

“What are the key climate related trends and influences on the SA wine industry and how might they play out over the next 10-15 years?”

Peter Hayman SARDI Climate
Applications

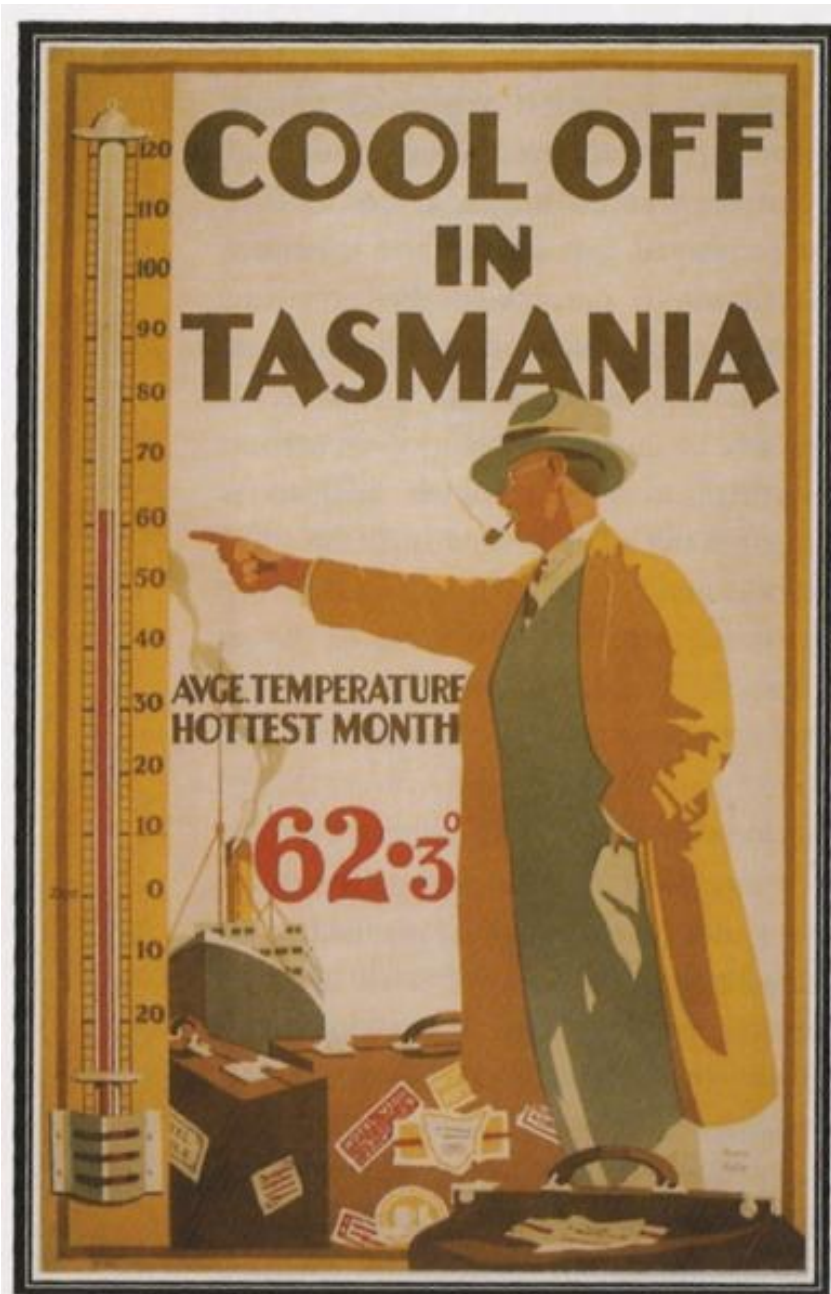
Adaptation Migration Extinction



140 year old Shiraz vine

Migrate

Toward poles and
up hills



Ferrari moving to higher vines as climate change effects felt

- **Tuesday 11 December 2012**
- by Anne Krebiehl

Tweet**44** +10Share**50**

Italian sparkling producer Ferrari Fratelli Lunelli is actively encouraging its growers to plant vines higher in Trentino to avoid the effects of climate change.

