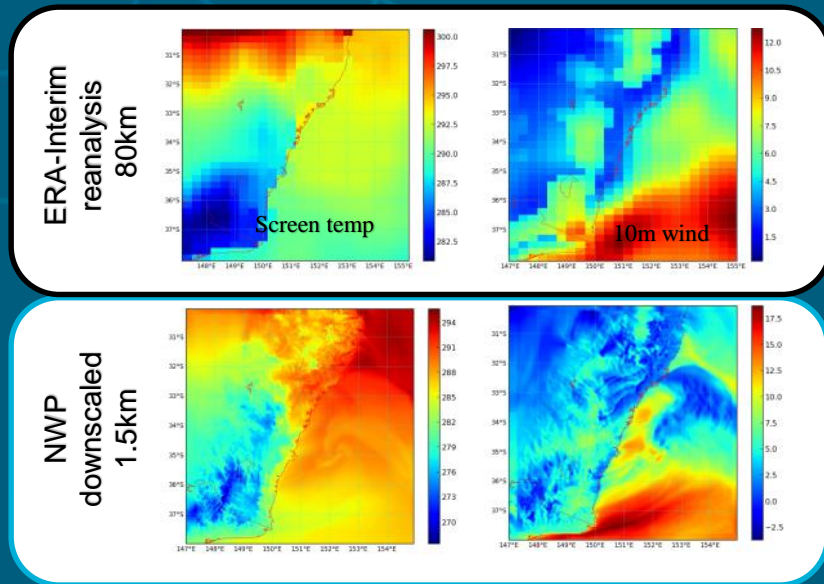


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What is an atmospheric reanalysis?

- Best historical, 4-dimensional (lat, lon, height, time) description of the atmosphere, produced by optimally combining many observations and best model physics in retrospective (i.e. an "analysis")
- Use of standardised methods (analysis scheme and physical models) to perform this "analysis" with all available observations
- Temporal consistency of methods will lead to consistency in the data so that the data is suited for defining climatology, anomalies, trends, and event likelihood



Global reanalyses are very coarse (80 km+)
NWP analyses are not suited to climate studies



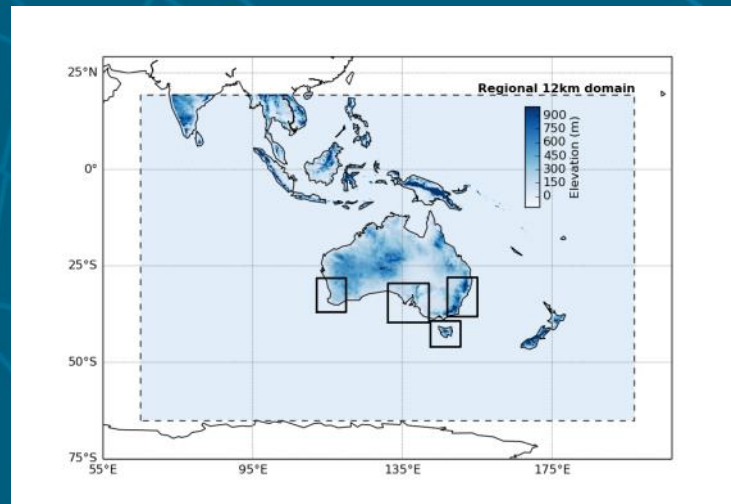
Domain, resolution and technical details

BARRA12

- 12 km reanalysis system, with deterministic 36km 4dVAR, L70 (80km top), Reanalysis period 1990-2016 (27 years). Pre-1990 reanalysis by NIWA (Stuart Moore).
- Start production from March 2017, expected to complete by May 2019.
- Current throughput is 6 years of reanalysis per 6 months clocktime.

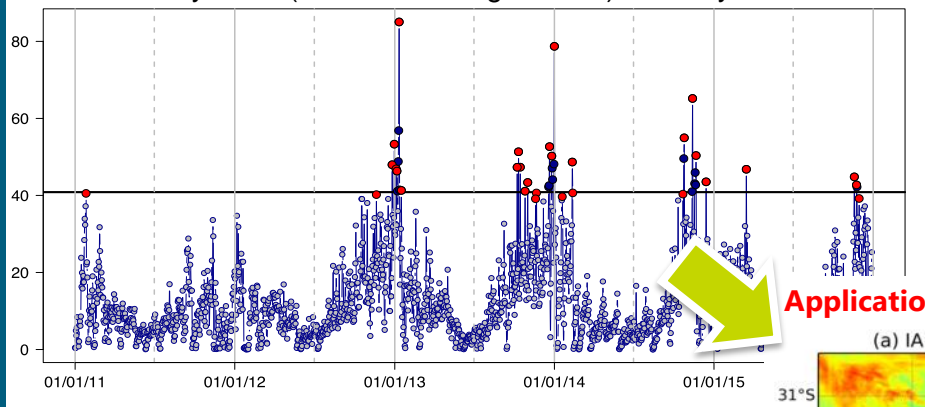
BARRA-SY (eastern NSW), BARRA-TA (Tasmania), BARRA-AD (South Australia), BARRA-PH (part of Western Australia)

