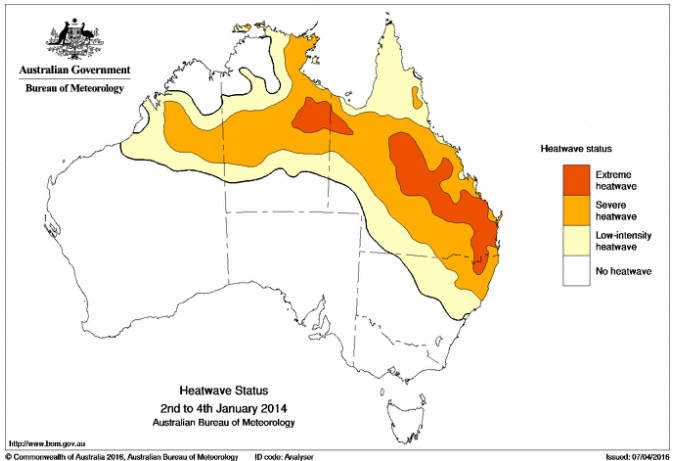
Australia's National Heatwave Service

mapping increasing severity

International Congress of Biometeorology, Durham September 2017

John Nairn
Australian Bureau of Meteorology
University of Adelaide



Acknowledgements

- Prof Bertram Ostendorf — University of Adelaide (supervisor)
- Prof Peng Bi — University of Adelaide
- Robert Fawcett — Bureau of Meteorology R&D, High Impact Weather Team
- Debra Hudson — Bureau of Meteorology R & D, Seasonal Prediction and Climate Variability

John Nairn

State Manager South Australia
Bureau of Meteorology
National Heatwave project Director
Churchill Fellow (heatwaves)

Australian Government
Bureau of Meteorology

building Australia's national heatwave service

Requirements

- need
- method
- product
- warnings
- tailoring

Participants

- health and emergency services partners
- research partnerships
- health, emergency services, and media stakeholders
- health and emergency services partners
- any customer