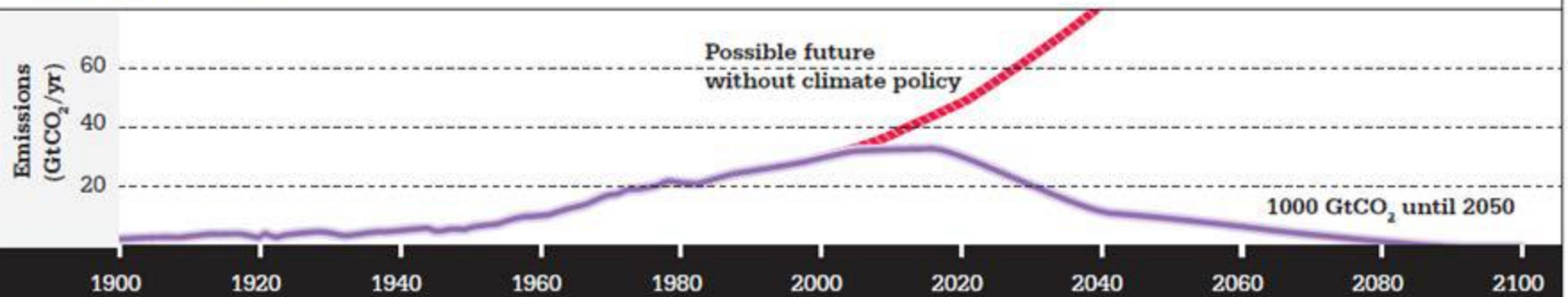




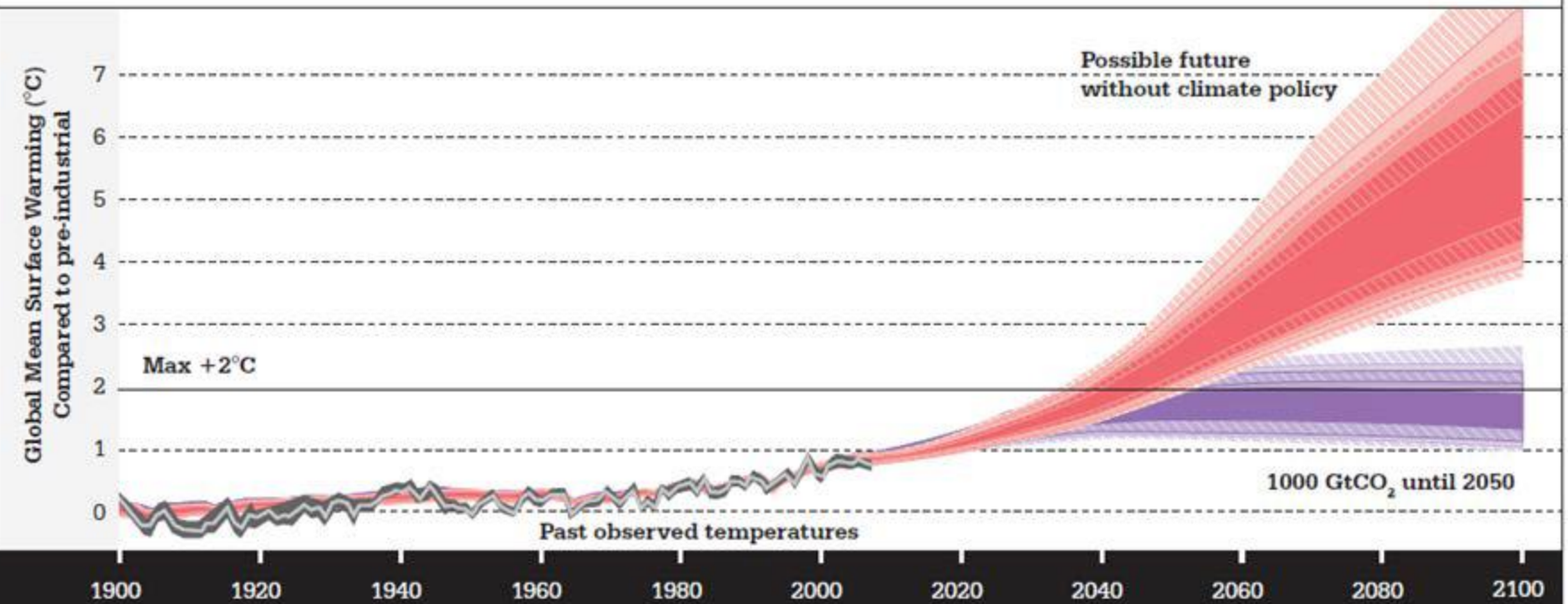
Climate is only one of many factors in decisions to adapt, to shift location and to exit industry....

