CLIMATE CHANGE AND ITS IMPLICATIONS FOR WINE

Whether or not you are alarmed by the prospect of global warming largely depends on where you live, your political orientation and how much you have read on the subject. While many see it as the most serious issue facing humanity, global warming remains a contentious topic, albeit not nearly as contested as it used to be, writes Dr. Jamie Goode.

While it's indisputable that average global temperatures have been rising for the last century, and more specifically over the last 50 years, the problem is that it has been difficult to demonstrate that this is caused by human activity – or 'anthropogenic', to use the trade term. Ice cores, long-term temperature records and other clues indicate that the world's climate has shifted quite significantly throughout history. In recent times, there was a warm period described as the 'Little Optimum' in the Middle Ages, followed by the 'Little Ice Age' from the 14th to the 19th centuries.

In 2004 Isabelle Chuine, of the CEFE-CNRS in Montpellier, and her colleagues used historical records of the grape harvest dates in Burgundy to reconstruct spring and summer temperatures from 1370 to 2003. They found two particularly warm decades, in the 1380s and 1420s, followed by a series of warm decades in the 1520s, 1630s and 1680s. After this a long cooling phase began, which commenced with a cold snap in the 1750s, lasting until the 1970s. 'Our results reveal that temperatures as high as those reached in the 1990s have occurred several times in Burgundy since 1370', says Chuine.

So could it be that what we are seeing now is merely one of these long-term trends? In the absence of scientific 'proof' – which because of the incredible complexity of accurate climate modelling has not been forthcoming – there has been space for climate sceptics.

Back to wine. Perhaps more than any agricultural crop, the grape vine is exquisitely sensitive to changes in average growing season temperature. So much so, that varieties have been carefully matched to site, and even within the same region some slopes are fine for one variety but not another. Small perturbations in average temperature could therefore have a strong qualitative impact on wine production. So what do the best data suggest is happening to the world's climate, and how will this effect winegrowing? The answer is complex, a little uncertain, and doesn't make cheerful reading.

The most prominent study to address the issue of global warming and its implications for wine was published in 2005 by Professor Gregory Jones and his colleagues from Southern Oregon University. Jones and his colleagues analysed 50 years of climate data from 27 different wine regions and compared them with Sotheby's 100-point vintage ratings, looking for any trends. They also ran a powerful computer program, the Hadley Centre Climate Model, to look at the projected temperature changes.

Overall, growing season temperatures have increased for most of the world's high-quality wine regions over the last 50 years, by an average of 2°C. In tandem with this rise in temperatures, the quality of vintages has also improved – so far. There is a significant positive correlation between the vintage ratings and monthly average growing season temperatures in most regions. Perhaps the most interesting part of the study concerns its predictions for the next 50 years. The results of the model suggest that the regions analysed can expect an average growing season temperature increase of 2.04°C by 2049, on top of the 2°C rise seen over the last 50 years. This is a highly significant change. The largest predicted change was for southern Portugal (2.85°C); the lowest was for South Africa (0.88°C).

The news is less encouraging for some of the warmest wine regions. 'For many of the warm-to-hot regions, the negative impacts are already being felt', Jones reports. Other regions, somewhat in between cool-to-hot growing climates, will likely have to consider other varieties that will produce better in a new climate regime. For example, in California's Napa and Sonoma Valleys, the climate has become so warm that ripening fruit is not an issue, but retaining acidity and developing flavour have become increasingly difficult in the warmer conditions. Our analysis shows that this issue could become very critical in already warm areas like Chianti, Rioja, the Hunter Valley and California's Central Valley.'

Increased temperatures could see harvest periods being brought forwards into the warmest parts of the year, with increased pest and disease burden. So while it seems that the climate change over the last 50 years has mostly had a positive effect on wine quality, the future picture could be quite different. And assuming that the projections from the climate models are at all accurate, viticulturalists across the globe will have their work cut out adapting their vineyards to take account of these changes. In some cases the careful matching of grape variety to vineyard site may have to be reconsidered.

As well as temperature changes, we have to consider climate unpredictability. Agriculture can handle difficult growing conditions, if these are predictable and occur year-on-year. Seasonal variation is much easier to manage if it can be planned for. However, what seems to be happening is that climate is becoming increasingly unpredictable. Most of Europe suffered a serious drought in 2005 after the

anomalously hot 2003 vintage and dismally damp 2002. Large variation isn't consistent for producing quality wines, where specific grape varieties are carefully planted in sites which have suitable average growing season conditions.

A further issue facing a warmer world is that of water availability. In most warm climate regions irrigation is the norm; even where this is only used as a last resort for extreme conditions, it is necessary for the establishment of young vines, and to rescue vintages where quality could be lost through periods of water stress.

