

# Climate Change and its Impact on the Wine World



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Insight Cruises  
December 2, 2013  
Somewhere on the Rhone

## Outline

- Berry development
  - Growth
  - Accumulation of solutes
  - Role of temperature
- Climate Change
- Wine quality in a changing world



## The Wine Regions of France



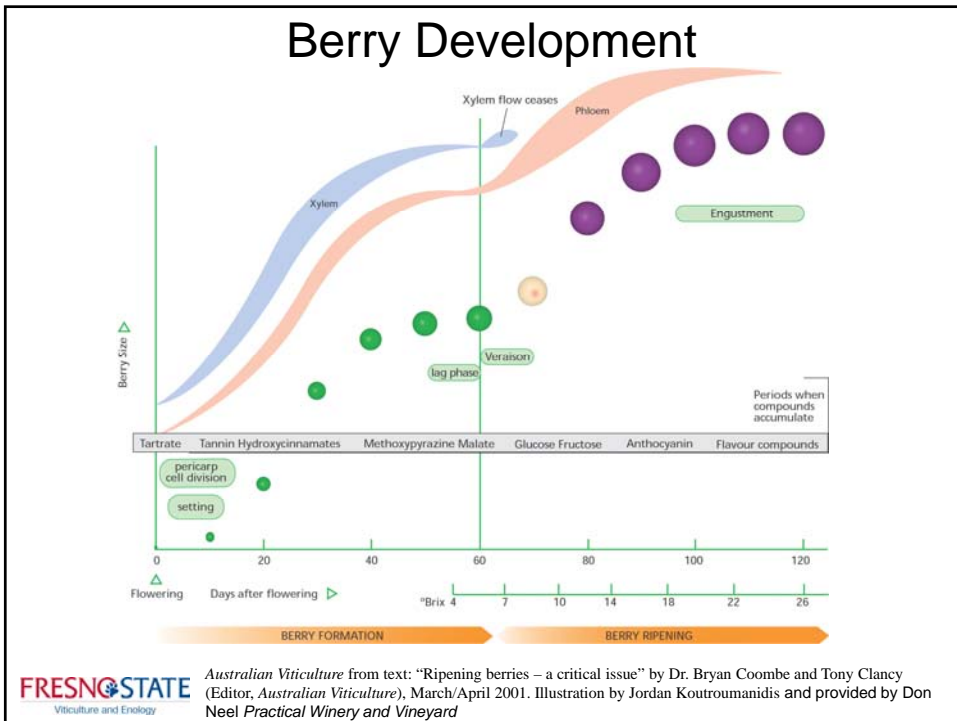
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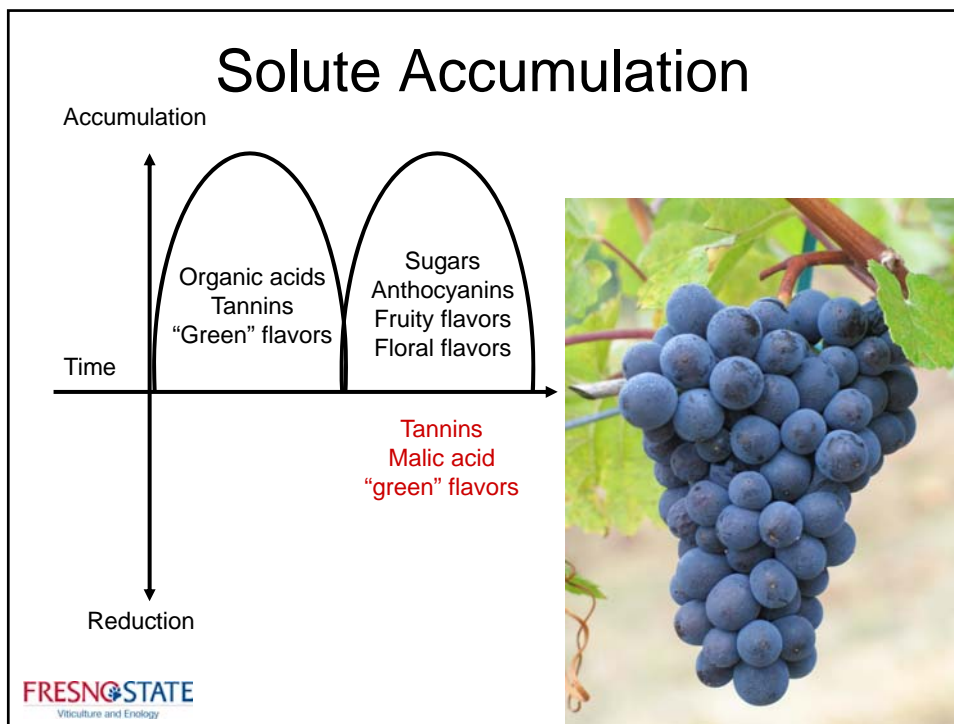
The Wines and Domains of France, Coates, 2000



## The Wines

- Bandol Domaine de Terrebrune
  - 2009
  - 85% Mourvedre - 7.5% Grenache - 7.5% Cinsault
  - Flavors to look for: wild game, earthy notes, red fruit flavors
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  - 100% Carignan
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## Flavor Evolution