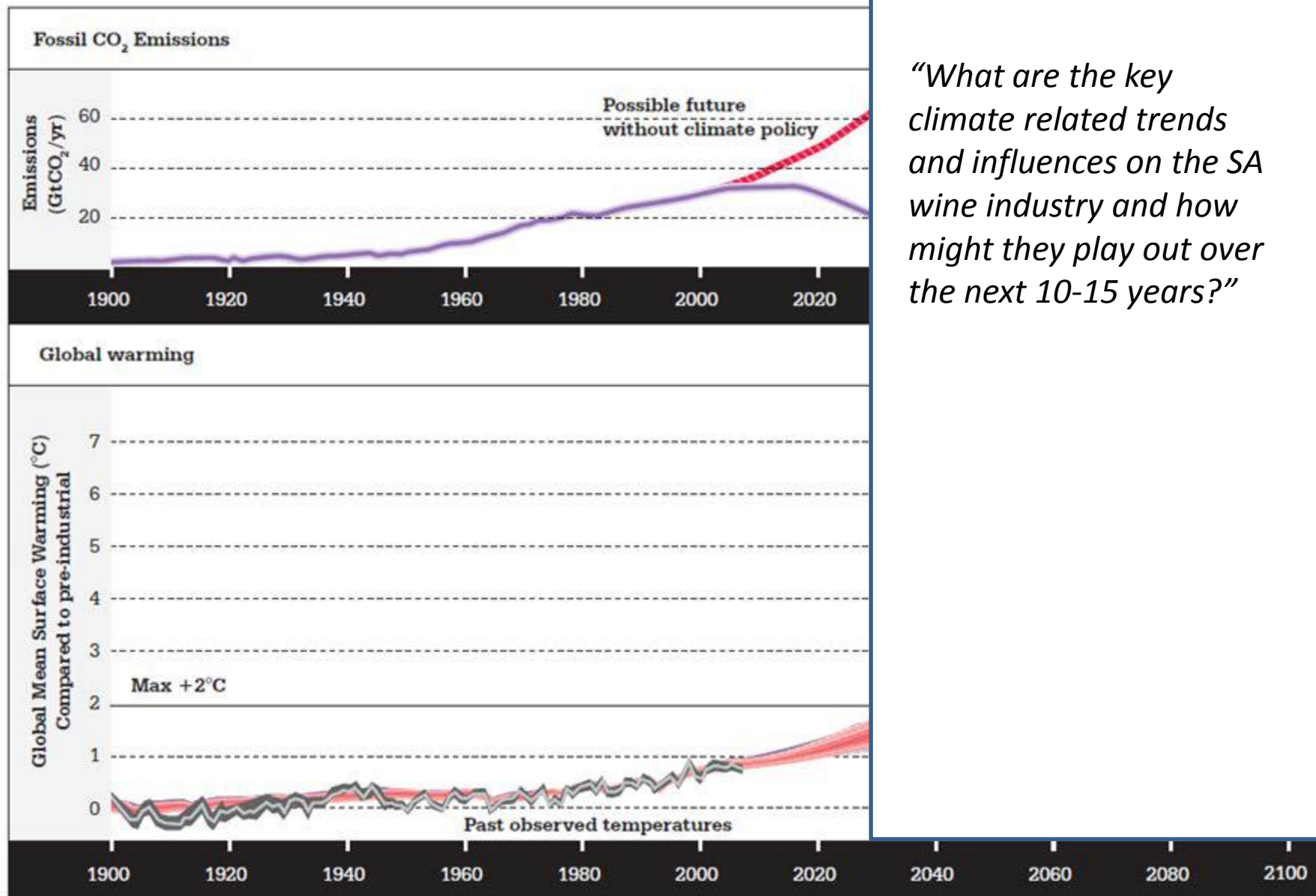


Fossil CO₂ Emissions



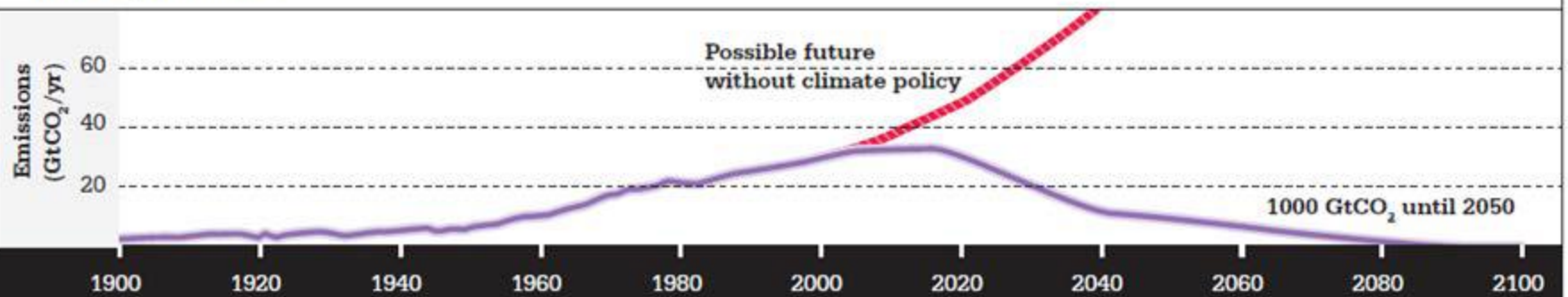
Global warming



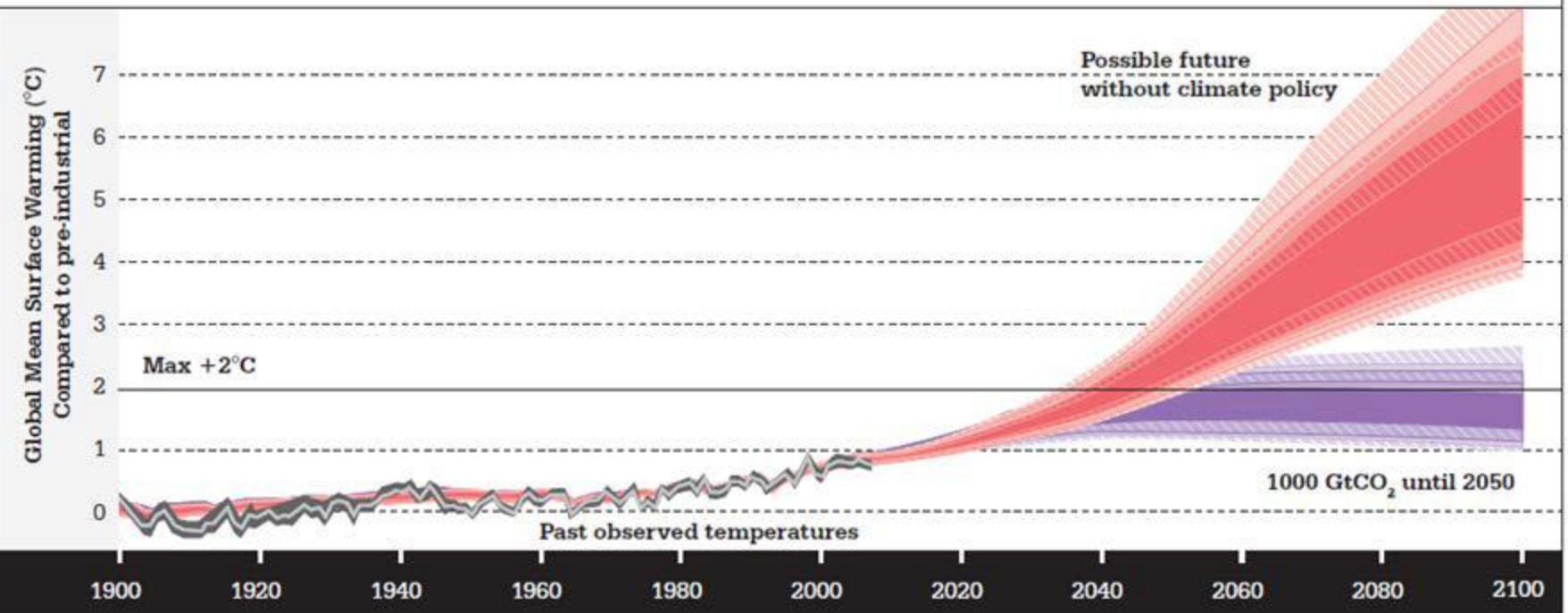


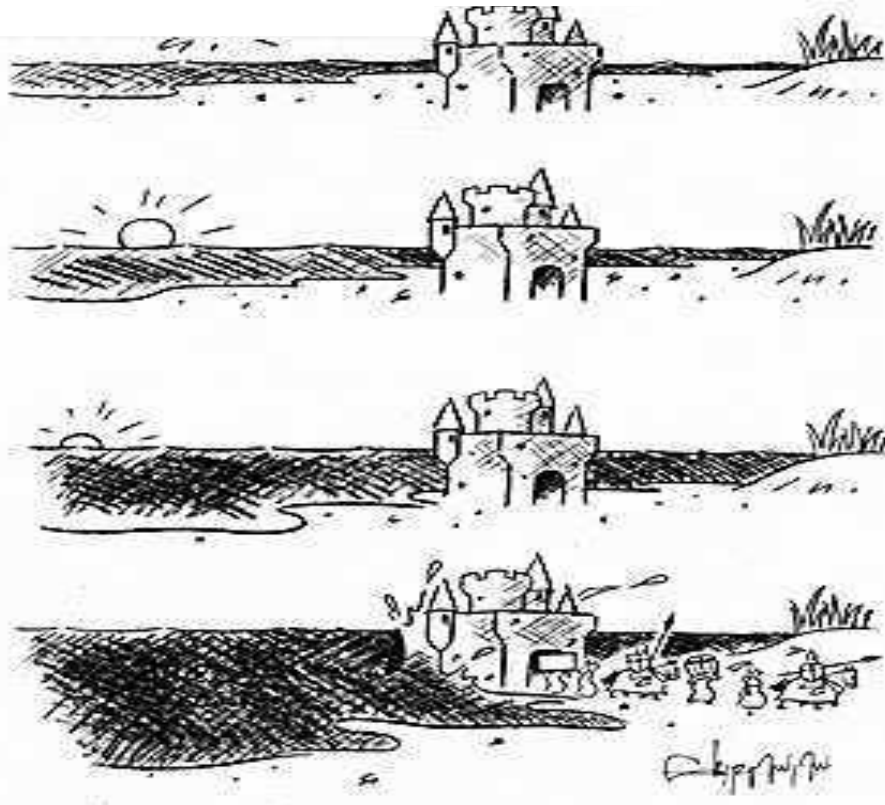
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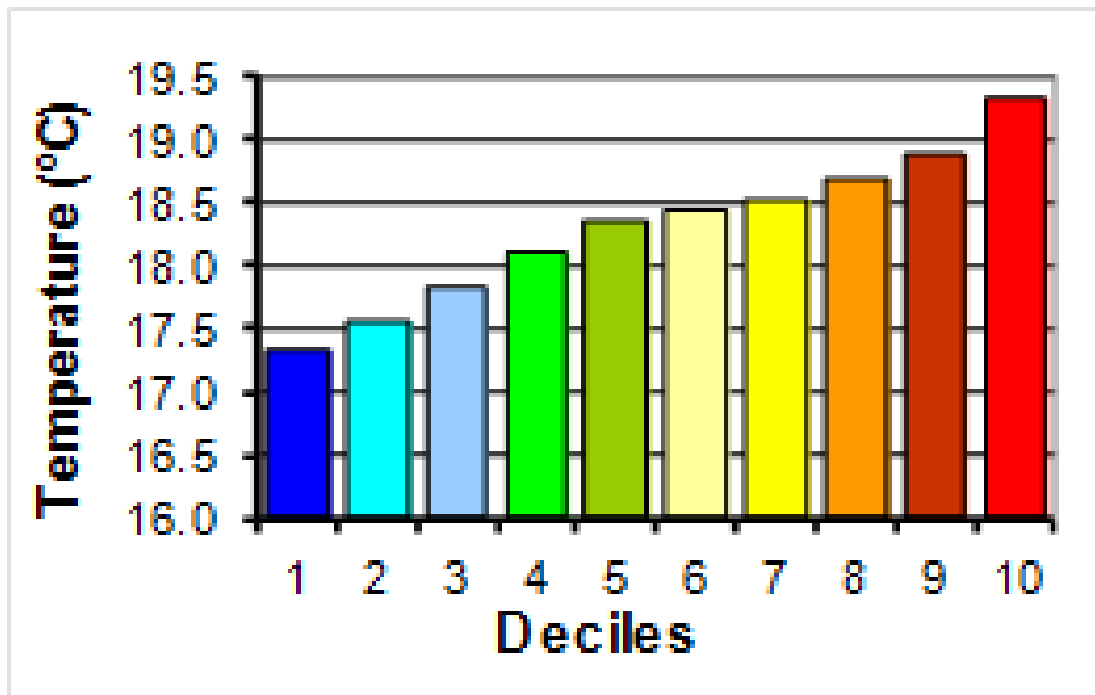


