

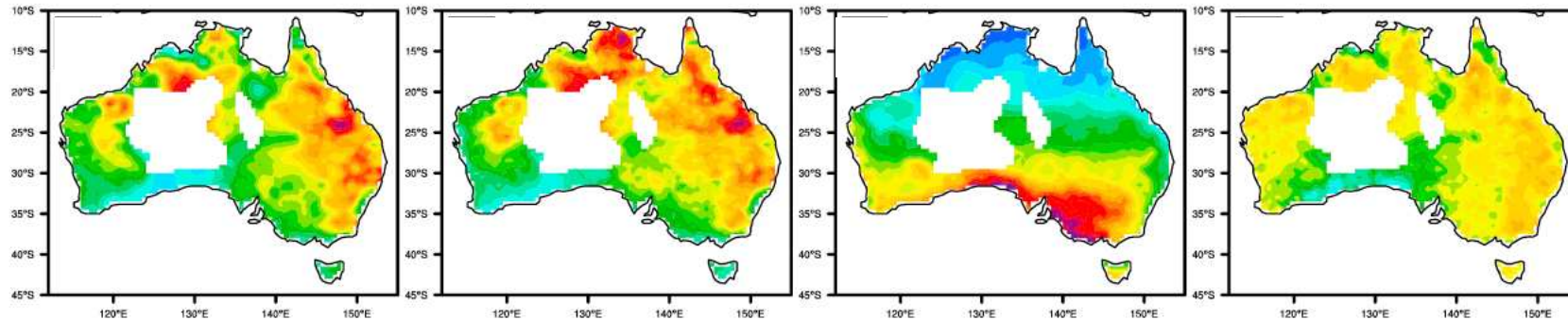


ARC CENTRE OF EXCELLENCE FOR
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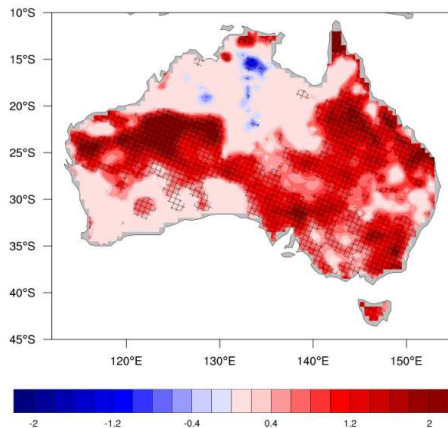
Natural Hazards in Australia: Heatwaves

A review part of the OZewex special edition of *Climatic Change*

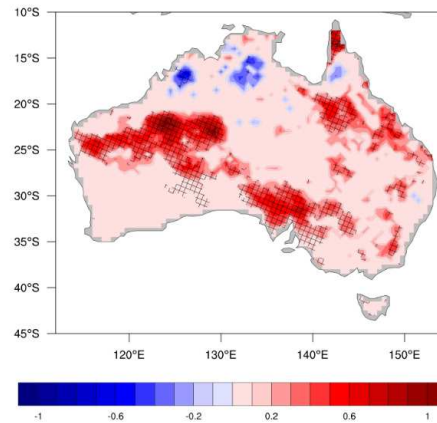
Sarah Perkins-Kirkpatrick, Chris White, Lisa Alexander, Daniel Argueso, Ghyslaine Boschat, Tim Cowan, **Jason Evans**, Marie Ekstrom, Eric Oliver, Alope Phatak, Ariaan Purich

Observed trends in heatwaves (1950-2013)

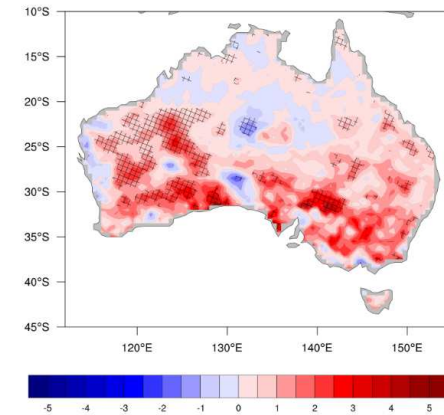
Frequency (days)



