Viticulture et changement climatique: vrai ou faux enjeu

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Discussion points

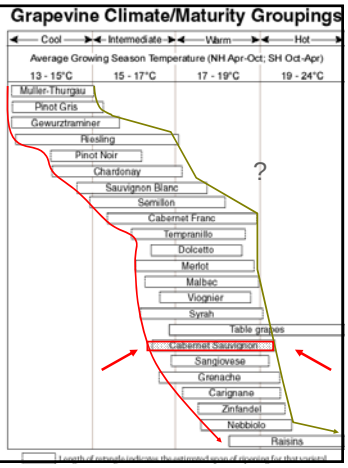
1. Temperature, a problem?
2. Climate requirements
3. Soil requirements
4. Fruit composition
5. The CO_2 problem

1. Temperature

If we are afraid – we should do more careful climate anlyses of wine regions!

News Nov. 22. 2010: 2010 most likely the hottest year on record!

Temperature requirements



Jones et al. 2005

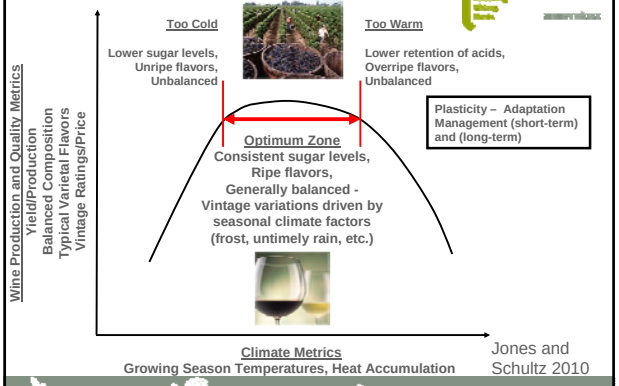
2. Climate requirements

A climate analysis of Cabernet Sauvignon areas in 3 countries

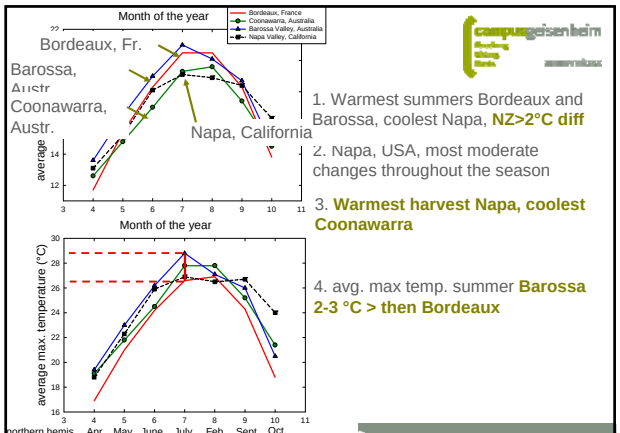
Bordeaux versus other Cabernet areas

Napa Valley, USA, Coonawarra, Barossa, Austr.