- four 1.5km downscaling systems, nested within BARRA12



Application for NSW: Return periods of forest fire danger

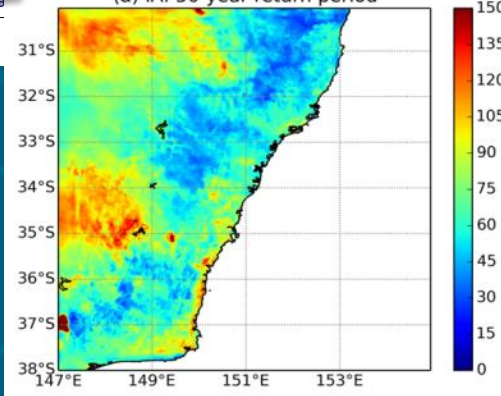
DATA: Daily FFDI (Forest fire danger index) from 5-year IA



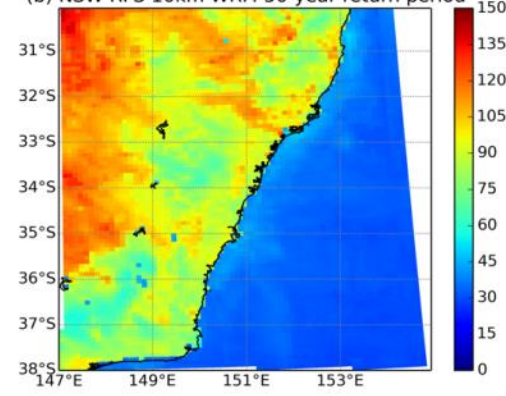
Based on Initial Analysis (2011 to 2015)

Application: Extreme value analysis for risk assessment

(a) IA: 50-year return period



(b) NSW-RFS 10km WRF: 50-year return period



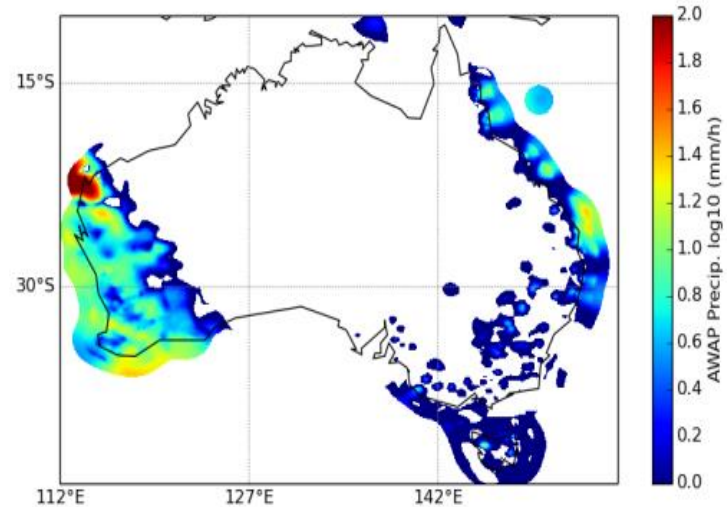
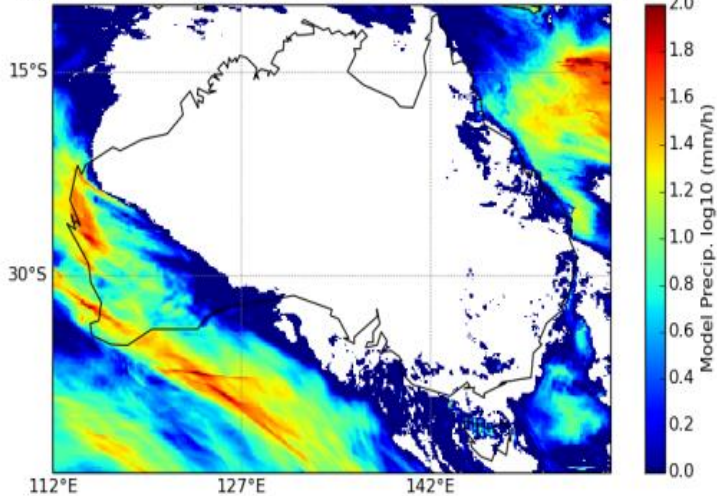
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Based on 2011-2015
1.5 km IA

Based on 1985-2008
10 km WRF data

Application of reanalysis: gridded rainfall

Base 2010/06/15 18h, Valid at 2010/06/15 00h-2010/06/16 00h



Comparisons of modelled daily rainfall from BARRA12, against daily rainfall (AWAP).