**Riesling**  
Floral-perfumed-apple-pear-citrus-lime-passionfruit-tropical fruit

**Sauvignon Blanc**  
Asparagus-capsicum-herbaceous-grassy-gooseberry-tropical fruit

**Semillon**  
Herbaceous-straw-gooseberry-apple-quince-lemon-lime-passionfruit-tropical fruit

**Chardonnay**  
Cucumber-grapefruit-gooseberry-apple-lime-melon-peach-rockmelon-fig-tropical fruit

**Pinot Noir**  
Cherry-strawberry-violet-raspberry-plum-stewed plum

**Grenache**  
Floral-boiled lolly-spicy-raspberry-pepper-plum-stewed plum-prunes-liquorice

**Merlot**  
Herbaceous-leafy-perfumed-fruity-violet-cherry-raspberry-plum-fruitcake-blackcurrant

**Cabernet Sauvignon**  
Herbaceous-capsicum-tomato bush-leafy-mint-dusty-black olive-blackcurrant

**Shiraz**  
Herbaceous-spicy-raspberry-plum-pepper-blackberry-mulberry-liquorice-black olive-jam

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Iland, P. and Gago, P. (2002). *Australian Wines, Styles and tastes*. Patrick Iland Wine Promotions, Adelaide.

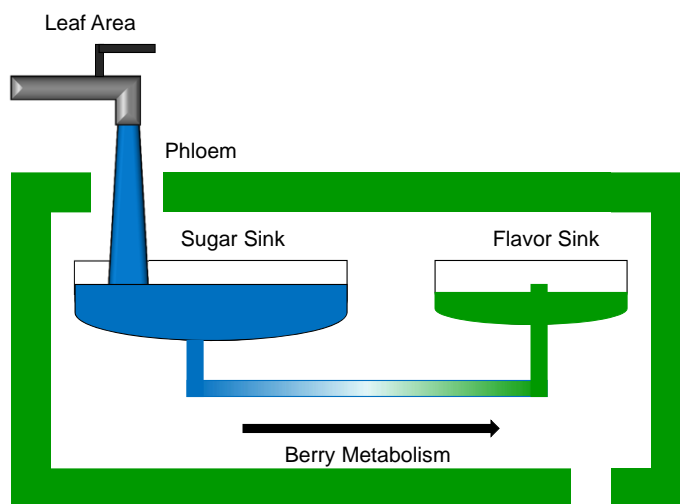
## Fruit Exposure a Good Thing

- Exposure improves flavor profile
  - Reduced veggie and more fruity/floral
    - Reducing veggie: exposure driven
- Exposure reduces disease pressure
- How much exposure is sufficient?
  - Depends on growing region
    - cooler – more exposure



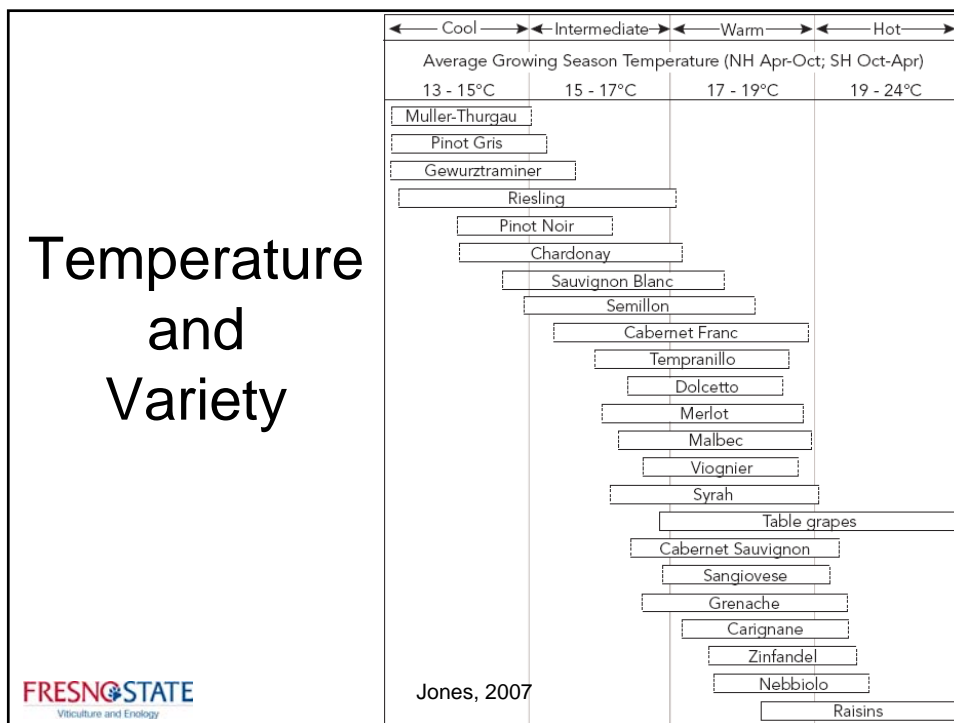
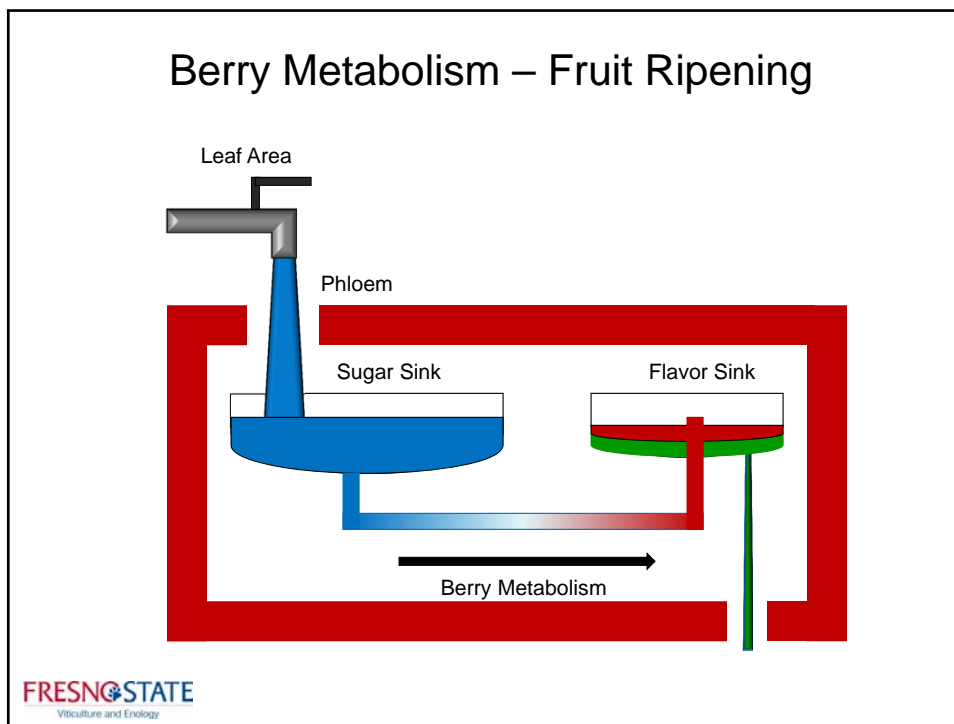
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## Berry Metabolism – Preveraison