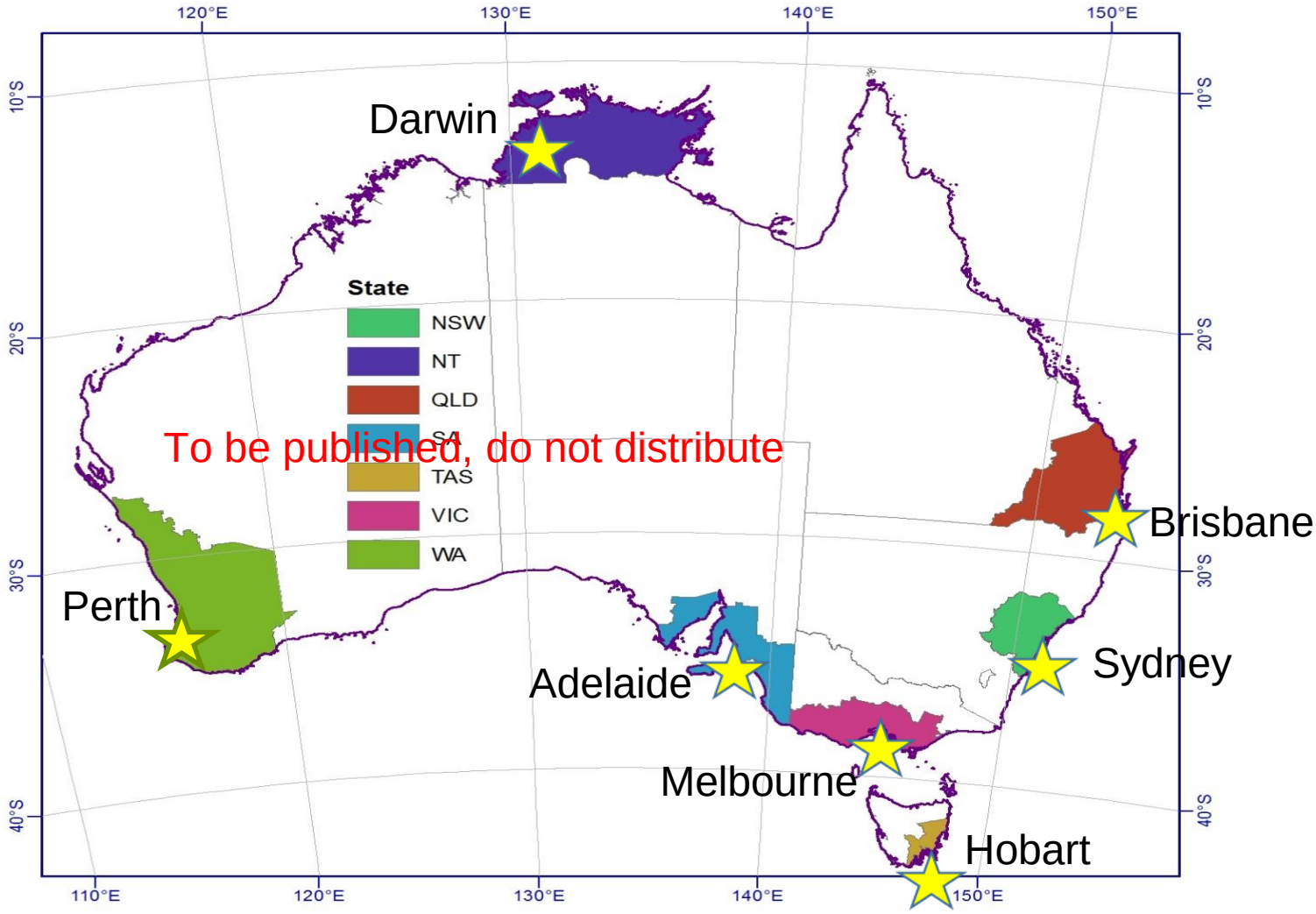
Response

- service demand
- collaborative publications
- pilot service (OCF) maturity
- service alignment with all hazards warning framework
- multi-format services

NEED

Australian Governm
Bureau of Meteorolog

capital city
regional
climate trends
for heatwave
severity



NEED

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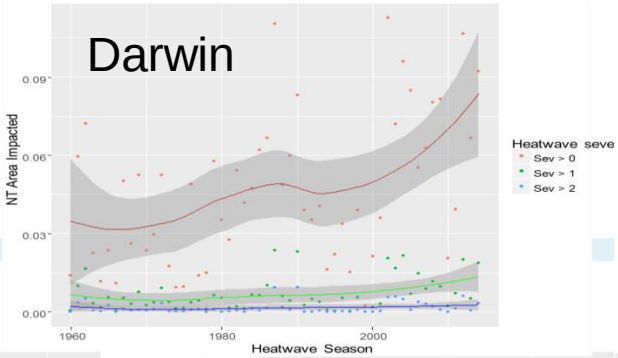
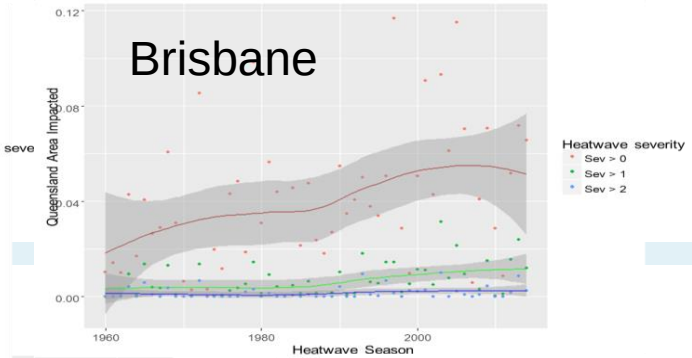
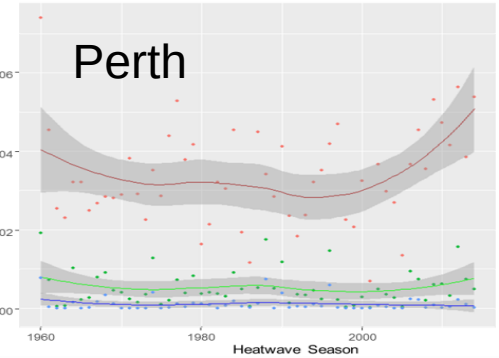
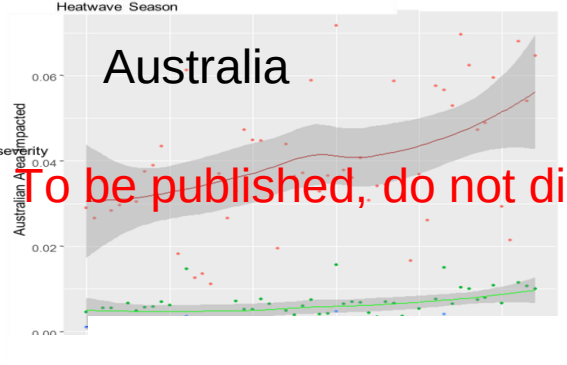
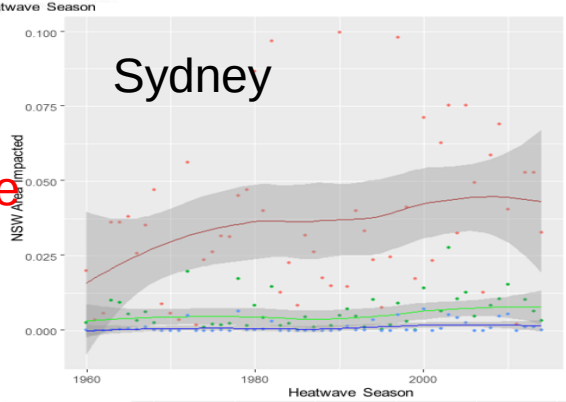
proportion of region per year
for severity 0, 1 & 2

