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# CLIMATE AND TERROIR IN PIEDMONT: CASE-STUDY OF LANGHE'S CUESTAS

INTERNATIONAL WORKSHOP "A TASTE OF INNOVATION:  
SCIENCE FACTS ABOUT PIEDMONT TERROIR"

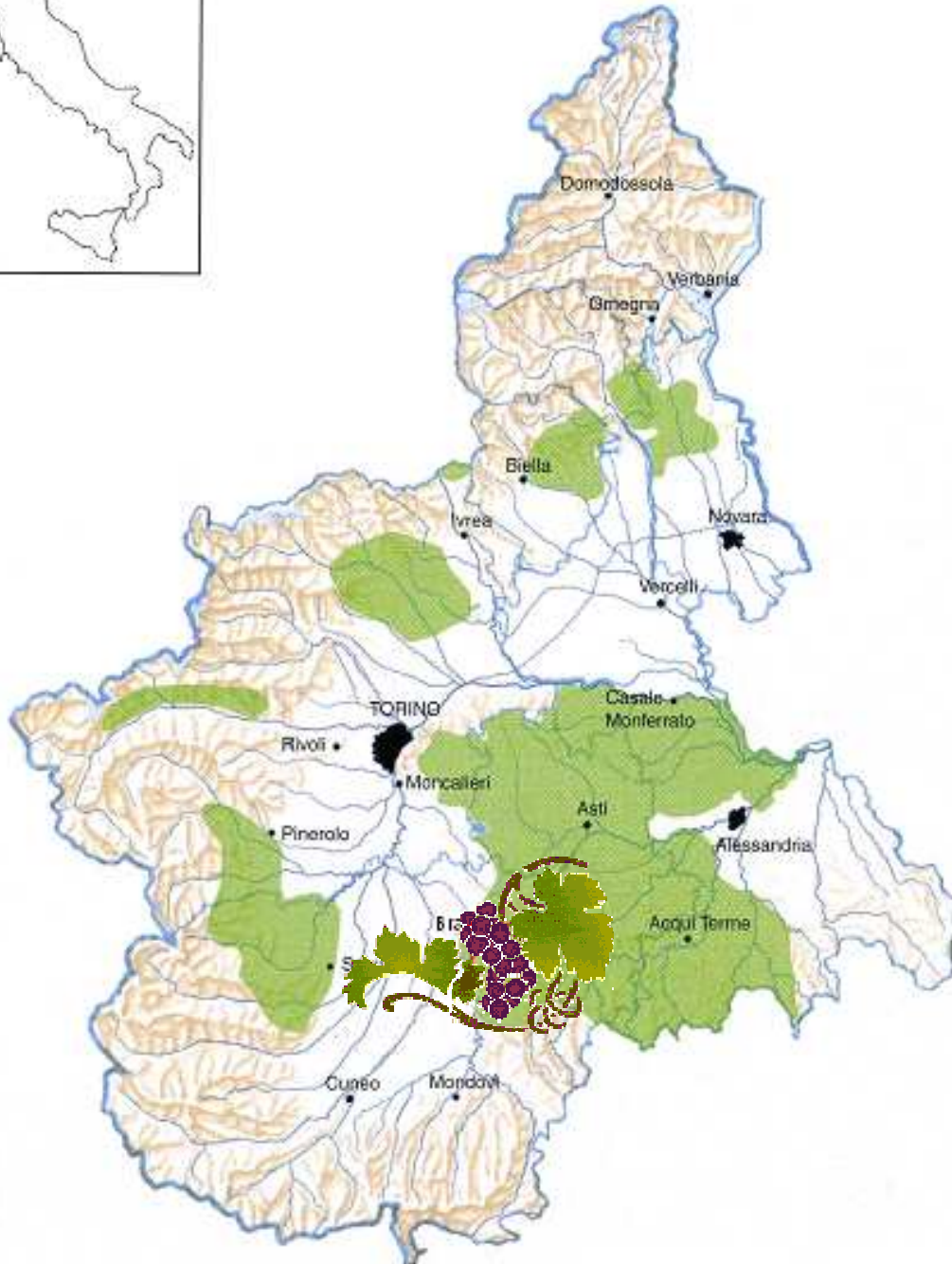
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*Dipartimento di Scienze della Terra  
Università degli Studi di Torino*