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### Shiraz

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Iland, P. and Gago, P. (2002). *Australian Wines, Styles and tastes*. Patrick Iland Wine Promotions, Adelaide.

## Consequence of Temperature

- Sunburned fruit
- Over-ripe “cooked” flavors
- Under-ripe flavors
- Insufficient acidity
  - Tartaric acid costs

## Climate Change

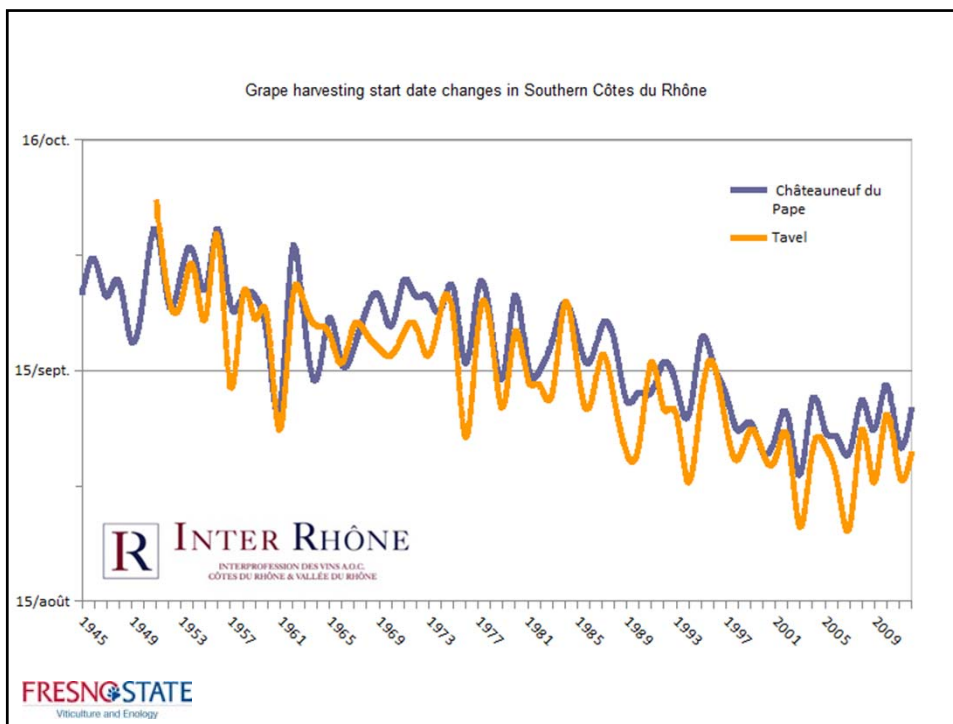


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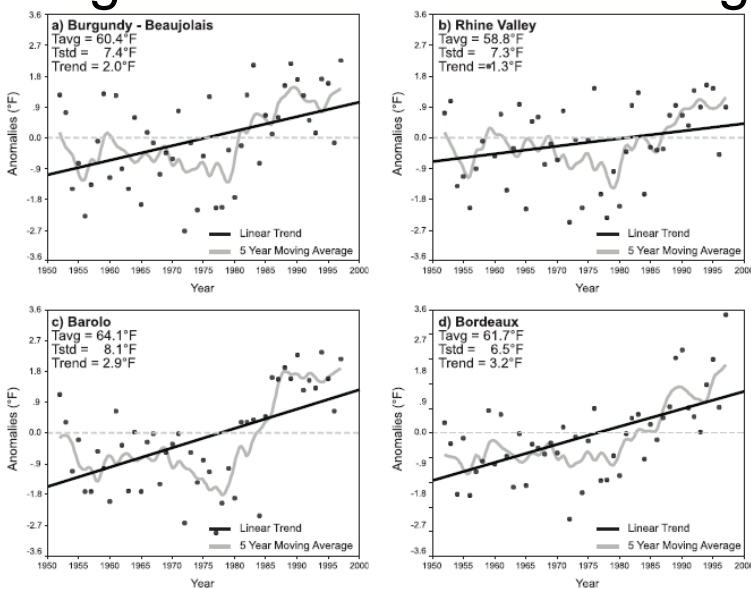
- There is an abundance of evidence that the world is undergoing more rapid climate change
- Viticultural areas of the world are getting warmer
- Models suggest that profound change in wine regions will take place over the next century

## Climate Change and Agriculture

- Productivity:
  - Quantity and quality
- Agricultural practices:
  - change in water use (irrigation) inputs (herbicides, insecticides, fertilizers)
- environmental effects:
  - Soil erosion and quality, biodiversity
- rural space:
  - loss and gain of cultivated lands
- Adaptation:
  - competition, development of plants to deal with consequence of climate change.