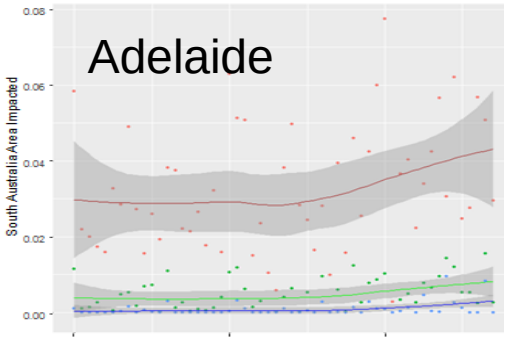


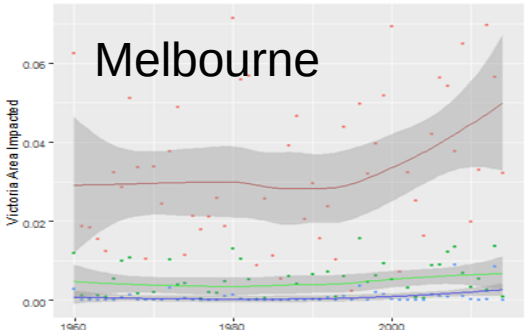


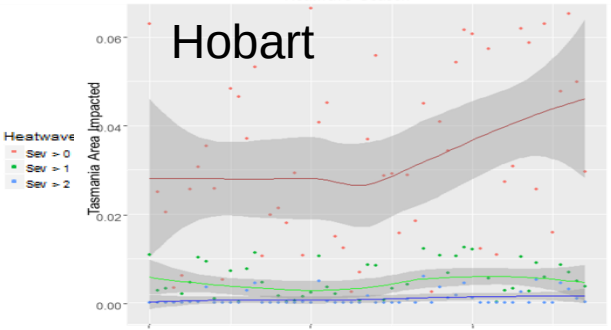












NEED

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proportion of region per year
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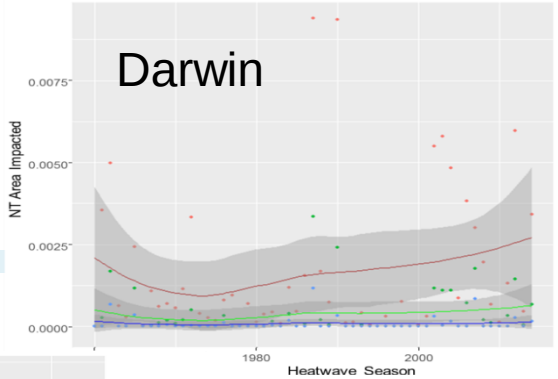