What destroyed the sand castle ? The wave or tide ?

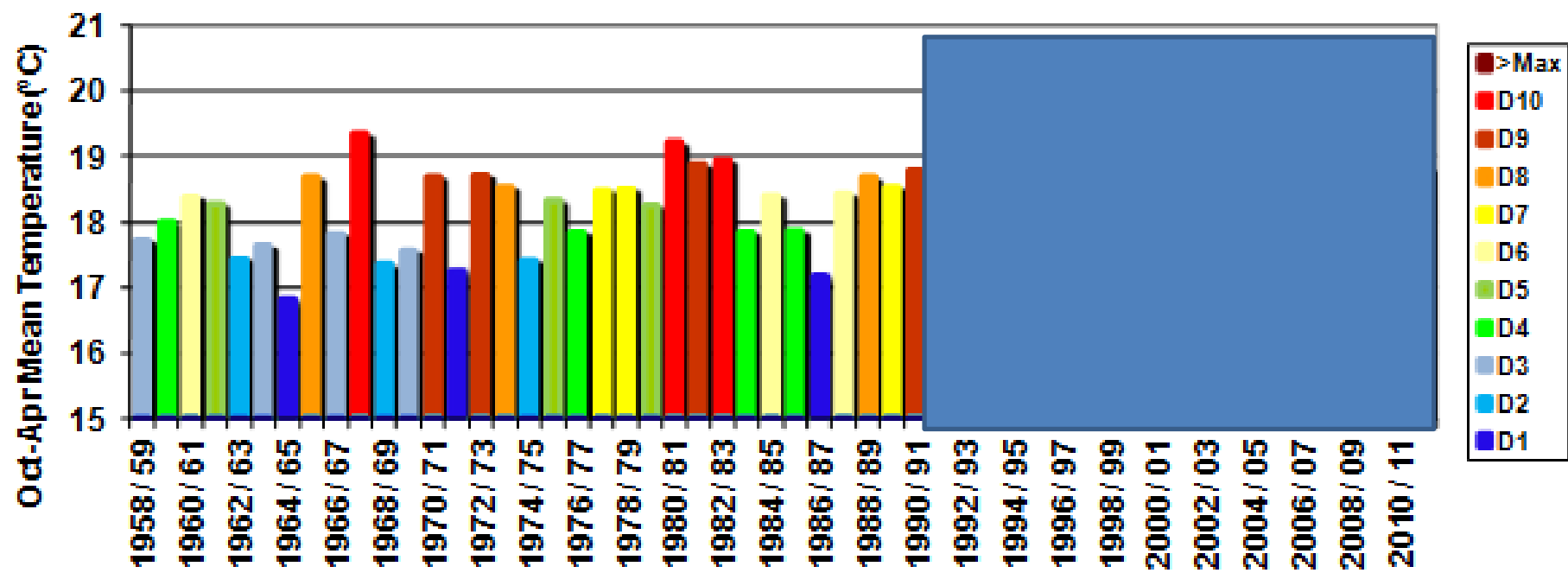
What can we learn from the wave about future resilience and vulnerability ?

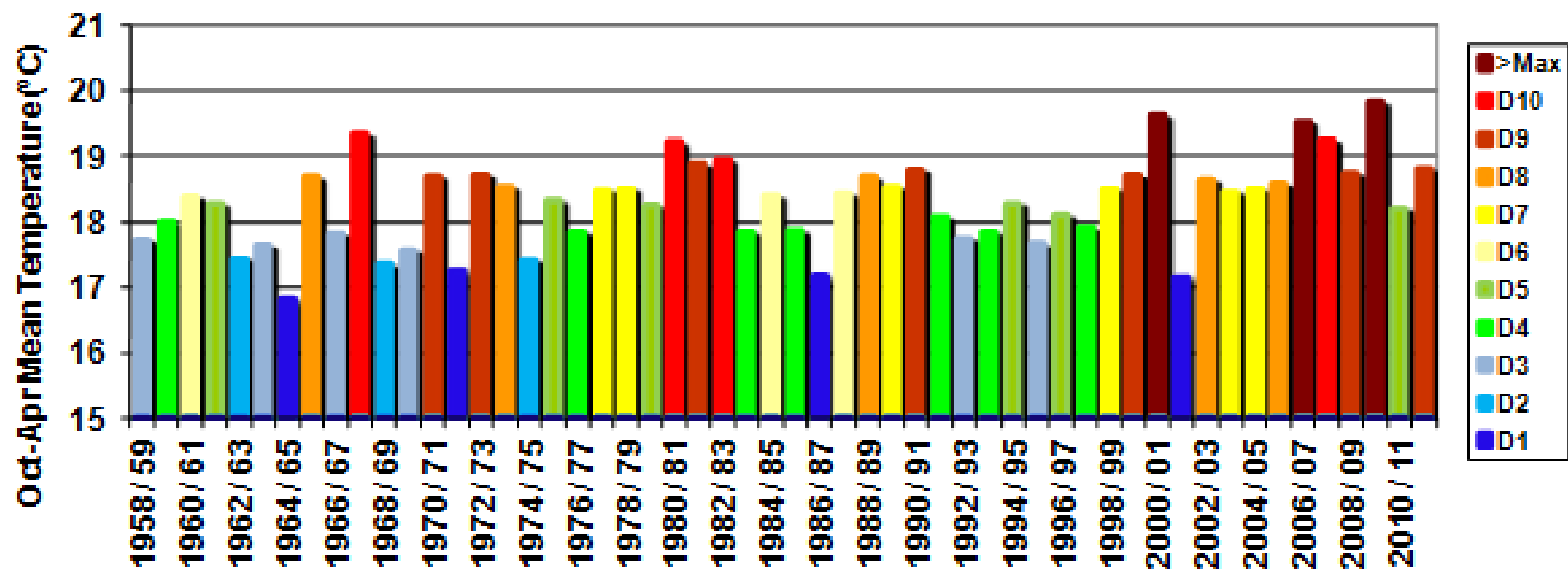
Seven impacts of climate change on viticulture