## Long-Term or Climate Change

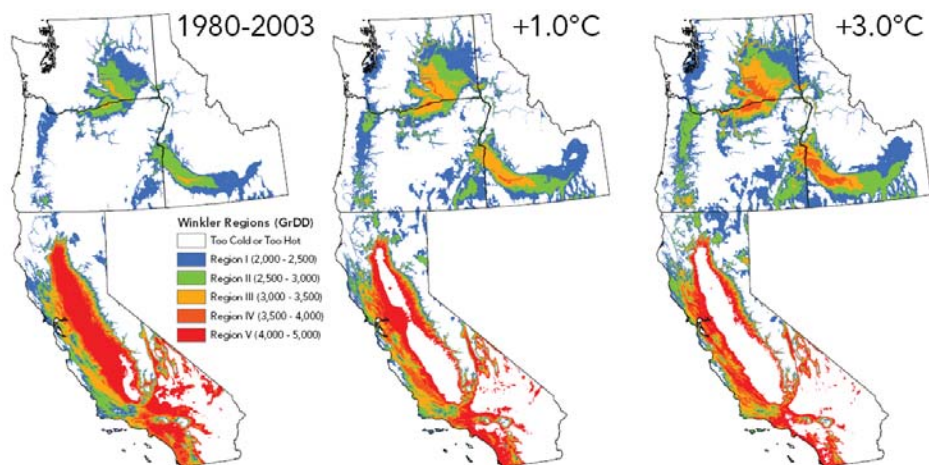


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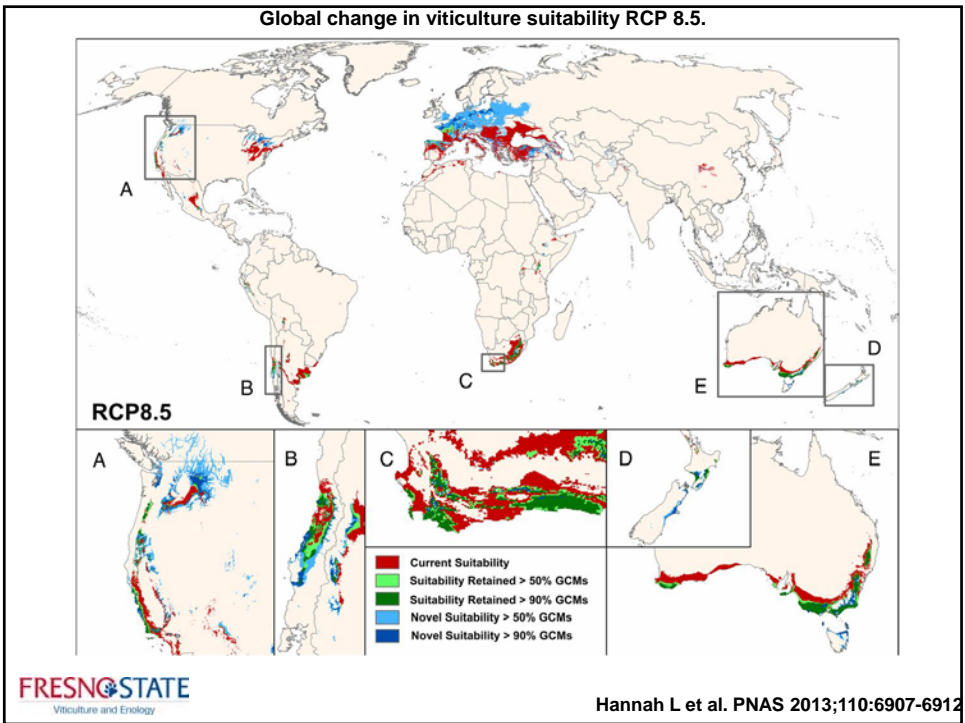