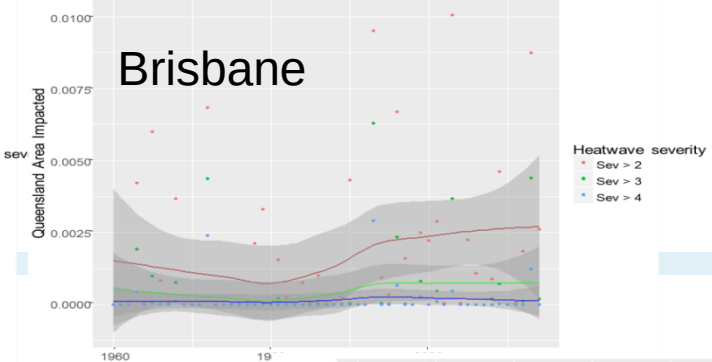

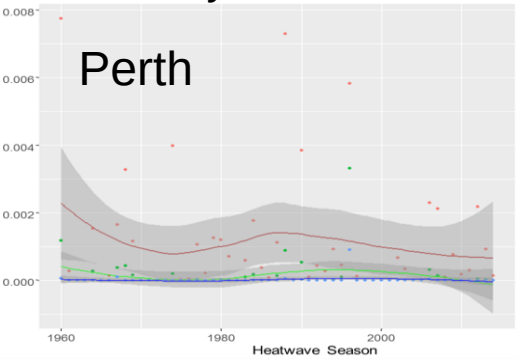

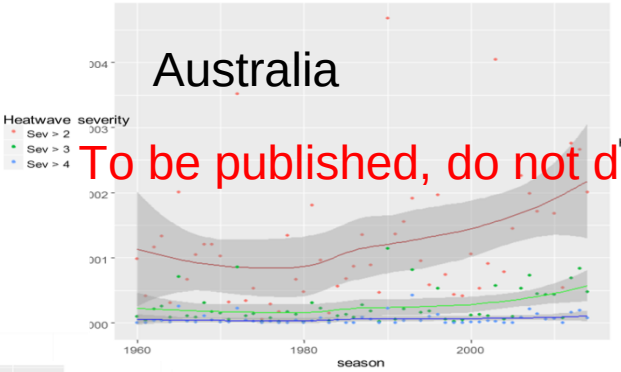

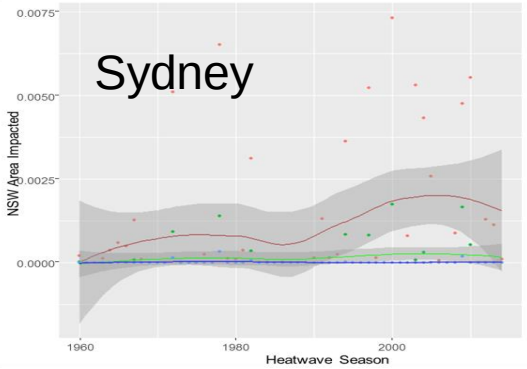

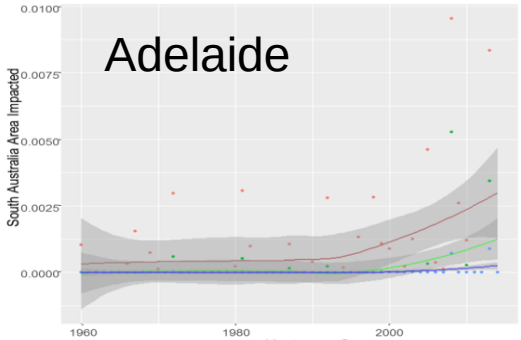

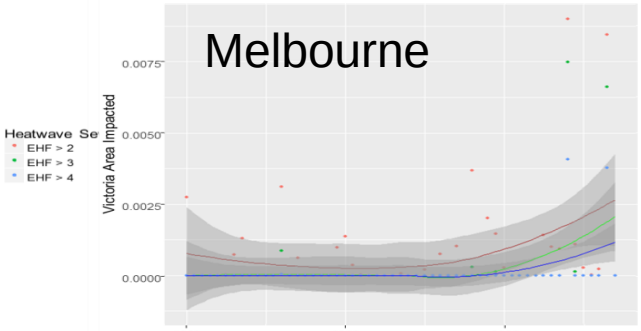

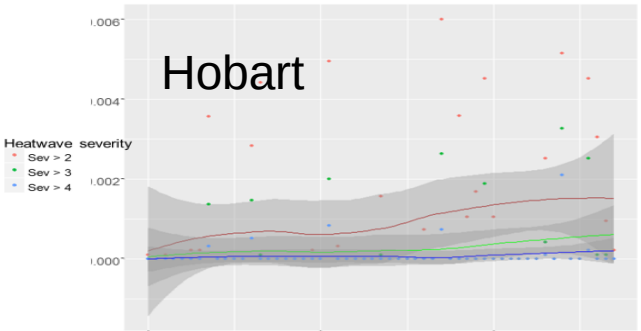

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building Australia's national heatwave service

Requirements

- need
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METHOD - collaborators

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Collaborators

Collaborators

- Epidemiologist (health and universities)
- State government committees
- UK Met Office

Activities

- Grant applications
- Workshops
- Studies and publications
- Global Hazard Map

Australian Government
Bureau of Meteorology

Collaborative studies (1)

- Colleagues in Bureau of Meteorology in South Australian Regional Office, Weather and Oceans Services Policy Branch and Centre for Australian Weather and Climate Research
- South Australian State Emergency Service, Department of Health, Department of Families and Communities – recognised by AGD State and National 2010 Safer Communities Award
- PricewaterhouseCoopers 2011 Report for Government
- Publications in Geophysical Research Letters and the Journal of Climate (2012) by Perkins and Alexander (UNSW) have reviewed heatwave indices and utilised EHF (heatwave intensity).
- Churchill Memorial Trust travel in 2013 and report
- CAWCR 2013 Technical Report 60 co-authored with Robert Fawcett (National Climate Centre then CAWCR with support from the Bushfire CRC).
- Using the Excess Heat Factor (EHF) to predict the risk of heat related deaths. Langlois et al. 2013. Journal of Forensic and Legal Medicine. http://www.scopus.com/inward/record.url?eid=2-s2.0-84878902127&partnerID=tZOtx3y1