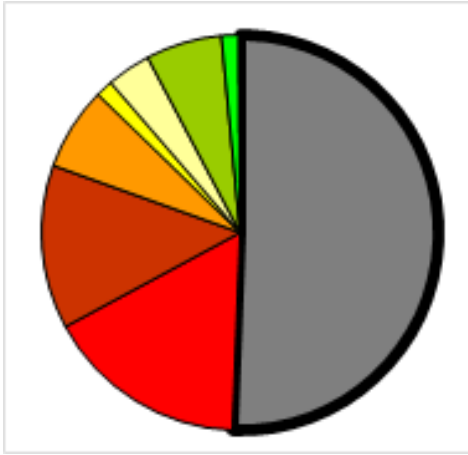
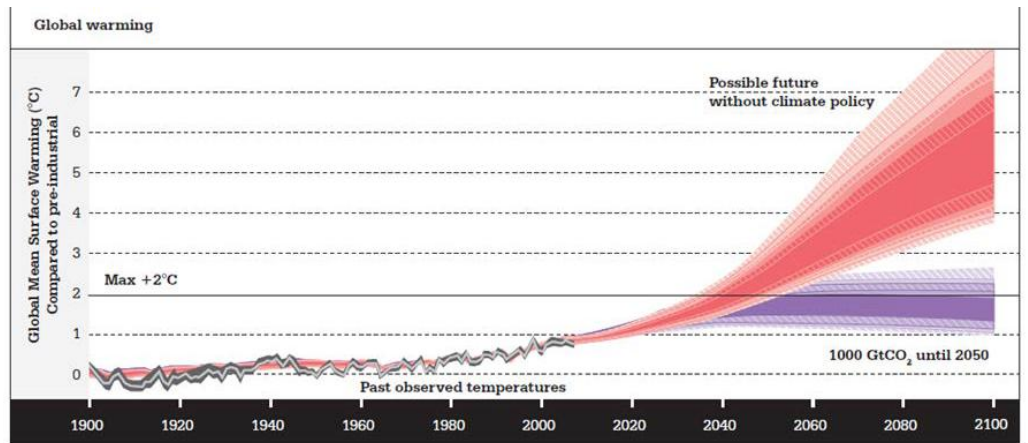
1. Change in mean temperature: faster crop development, higher water use & changed pest and disease risk.
2. Changes to extreme max temperatures – heatwaves
3. Changes to frost risk
4. Change in winter rainfall
5. Changes to quality and quantity of water available for irrigation
6. Change in summer rainfall
7. Change to carbon dioxide in the atmosphere



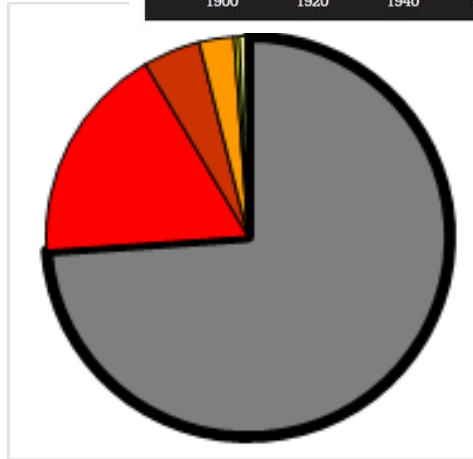
Growing Season temperature for Nuriootpa in Barossa