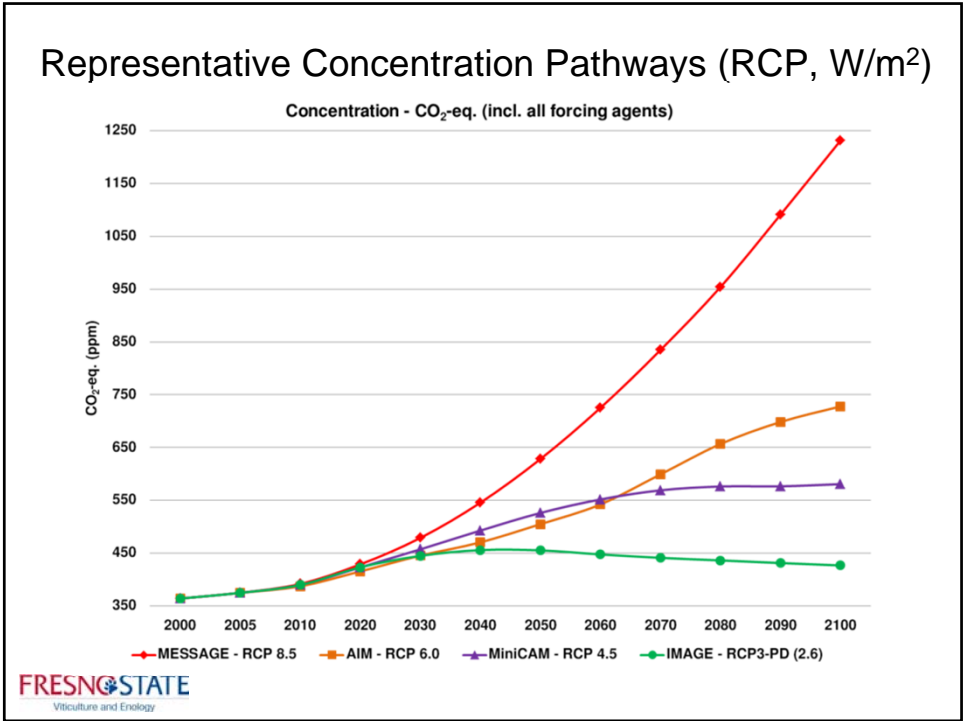
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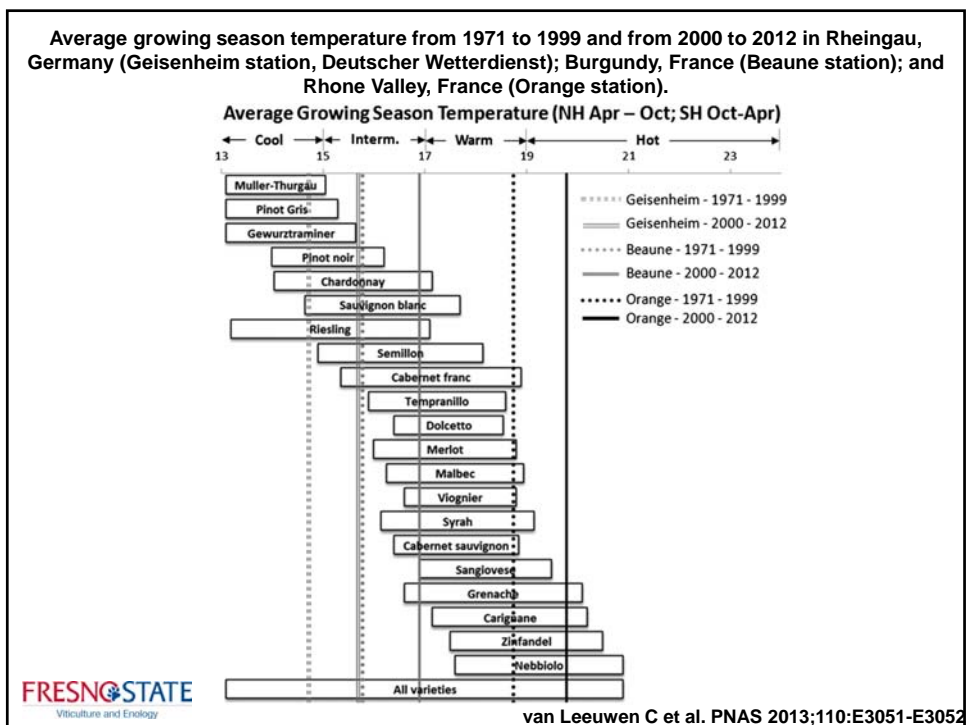
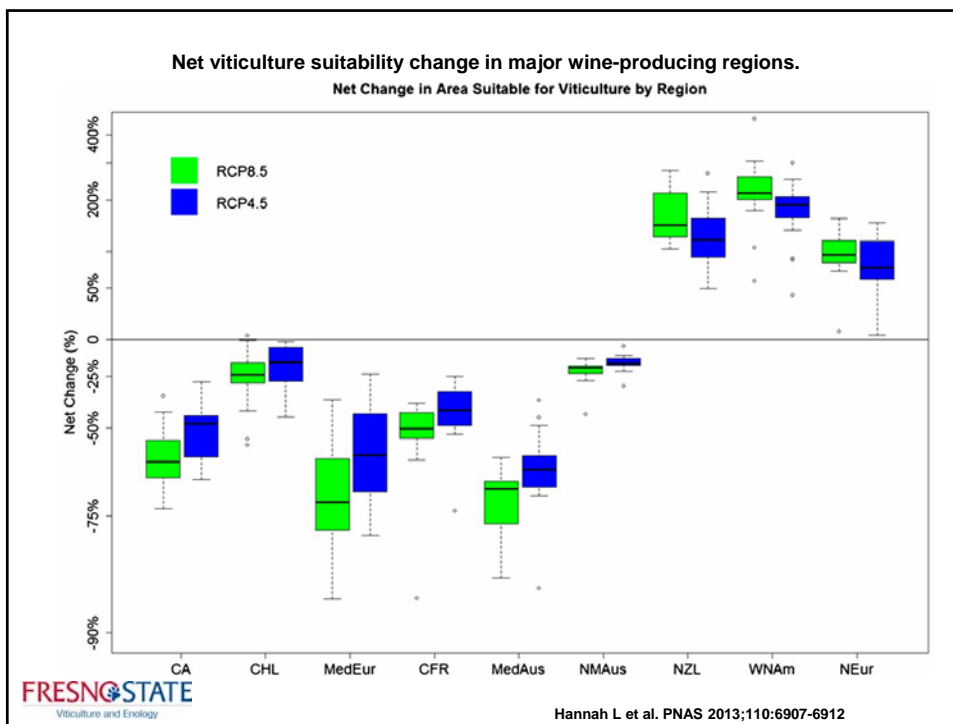
## Long-Term Predictions