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Collaborative studies (2)

- Heatwave defined as a heat impact event for all community and emergency sectors in Australia. Nairn 2013. http://www.bushfirecrc.com/resources/research-report/heatwave-defined-heat-impact-event-all-community-and-emergency-sectors-aus
- The excess heat factor: A metric for heatwave intensity and its use in classifying heatwave severity Nairn, J.R., Fawcett, R.J.B. *Int. J. Environ. Res. Public Health* **2015**, *12*(1), 227-253; doi:10.3390/ijerph120100227
- Responding to heatwave intensity: Excess Heat Factor is a superior predictor of health service utilisation and a trigger for heatwave plans. Scalley et al. Australian and New Zealand Journal of Public Health 2015
- Extending the Bureau's heatwave forecast to multi-week timescales. Hudson, D and Marshall, A.G. 2016. Bureau Research Report, No. 16. Bureau of Meteorology Australia, http://www.bom.gov.au/research/research-reports.shtml
- Extreme climatic conditions and health service utilisation across rural and metropolitan New South Wales. Jegasothy et al, 2017. https://link.springer.com/article/10.1007/s00484-017-1313-5 DOI 10.1007/s00484-017-1313-5
- Variation in Population Vulnerability to Heatwave in Western Australia. Jianguo et al. Front. Public Health, 03 April 2017 | https://doi.org/10.3389/fpubh.2017.00064
- Heatwaves in Queensland. Nairn and Fawcett. AJEM, 2017. https://ajem.infoservices.com.au/items/AJEM-32-01-11
- Challenges for verifying global heatwave and coldwave forecasts: Can emerging technology help? Robbins et al. ICB17.

PRODUCT

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building Australia's national heatwave service

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PRODUCT

Heatwave forecasts: from daily to multi-week

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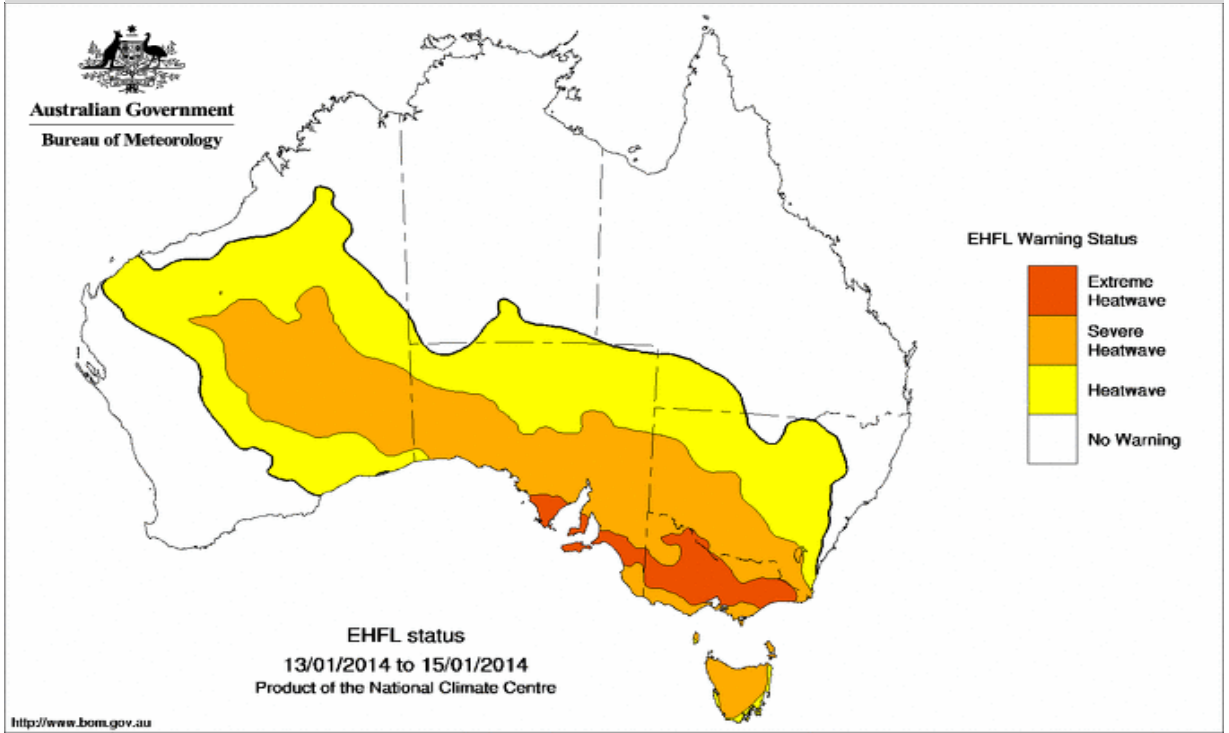
Then extend heatwave service to multi-week timescales