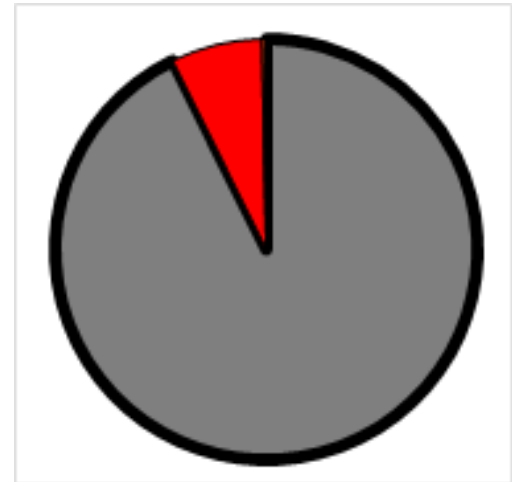




1 degree warmer



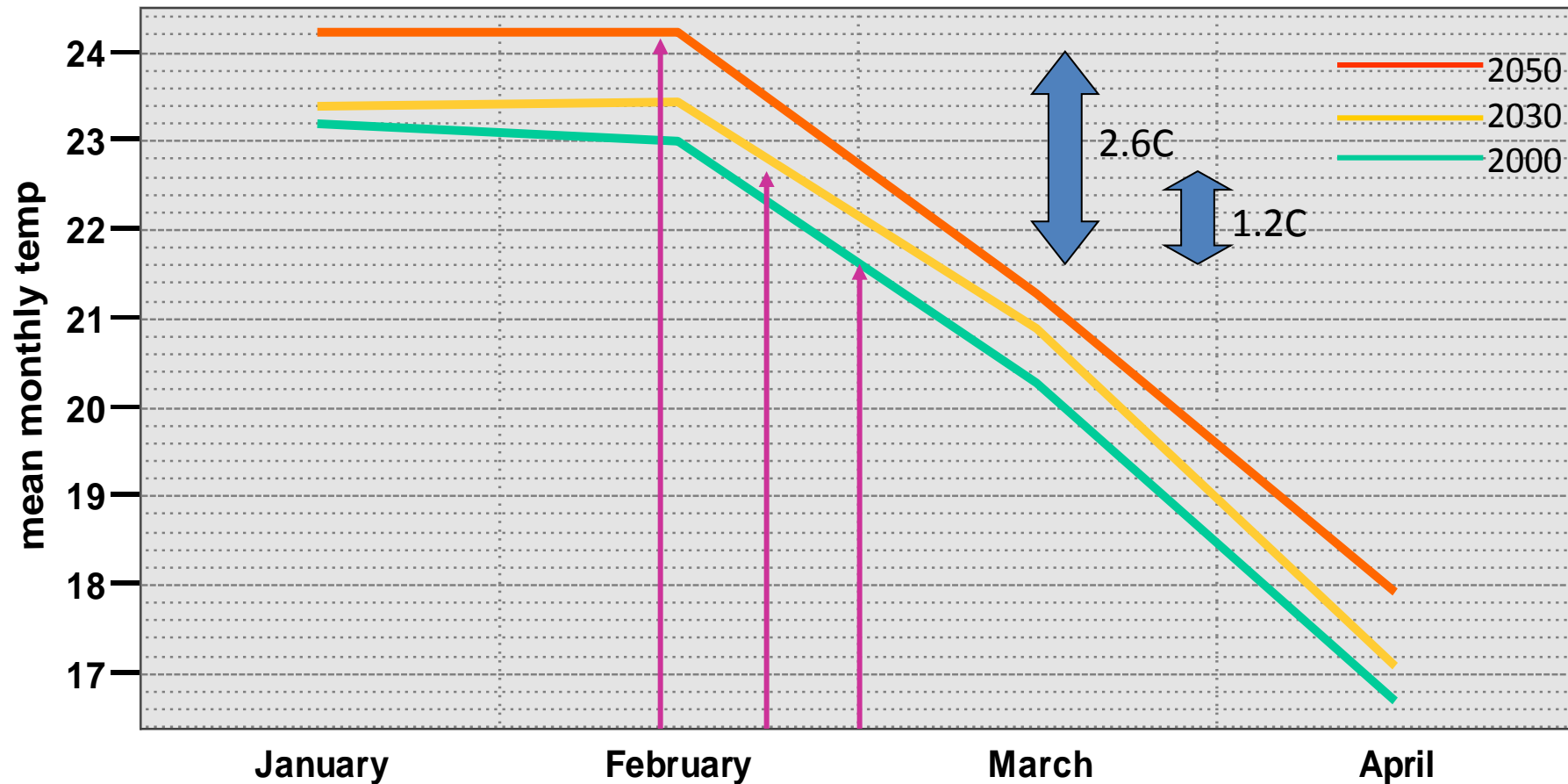
1.5 degrees warmer



2 degrees warmer

Thinking about risk management with non-stationarity

Riverland



A1B GHG emission scenario
Mid climate sensitivity
CSIRO Mk3 climate model

→ Cabernet Sauvignon

Leanne Webb CSIRO/University of Melbourne



Delayed pruning.

Paul Petrie Treasury Wine Estates



Winter



Spring



Summer



Autumn

Standard
Pruning



Delayed
Pruning

Paul.Petrie@tweglobal.com



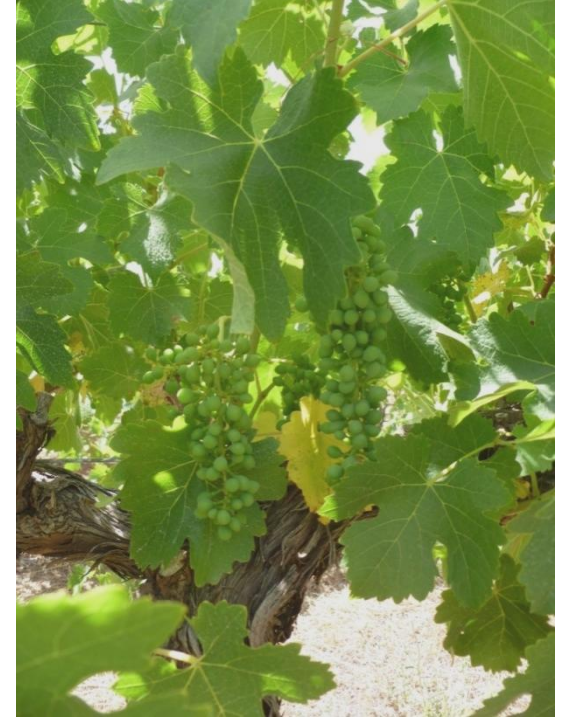
Fruit colour at veraison (11 January)