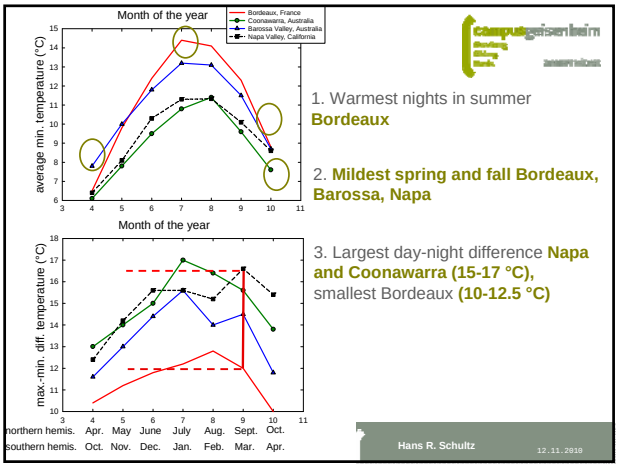
Variety-Climate Thresholds



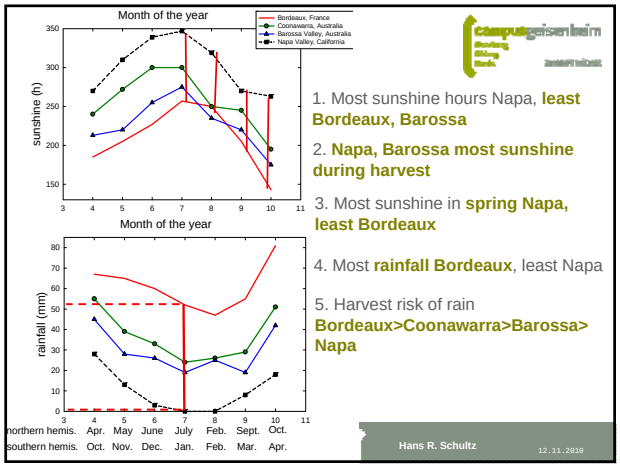
Jones and Schultz 2010



1. Warmest summers Bordeaux and Barossa, coolest Napa, **NZ>2°C diff**
2. Napa, USA, most moderate changes throughout the season
3. **Warmest harvest Napa, coolest Coonawarra**
4. avg. max temp. summer **Barossa 2-3 °C > then Bordeaux**

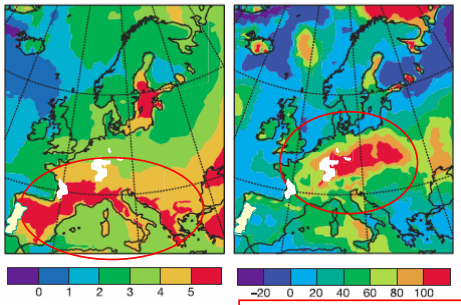


1. Warmest nights in summer **Bordeaux**
2. **Mildest spring and fall Bordeaux, Barossa, Napa**
3. Largest day-night difference **Napa and Coonawarra (15-17 °C),** smallest Bordeaux **(10-12.5 °C)**



1. Most sunshine hours Napa, **least Bordeaux, Barossa**
2. **Napa, Barossa most sunshine during harvest**
3. Most sunshine in **spring Napa, least Bordeaux**
4. Most **rainfall Bordeaux**, least Napa
5. Harvest risk of rain **Bordeaux>Coonawarra>Barossa> Napa**

Temperature prediction for Europe



Temperature change (°C)

Temperature variability (%)

Illustrated after data from Schär et al. (2004) Nature 427, 332-336

Temperature variability will accelerate the hydraulic cycle and will cause substantial fluctuations in precipitations

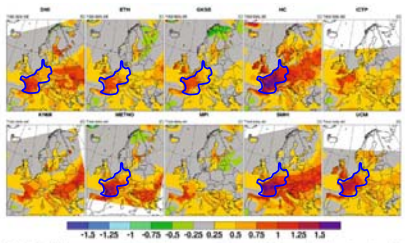
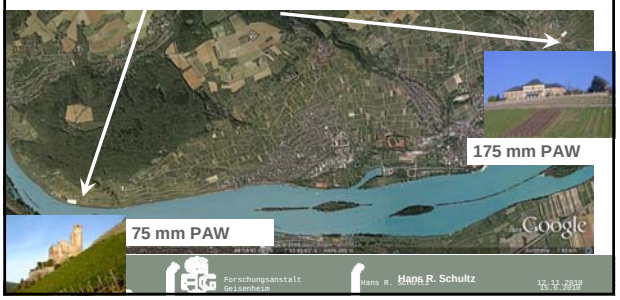


Fig. 2 a Total daily temperature variability (K) during summer (JJA) in CTL climate (1961–1990) simulated by ten different regional climate models and derived from the observational ENSEMBLES gridded data and ECAD station series. b Simul daily temperature variability (K) in SCN (2071-

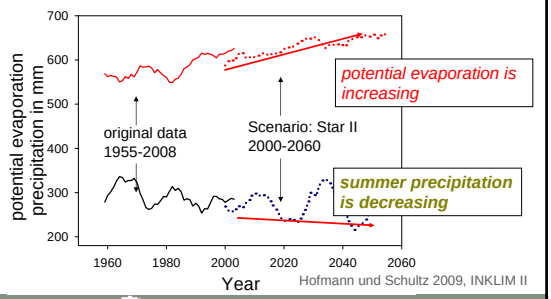
Fischer and Schär 2009 Clim. Dyn.