Example: January 2014

One of the most significant multi-day heatwaves on record affected southeast Australia over the period from 13 to 18 January 2014

Observations for 13-15 January 2014



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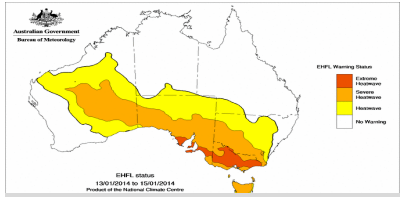
Heatwave forecasts: from daily to multi-week

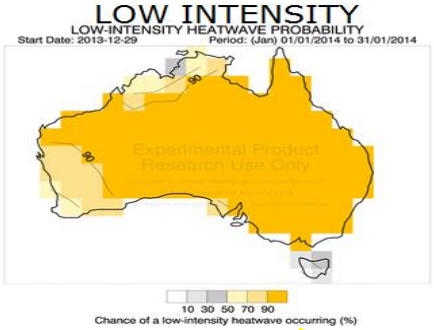
POAMA Forecasts (chance of a heatwave occurring in the period)

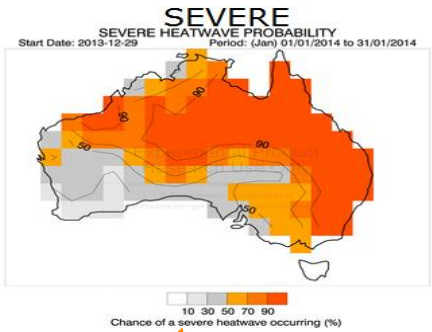


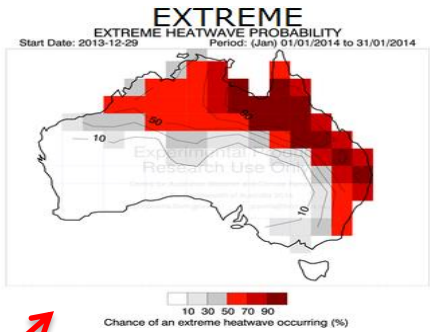
Observed heatwave: 13-15 January 2014

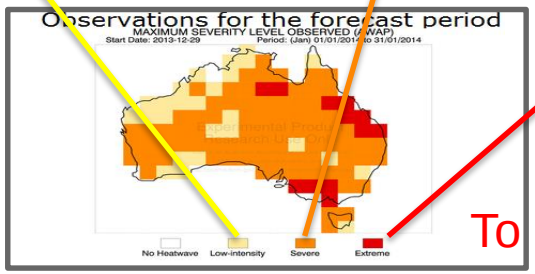
Forecast start date on ***29 December*** 2013 for the **month** of ***January 2014***

READY









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PRODUCT

Heatwave forecasts: from NWP to multi-week

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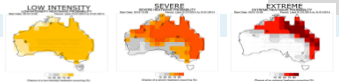
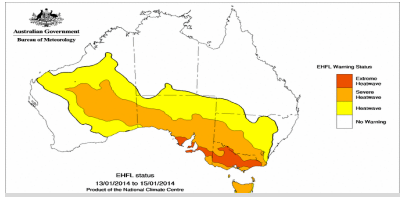
READY



POAMA Forecasts (chance of a heatwave occurring in the period)

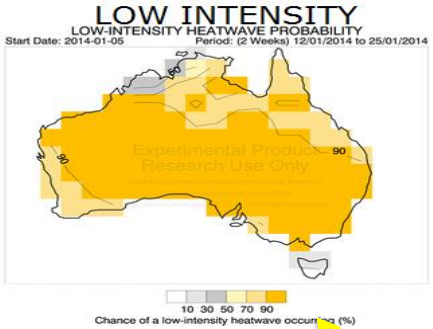
Forecast start date on ***29 December*** 2013 for the month of ***January 2014***