Pruned 26 May



Pruned 22 Sept



Pruned 13 Oct

Paul.Petrie@tweglobal.com

IN JUST
90 DAYS:
123
RECORDS
BROKEN
THROUGHOUT
AUSTRALIA

HERE ARE JUST
23 OF THE 123
RECORDS FROM SUMMER 2012/2013

MAXIMUM
TEMPERATURE
RECORDS



FLOOD
RECORDS



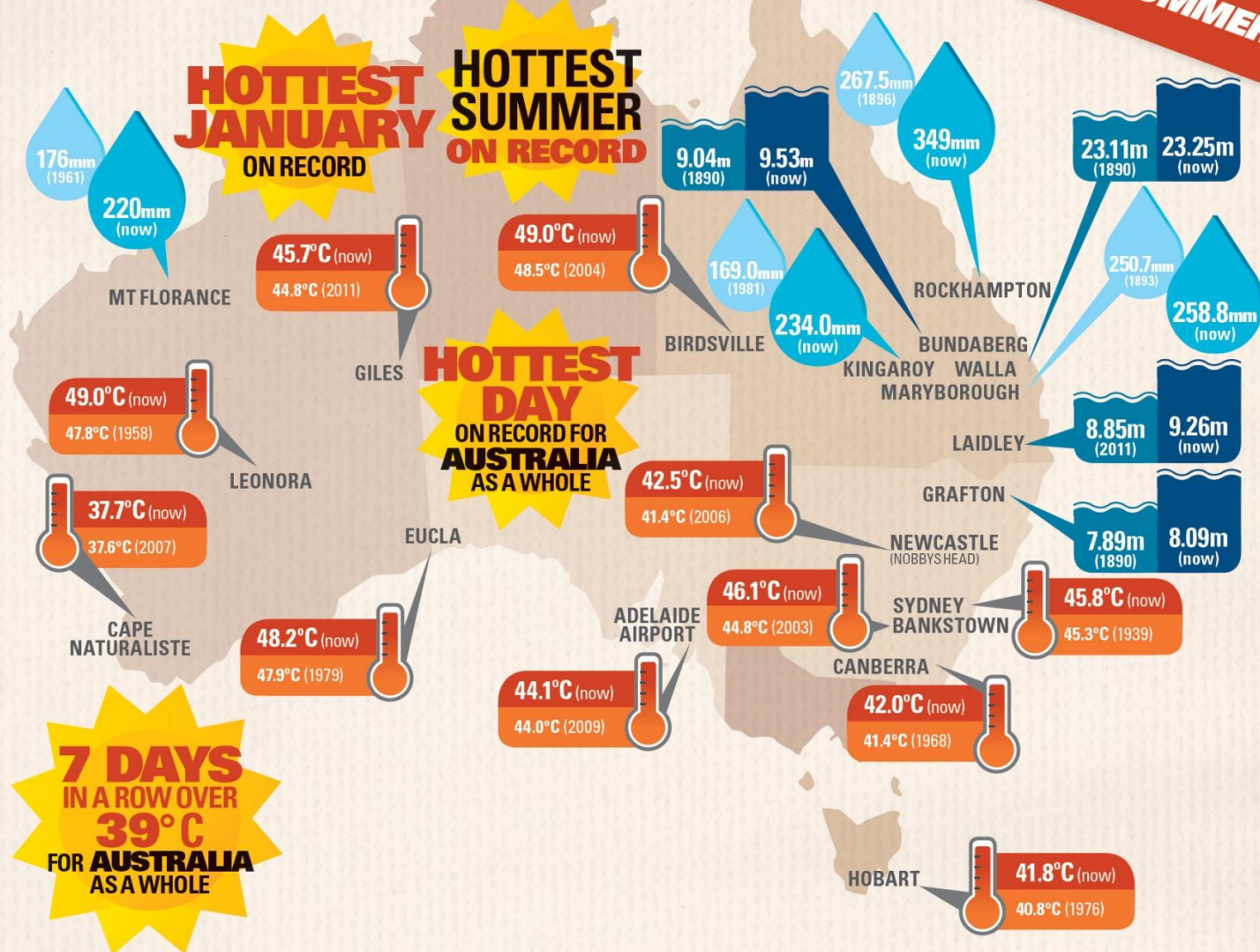
DAILY RAINFALL
RECORDS



HEATWAVE
RECORDS



THE ANGRY SUMMER



Heatwaves

- Intensity (how hot? > 35 C, $> 95^{\text{th}}$ percentile)
 - Duration (how many days? 3, 5+)
 - Timing (when? – critical stages)
-
- Night temp (any relief? night > 20 C for 3)
 - Humidity (how dry is air?)
 - Wind speed (how drying is air?)

- *Bordeaux*

- 17th Aug 39 C
- Dew Point 13C
- 20% Relative Humidity

- *Adelaide*

- 23rd Dec 41C
- Dew Point -10C
- 2% Relative Humidity



Budburst



Flowering



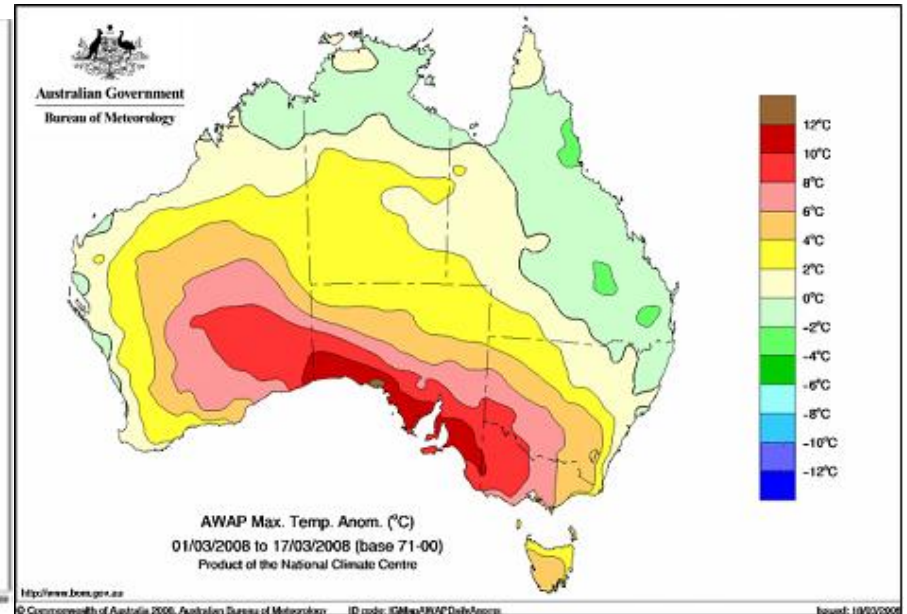
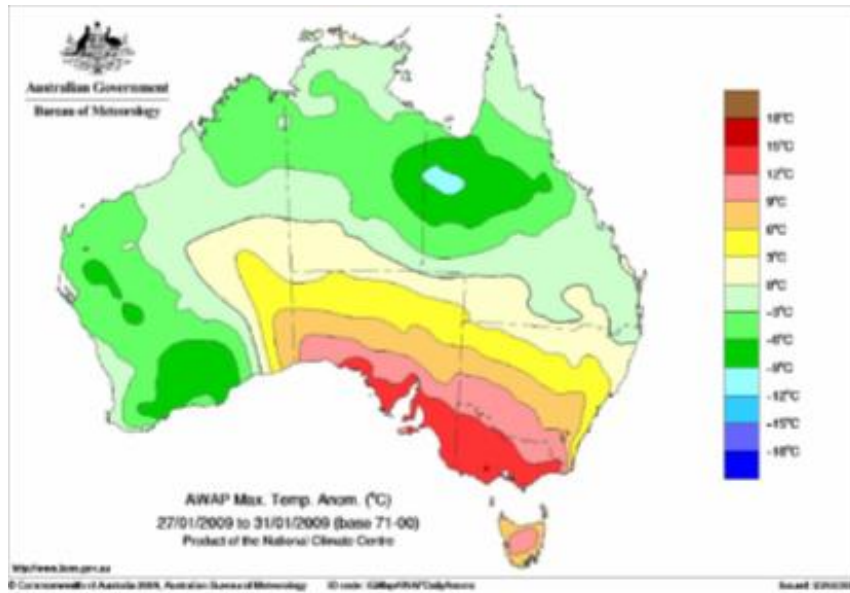
Veraison