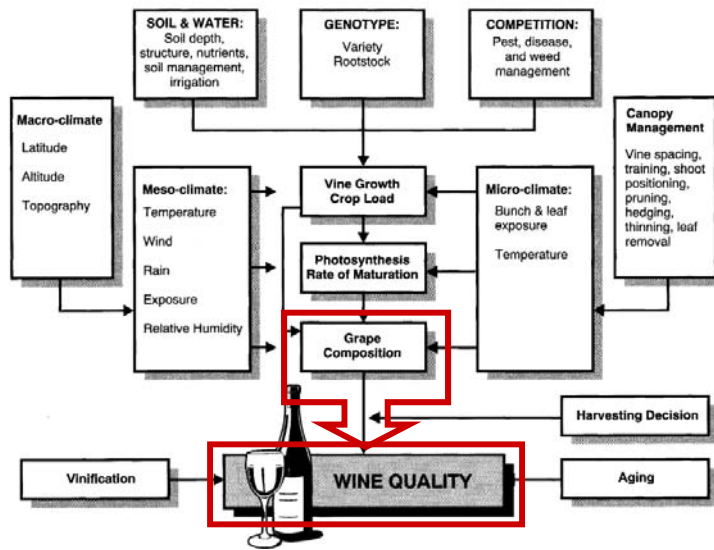
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Jones, 2007





# Inputs Responsible for Wine Quality



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Jackson and Lombard, AJEV, 1993



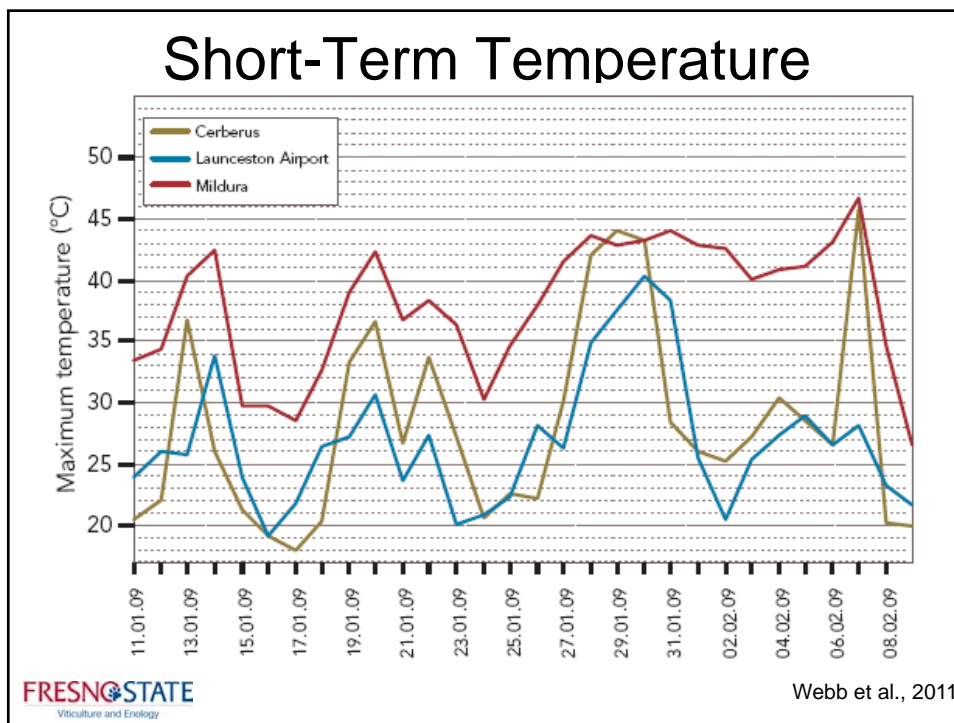
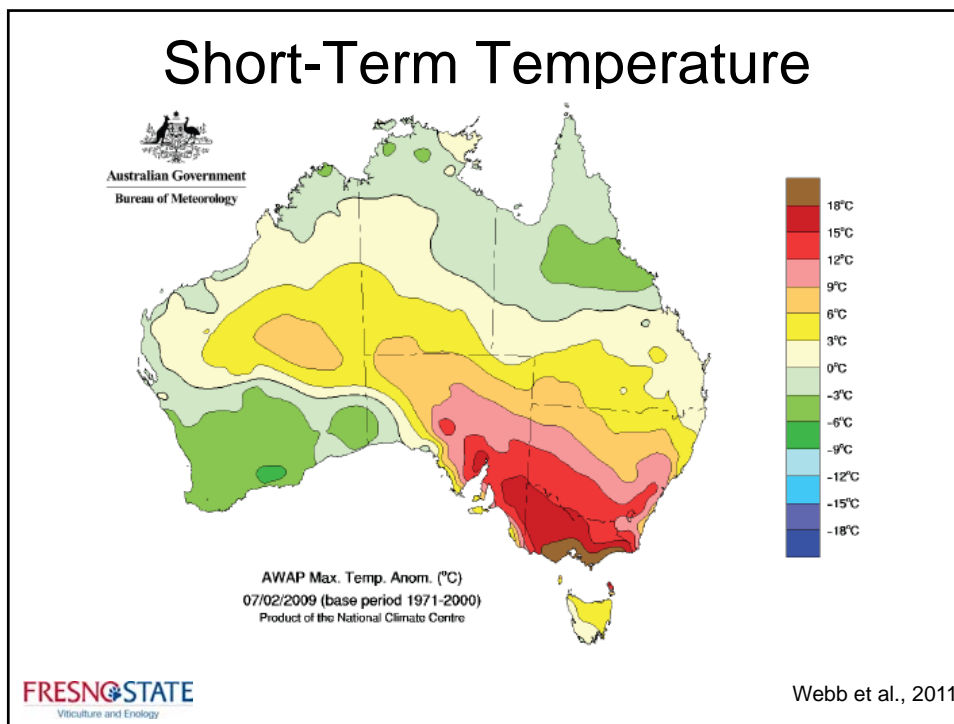
<Warm climate