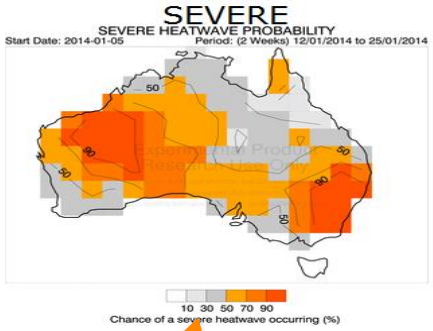


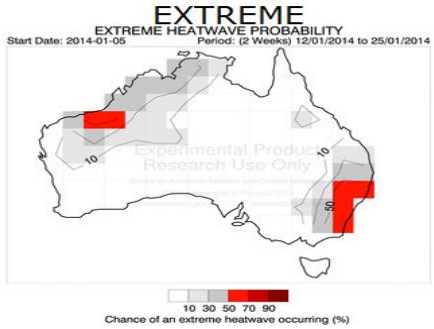
Observed heatwave: 13-15 January 2014

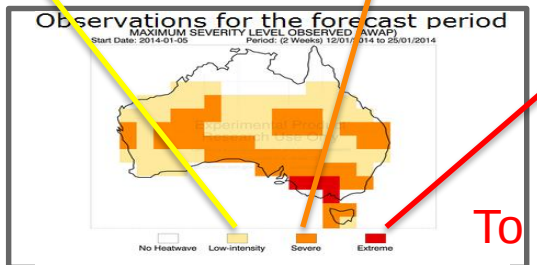
Forecast start date ***5 January*** 2014 for ***12 to 25 January*** (i.e. **weeks 2 & 3**)

SET









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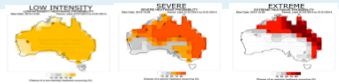
PRODUCT

Heatwave forecasts: from NWP to multi-week

Australian Government

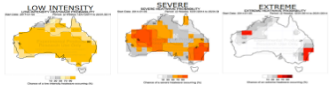
POAMA Forecasts (chance of a heatwave occurring in the period)

READY



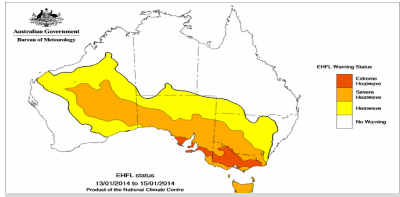
Forecast start date on ***29 December*** 2013 for the month of ***January 2014***

SET



Forecast start date ***5 January*** 2014 for ***12 to 25 January*** (i.e. weeks 2 & 3)

*Weather (NWP) Forecasts for **13 to 15 January***



Observed heatwave: 13-15 January 2014

GO

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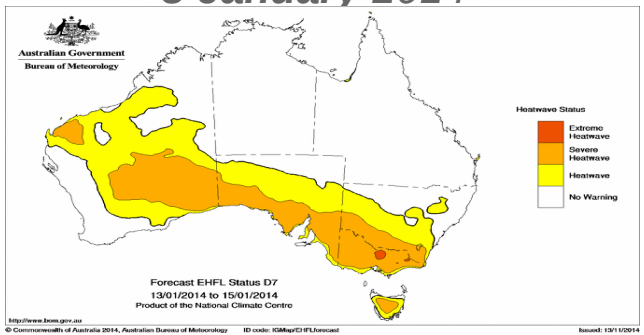
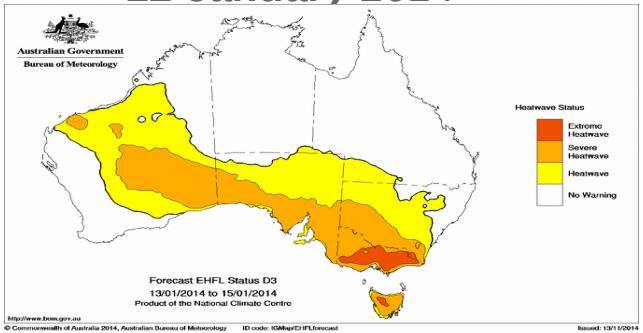
*Forecast start date **8 January** 2014*



*Forecast start date **12 January** 2014*



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Partnerships

Partners

- Health
- Emergency services
- Media

Activities

- Post season performance reports
- Pre & Post season briefings
- Product development feedback
- Communication strategies
- Commercial interest in multi-week forecasts