3. Soil requirements

future water relations of Riesling areas
example Rheingau

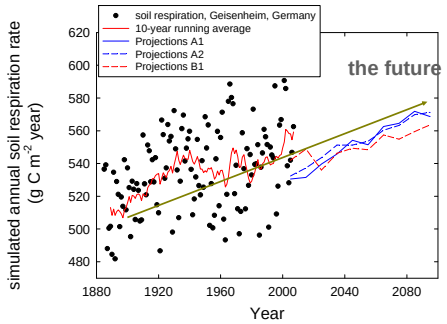


1. Precipitation during the growing season will decline (for mid-northern latitudes increase in winter)
2. Evaporative demand of the atmosphere is increasing. Example Geisenheim (April-September, 10-year running mean)



Hofmann und Schultz 2009, INKLIM II

Changes in the soil (organic material)

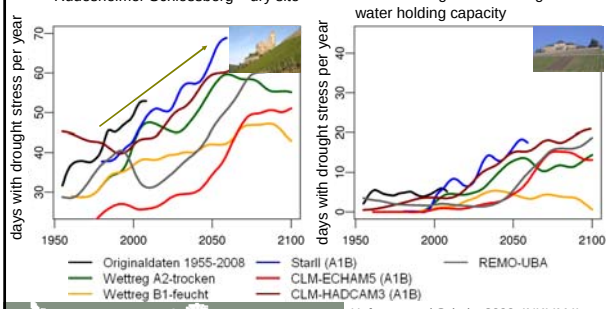


+ 15 %

Possible changes of water relations in the future

Rüdesheimer Schlossberg – dry site

Johannisberger Schloss – good water holding capacity



Hofmann und Schultz 2009, INKLIM II

Rootstocks?

Riesling in Australia

Adelaide Hills, Australia

4. Fruit composition

basic fruit composition has changed over the past 40 years

Results 1970 - 1986

Guyot 2,00 m x 1,2 m			cordon 2,00 m x 1,5 m		
t/ha	°Alc.	Ac. g/L	t/ha	°Alc.	Ac. g/L
12.6	9.6	15,5	11,3	9.7	15,7

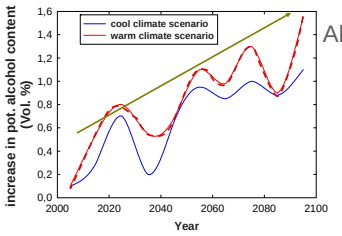
Kiefer and Weber 1992

Results 1994 - 2009

Guyot 2,00 m x 1,2 m			Minimal pruning 2,80 m x 0,85 m		
t/ha	°Alc.	Ac. g/L	t/a	°Alc.	Ac. g/L
11,3	12.4	9,1	18,6	11.1	10,0

4. Fruit composition

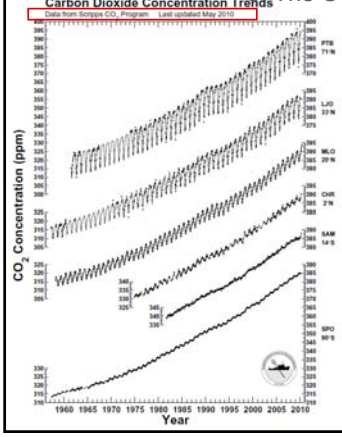
Can we change berry ripening?