Finally, there is a significant worry for growers in many parts of Western Europe: what will happen to the Gulf Stream? This is part of an ocean circulation system known in the trade as the 'Ocean Conveyor', or the 'Northern Hemisphere Thermohaline Circulation', which shifts large amounts of heat from equatorial regions northwards between North America and Western Europe. This ocean flow releases its heat in cooler northerly regions and is responsible for tempering what would otherwise be a much cooler climate. The driving force for this conveyor is the fact that colder water is denser than warm, and saltier water is denser than less salty water. Once this North Atlantic ocean flow, which is very salty, has released its heat, it becomes cooler and sinks, drawing more water from warmer areas and maintaining the flow. What would happen if this water didn't sink? The answer is that the conveyor would cease. Evidence from ice cores suggest such a conveyor shut-down has occurred several times in the past, leading some commentators to dub it the 'Achilles heel' of the world's climate. If the conveyor were to shut down now, the effects would be disastrous for most of Europe's wine growing regions, with a drop in average temperatures of up to 5°C. To put it bluntly, Europe's wine regions would be ruined. So, paradoxically, global warming could actually prove to be the catalyst for a much colder future for many of us. Signs that global warming has been affecting the vital global conveyor are already emerging. It's not likely that we'll see a complete shutdown over the next couple of decades, but this is a possibility we should be concerned about.

The message for winegrowers worldwide is that we should be prepared for change. The hope is that this change will be manageable. From the perspective of winemakers, the important fact is that warming is occurring and looks set to continue. It seems likely that increasing temperatures are at least partly to blame for rising alcohol levels. Increasingly, a challenge for growers will be how to manage vineyards to achieve optimum flavour development at sugar levels that don't result in overly alcoholic wines. Even in the classic European regions, the focus is turning away from paying growers by potential alcohol - once a reliable for grape quality,ut no longer.

One thing is for sure: there will be winners and losers, but it's likely that for every winner, there will be scores of losers. ■

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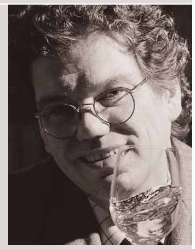
QUOTE UNQUOTE

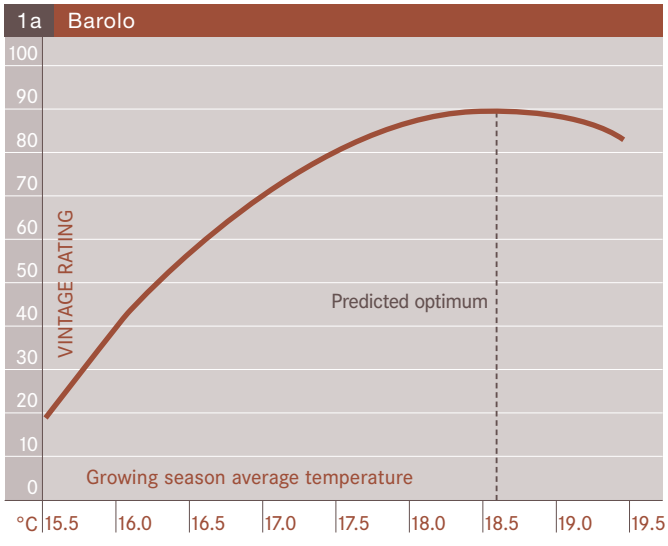
» We are buying vineyards higher up the slopes «

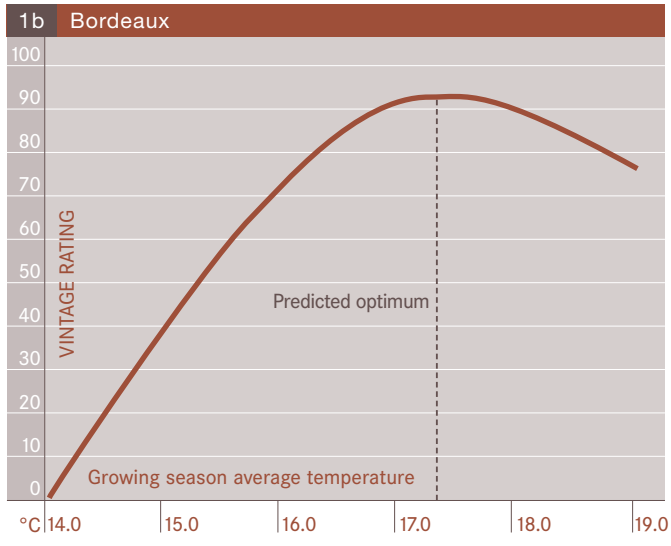
Ernie Loosen



Today, in order to prolong the grapes' ripening period, we are buying vineyards higher up the slopes or around a bend in the river that we would not have touched when I took over the estate twenty years ago. That gives our rieslings their lightness and elegance. Almost all of the kabinetts that we sell from our finest sites are legally ausleses.

Ernie Loosen, one of the most well-known personalities on the Mosel, has seen climate change affect his rieslings over the past two decades.





The average 2°C rise in temperature over the last 50 years has improved the quality of vintages – so far. The expected increase of another 2°C by 2049 could have a devastating impact as the average growing season temperature surpasses the predicted optimum. In many of the warm to hot regions, the negative effects are already being felt.

SOURCE: PROFESSOR GREGORY JONES, SOUTHERN OREGON UNIVERSITY