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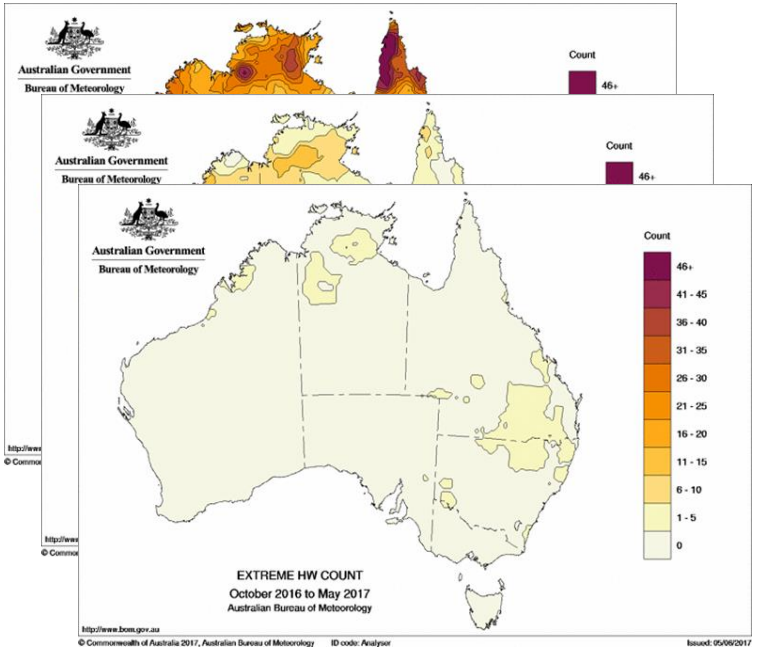
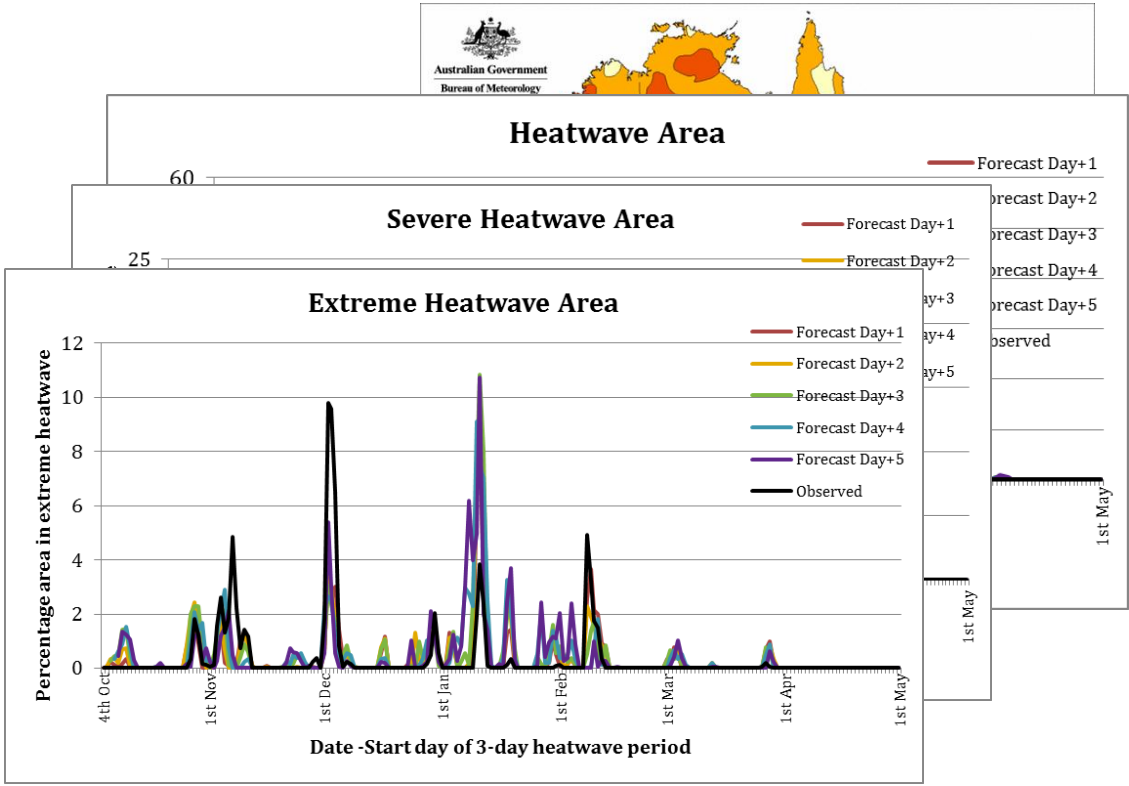
Verification in post season reports





WARNINGS and TAILORING

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building Australia's national heatwave service

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WARNINGS

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Requirement for a national heatwave warning framework which incorporates partner agencies warning requirements

Service alignment within an all hazards warning framework

- Heatwave
- Bushfire
- Pollens
- Severe winds
- Flood
- & more

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How do we get it to customers?

Formats
- Digital
- CAP enabled
- GIS mapping enabled
- Graphical
- Text

Channels
- Internet
- Mobile
- Apps
- External corporate
  - Public
  - Private
  - Commercial