Cool climate >

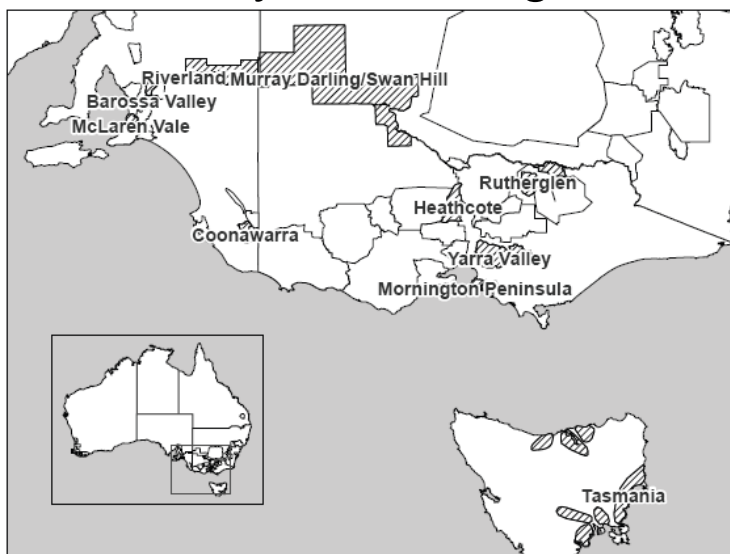


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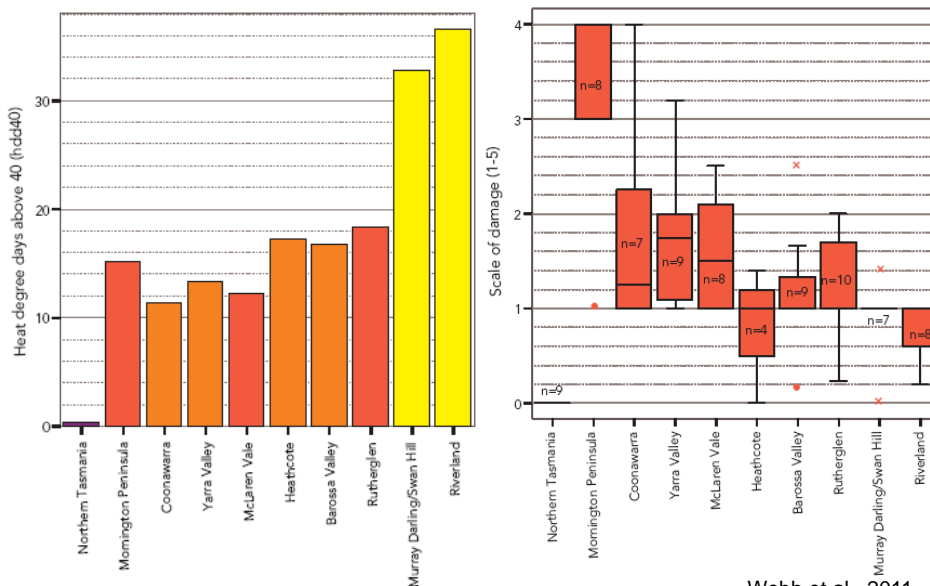
# Survey of Damage