Duration



Intensity

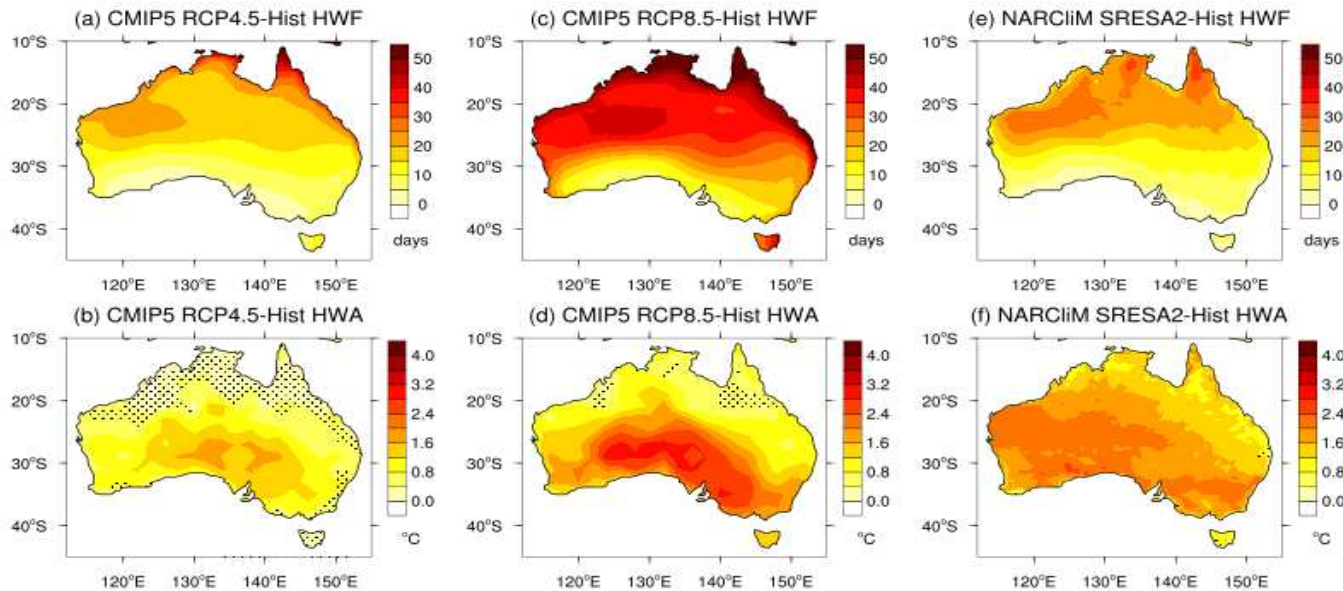


For most of Australia, trends are *accelerating*
Trends in heatwave duration lag frequency of days
Southern Australia experiences the most intense heatwaves

Donat et al, 2013
Alexander and Arblaster 2009
Perkins and Alexander, 2013

Steffen et al., 2014
IOCI 2012

Projections of atmospheric heatwaves



- GCMs, RCMs and choice of heatwave metric agree on direction of change, though differ quantitatively
- Comparable to changes in annual mean temperature
- Dramatic increases, particularly under a high emissions scenario
- Mainly driven by changes in temperature, little current evidence due to circulation/large scale drivers

CSIRO 2015; Cowan et al 2014; Purich et al 2014

Recommendations

- Impact relevant projections @ finer spatial scales
- Can we determine the human influence on observed *trends*?
- Can we distinguish the effects of aerosols? Ozone? Land cover changes?
- Untangling the complexity of physical drivers, especially soil moisture
- Quantifying the effect of urban areas
- We have opportunity to make massive advancements in the field of marine heatwaves – changes, projections, attribution