

“TERROIR” AND CLIMATE CHANGE IN FRANCONIA / GERMANY

Ulrike Maaß and Arnold Schwab

Bavarian State Institute for Viticulture and Horticulture
An der Steige 15, D-97209 Veitshöchheim
ulrike.maass@lwg.bayern.de

ABSTRACT

Franconia which is a „cool climate” winegrowing region is well known for its fruity white wines. The most common grape cultivars are Silvaner and Mueller-Thurgau.

Franconia is a landscape of contrasts with various climatic conditions. The vineyard sites are located at a height between 120 m and 420 m above sea level on slopes and steep slopes as well as on terraces.

In favourable south orientated sites the maximum temperatures reach about 40° C (peak value year 2003), while winter frosts cause deep temperatures down to about -27°C (year 2002) in valleys or exposed sites.

At present, the Franconian winegrowing region is being affected by the global climate change. Several forecasts predict an average annual temperature increase of approximately 2°C for Southern Germany until the year 2050. During the same period an increased occurrence of temperature-related extreme events is expected.

In case of permanent increase of the average air temperatures and temperature-related extreme events, the cultivation of grapes on E, W and NW slopes could be considered appropriate to preserve the fruity character of traditional white wines.

KEYWORD

Vineyard Climate, Climate change, Terroir, Topoclimate, Microclimate

INTRODUCTION

The project “Franconian vineyard climate” aims at recording local climatic peculiarities of Franconian vineyard sites. The research is based on data of different meteorological networks (about 30 stations, see Fig.1).

This empirical basis will serve to reveal changes of regional winegrowing conditions and to develop adaptional measures to manage the expected climate change.

The past development of the climatic conditions of different sites will be analyzed and projected into the future. On the basis of these results the future prospects of individual sites and especially of former favourable sites will be considered.

Object of this research is a modified ranking of vineyard sites with respect to prospective climatic conditions.

Furthermore the selected parameters air temperature, soil temperature, global radiation, precipitation and others enable comparisons of the Franconian vineyard climate with that of other German and European vineyards (Fig.2).

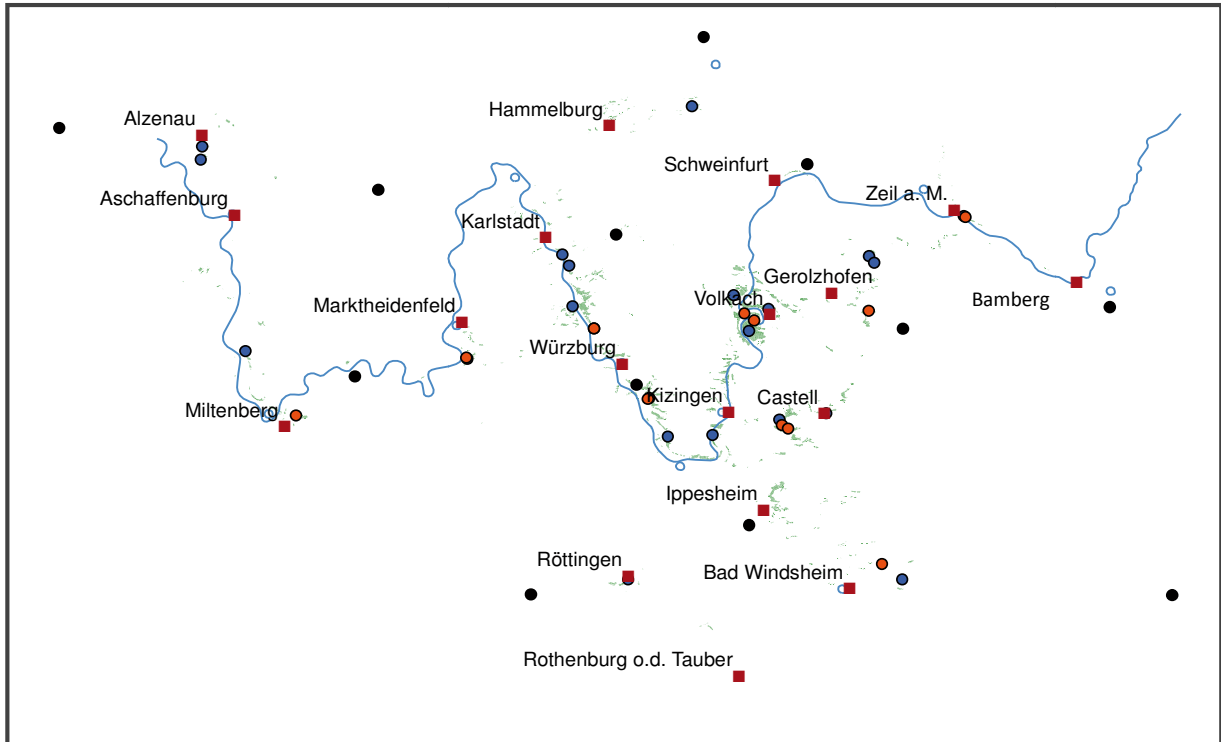


Fig. 1: The Franconian winegrowing area comprises an area of approximately 6,000 hectares and extends to a length of about 130 km (beeline) from east to west between Bamberg and Alzenau along the river Main. The coloured spots mark different meteorological stations.