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Webb et al., 2011

# Extreme Heat and Damage



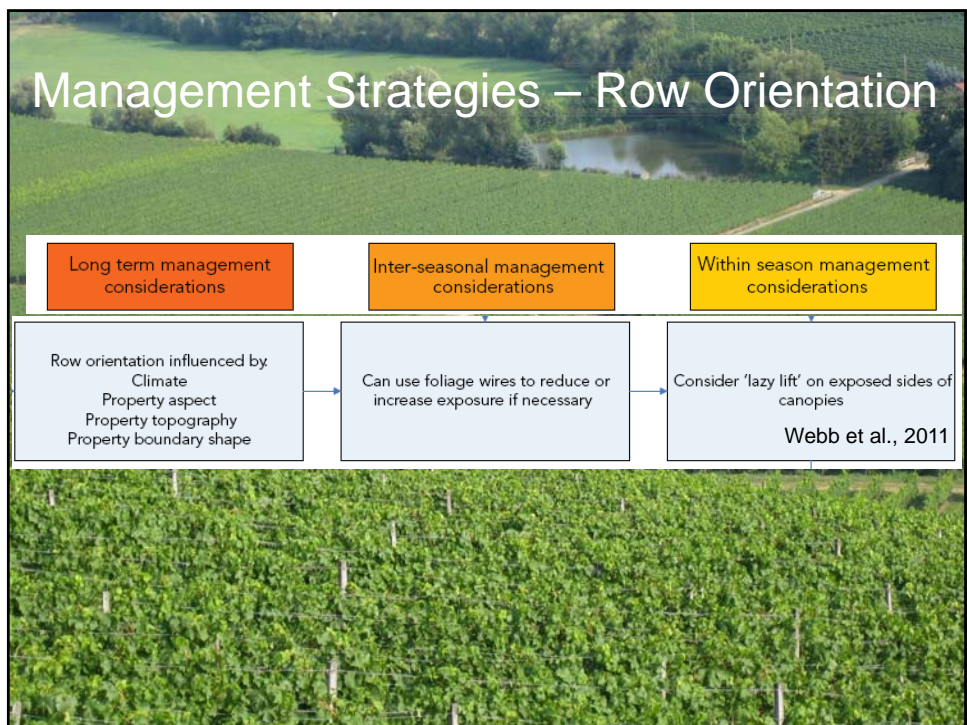
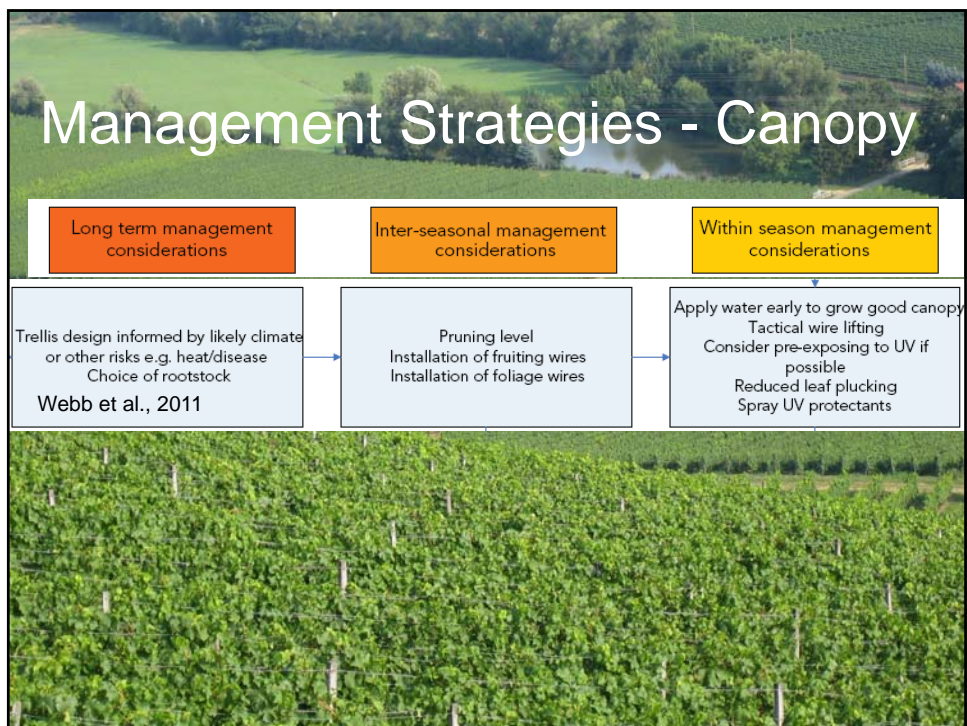
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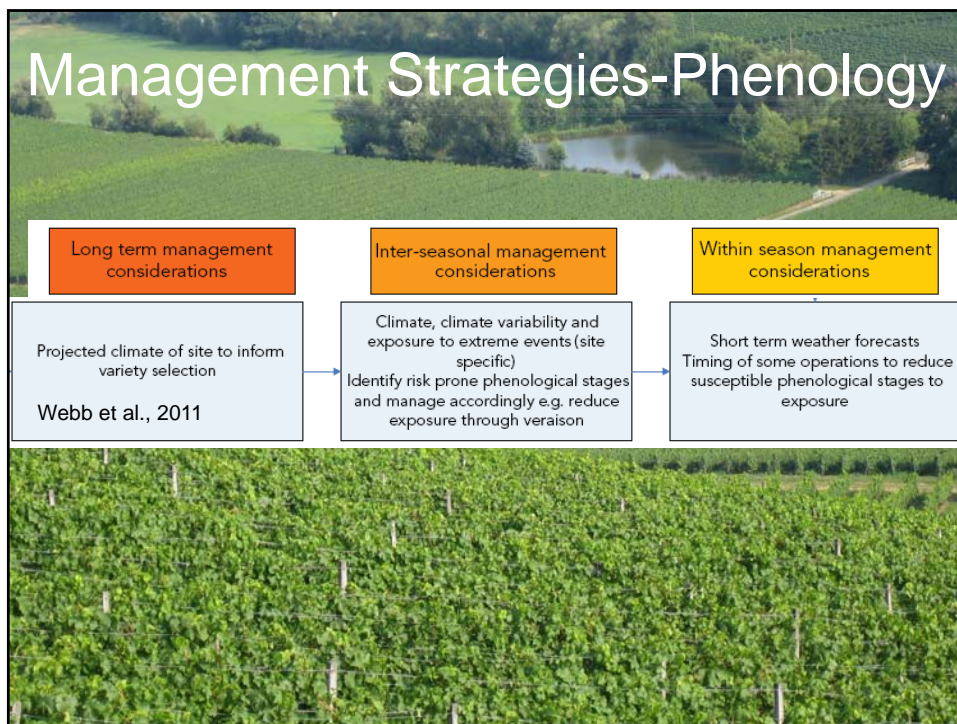
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## Final Thoughts

- Viticultural areas of the world are warming
- Viticulturists continue to develop strategies for producing quality winegrapes in a warmer world
- Role of the consumer
  - Change in style preference
  - Change in varietal preference
    - Hundreds of known winegrape varieties
    - Cabernet Sauvignon, Merlot and Chardonnay: 50% of consumption
    - Eight varieties: 76% of wine consumed

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Courtesy of :

Arnaud at  
Boutique John Euvrard Sélection  
Lyon

and

The Insight Cruises Team