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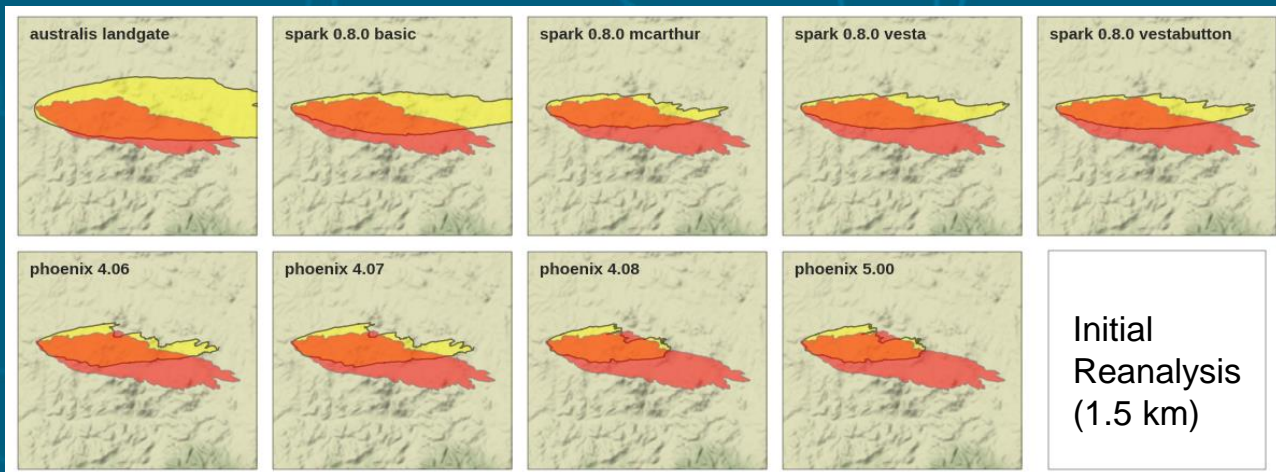
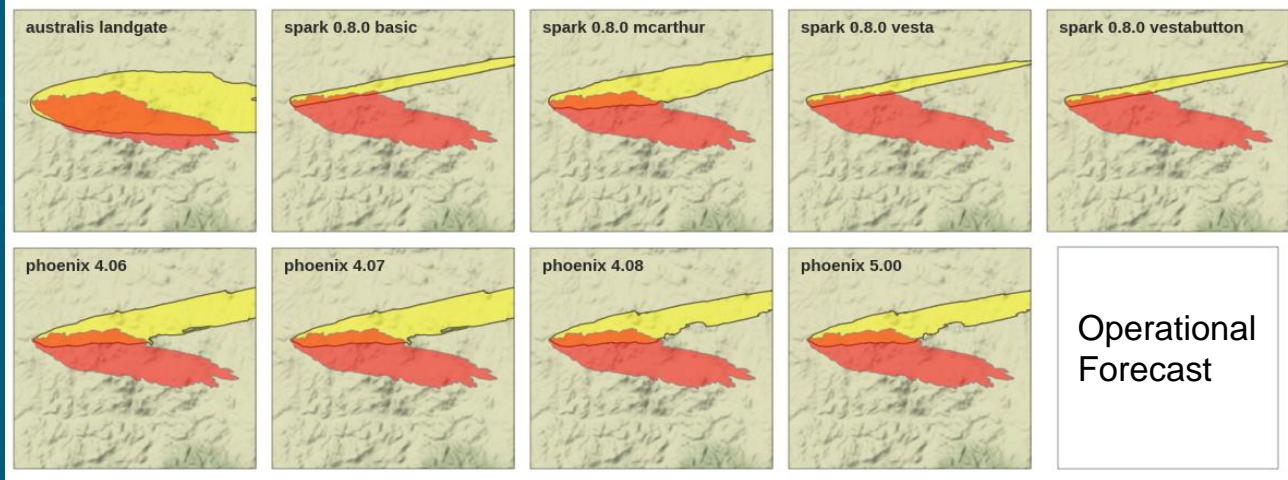
Based on reanalysis at 12 km resolution

Application of reanalysis: fire simulation

Comparison of simulated and observed fire behaviour for Cobbler Road fire (NSW, 8 Jan 2013). Yellow indicates the simulated fire scar while orange shows the observed.

Top: Simulations based on
Operational Forecast

Bottom: Simulations based on
hourly reanalysis data at 1.5 km
resolution



Thank you

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Further information:

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