Harvest

Reduction in yield

Reduction in yield and quality

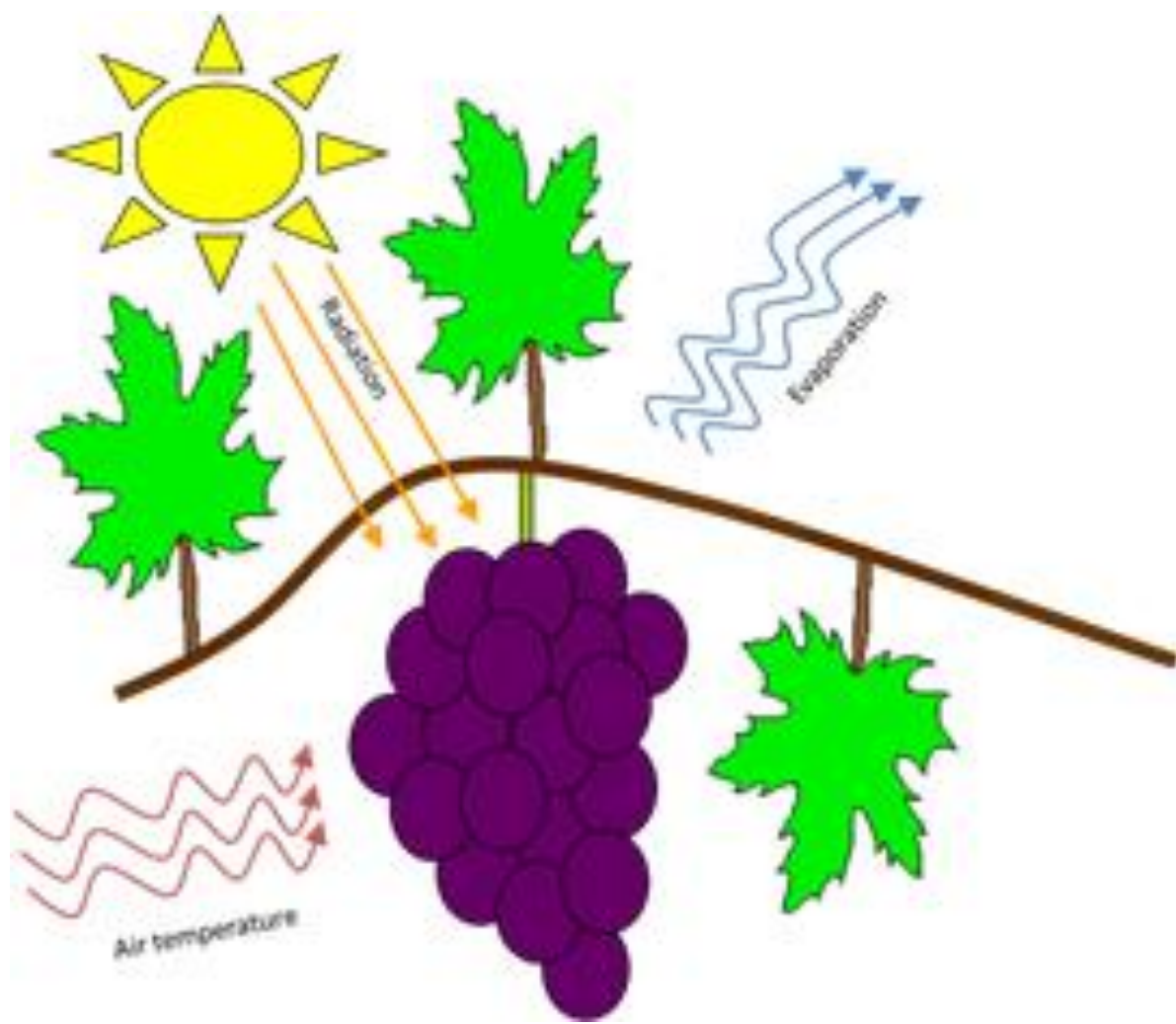


SARDI

Managing grapevines during heatwaves

Dr Peter Hayman (SARDI), Dr Mardi Longbottom (AWRI),
Dr Michael McCarthy (SARDI) and Dr Dane Thomas (SARDI)

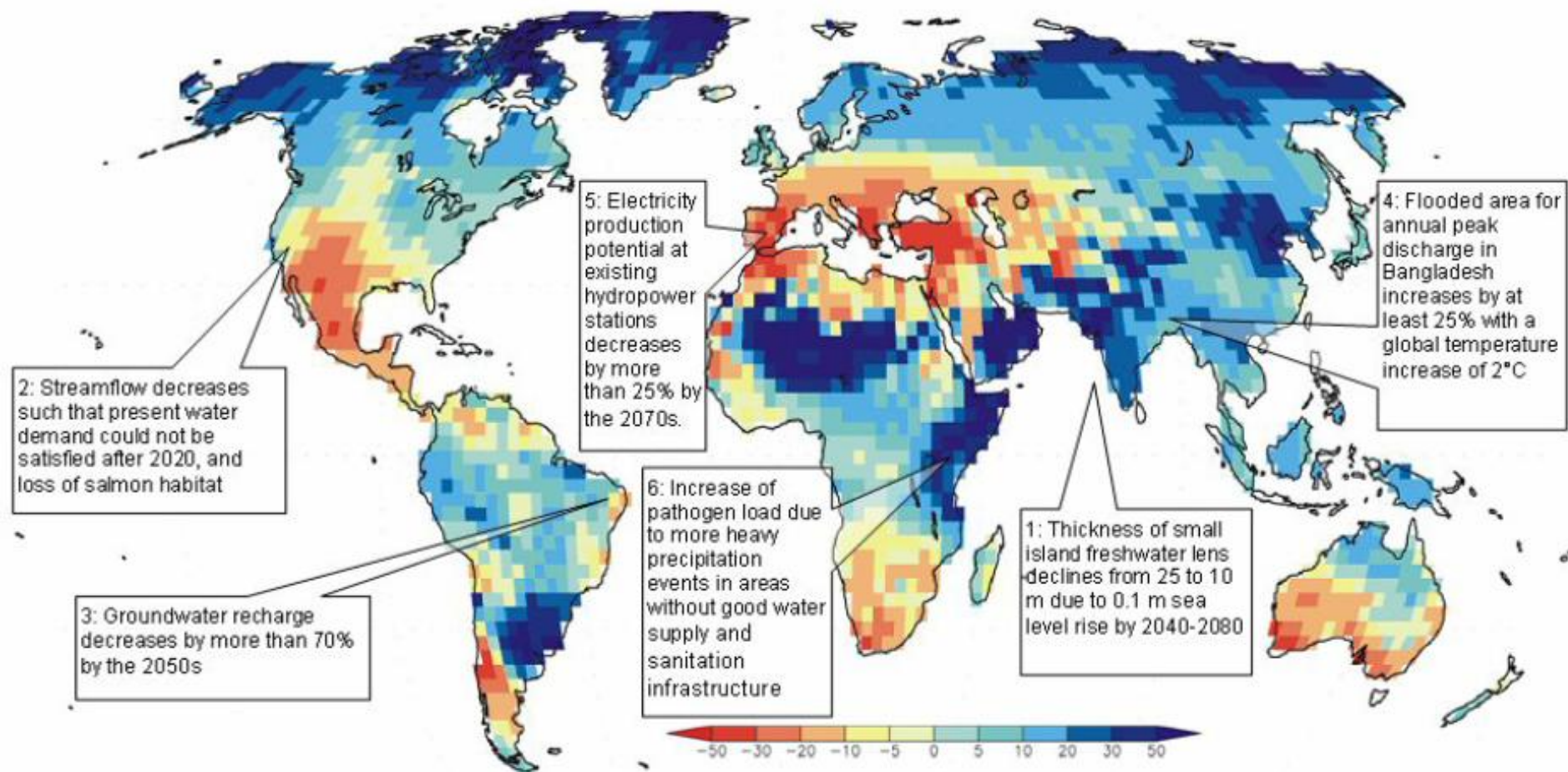








Climate change: water



A drier future ?

Four sources of water for

1. Water stored in soil from winter spring rain
2. Irrigation from local dams
3. Irrigation from groundwater
4. Irrigation from river

Plus a higher demand 4% per degree

Impact on viticulture

- Water constrained future may emphasise higher water holding capacity soils
- Seeking cooler mesoclimates
- Perceptions of iconic wines and regions might be challenged.
- Adapting to climate change may add extra costs which could challenge stressed enterprises

"The climate system is an angry beast and we are poking it with sticks." - *Dr. Wallace Broecker*



[/www.cbc.ca/news/technology
/story/2008/11/18/f-savory-
broecker.html](http://www.cbc.ca/news/technology/story/2008/11/18/f-savory-broecker.html)