Fig. 2: Meteorological station of Nordheim. The station collects parameters like air and soil temperature, global radiation, precipitation and wind velocity

FIRST RESULTS

Fig.3 displays the permanent increase of the average air temperature of the growing period (including months April to October) in Würzburg (DWD) since about 1980. According to studies in Württemberg/Germany (Rupp & Kast 2010) the maximum increase in temperature appears during the months April to June. Thus the energy gain of grapes during growing season is much higher than 30 years ago, and ripening is shifted from September/October to August.

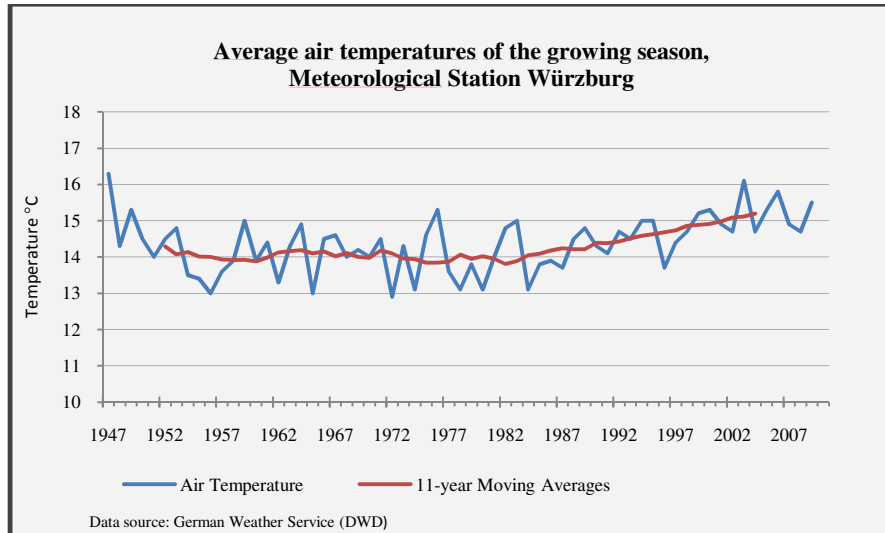


Fig. 3: Average air temperatures (including months April to October) of the meteorological station Würzburg, 1947-2009 with 11-year moving averages

Regarding temperature-related extreme events, the year 2003 with its “record summer” in Germany has to be mentioned. Station Würzburg (DWD) recorded 15 hot days in August 2003 (30-year climate reference: 3 days!) and 6 tropical nights with daily minimum temperature >20°C during the first half of August (30-year climate reference: 0!), on the other hand 6 frost days in April.

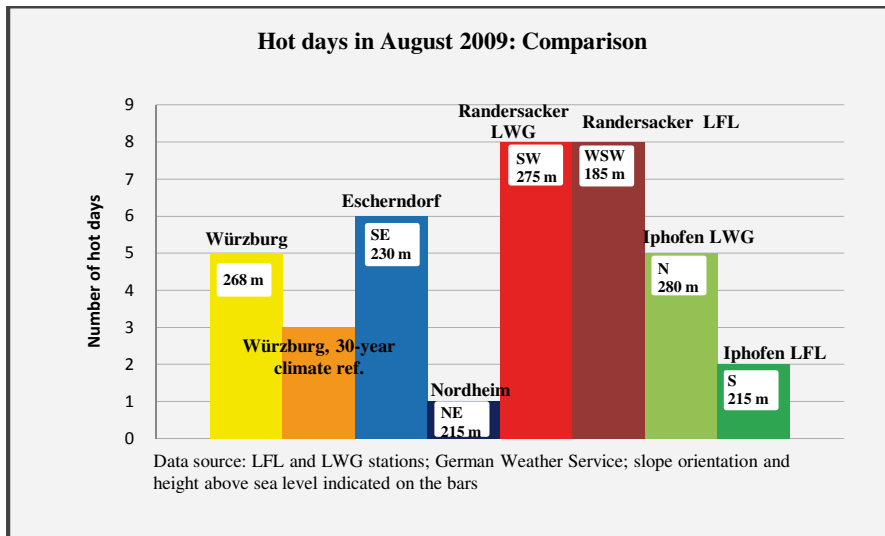


Fig. 4: Number of hot days (daily maximum temperature >30°C) in August 2009, recorded by stations of LFL (Bavarian State Institute for Agriculture) and LWG, compared with Würzburg

In Fig.4 the number of hot days in August 2009 as measured by LWG stations are compared to that of station Würzburg (DWD).

As is well known, a series of hot days during maturation influences the typical character of local wines negatively. The stations of Randersacker (SW, WSW) measured eight hot days, i.e. three days more than Würzburg (DWD) and nearly three times more than the 30-year climate reference. The NE slope of Nordheim recorded only 1 hot day.

CONCLUSIONS

The Franconian winegrowing region experienced increased temperatures mainly during the growing season within the last decades. This leads to advanced shooting and flowering of traditional grape cultivars and thus a higher risk of damages by late frost events. On the other hand an increased occurrence of temperature-related extreme events enhances the danger of draught damage.

According to the German Weather Service (DWD), the latest decade 2000-2009 was the warmest in Germany since the beginning of weather recording.

Assuming a continuous increase of the air temperatures and temperature-related extreme events in Franconia, the cultivation of grapes on E, W and NW slopes could be considered appropriate to preserve the fruity character of traditional white wines.

BIBLIOGRAPHY

German Weather Service, 2009, Clima Report 2008, Offenbach, 24 pages

Rupp, Kast, 2010, Cultivation Methods in a Changing Climate; oral communication