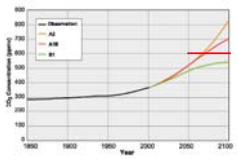


Alcohol Content

Hofmann, Schultz 2007

5. The CO_2 problem





600 ppm

IPCC report 2007

We are currently building a large research infrastructure to investigate these relationships

vegetables vigne apple ornamentals

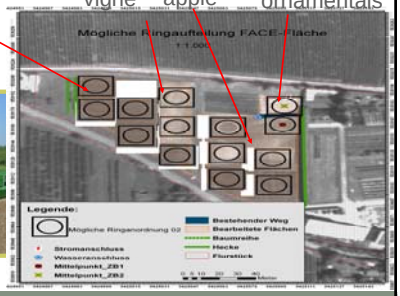
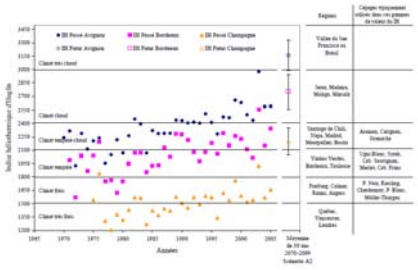
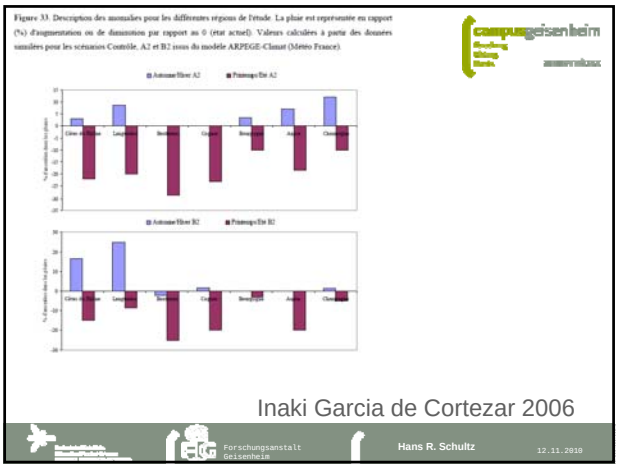


Figure 12. Carte des différents vignobles de France (Adapté de Nicolas[6] 2004)

Figure 27. Evolution de l'indice héliothermique d'Huglin (IH) pour les vignobles de Côtes du Rhône, de Bordeaux et de Champagne dans le passé et dans le futur (scénario A2) (points vides avec écart type). A côté du graphique, nous avons décrit les différentes régions que qui se trouvent actuellement dans chaque climat (toujours défini selon l'indice IH) et les cépages qui sont cultivés traditionnellement.



Inaki Garcia de Cortezar 2006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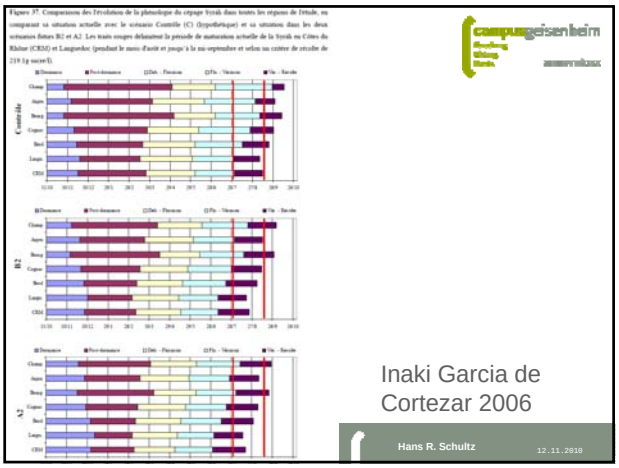
12.11.2010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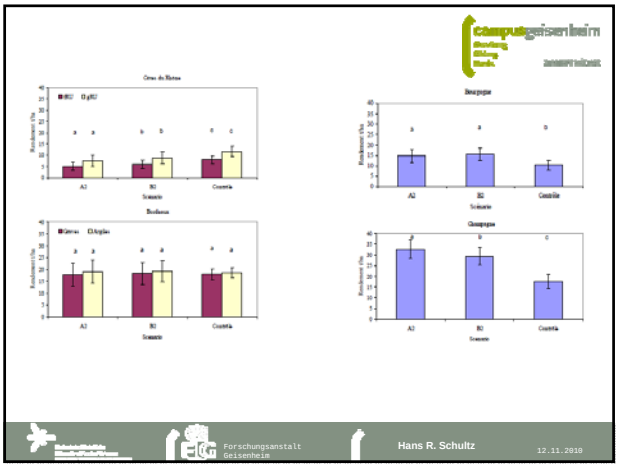
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