## VITICULTURAL AREAS



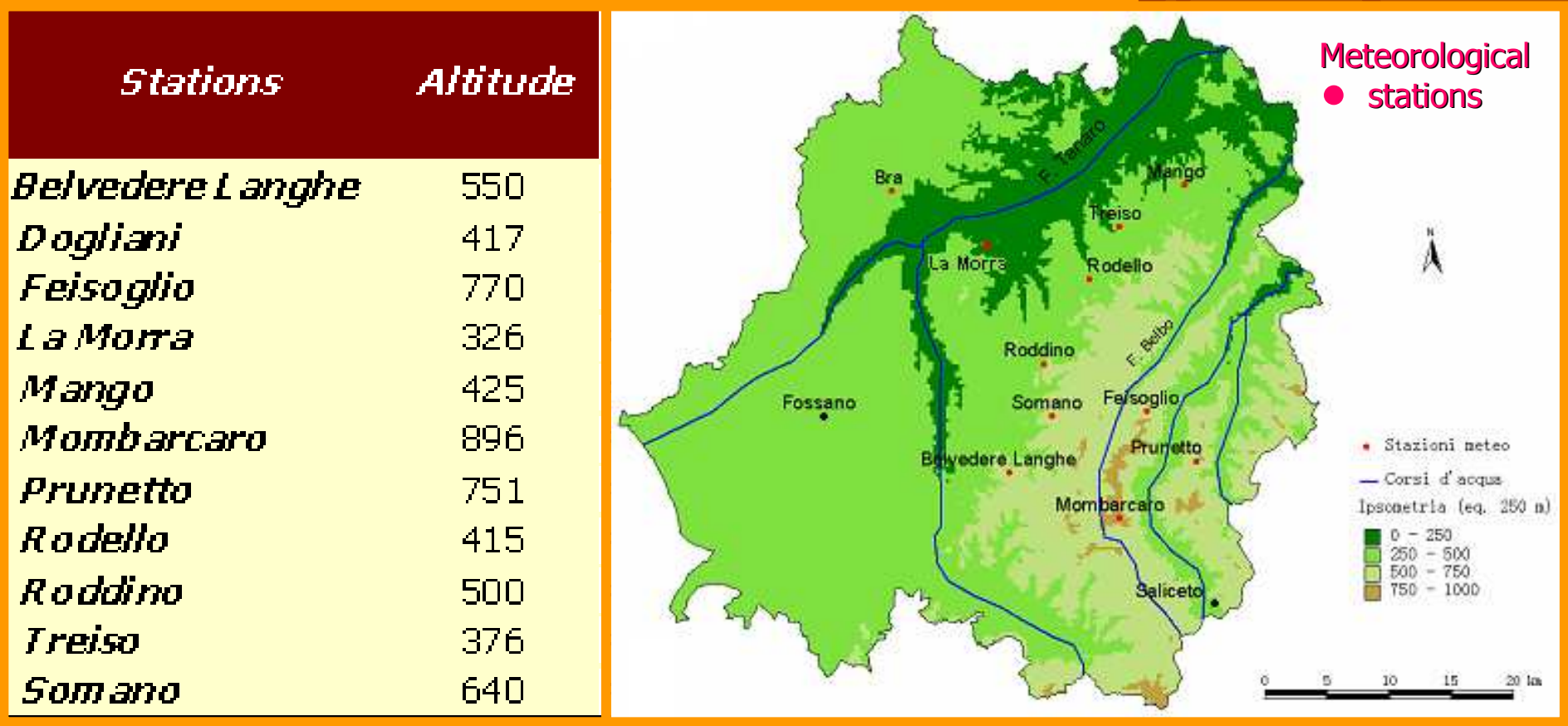
In Cuestas Langhe one of the most important vineyards in the Piedmontese grape-growing industry is cultivated: the Nebbiolo.

Thanks to the quality of its grapes, wines rated among the most valuable on a national and international level like Barolo, one of the first D.O.C.G. (D.P.R. July 1st 1980) in Italy can be produced.



# Climate and terroir

Quality and peculiarity of any wine are tightly connected to the type of climate. Its variations both in time and space, on the macro and meso-climatic scale affect the type of wine.





Temperature is the most important parameter in the vine vegetative cycle.

According to the “European vineyards map” carried out by the Comité Interprofessionnel du Vin de Champagne (CIVC, 1998, 2001) the area of Cuestas Langhe is classified as “cold terroir”.

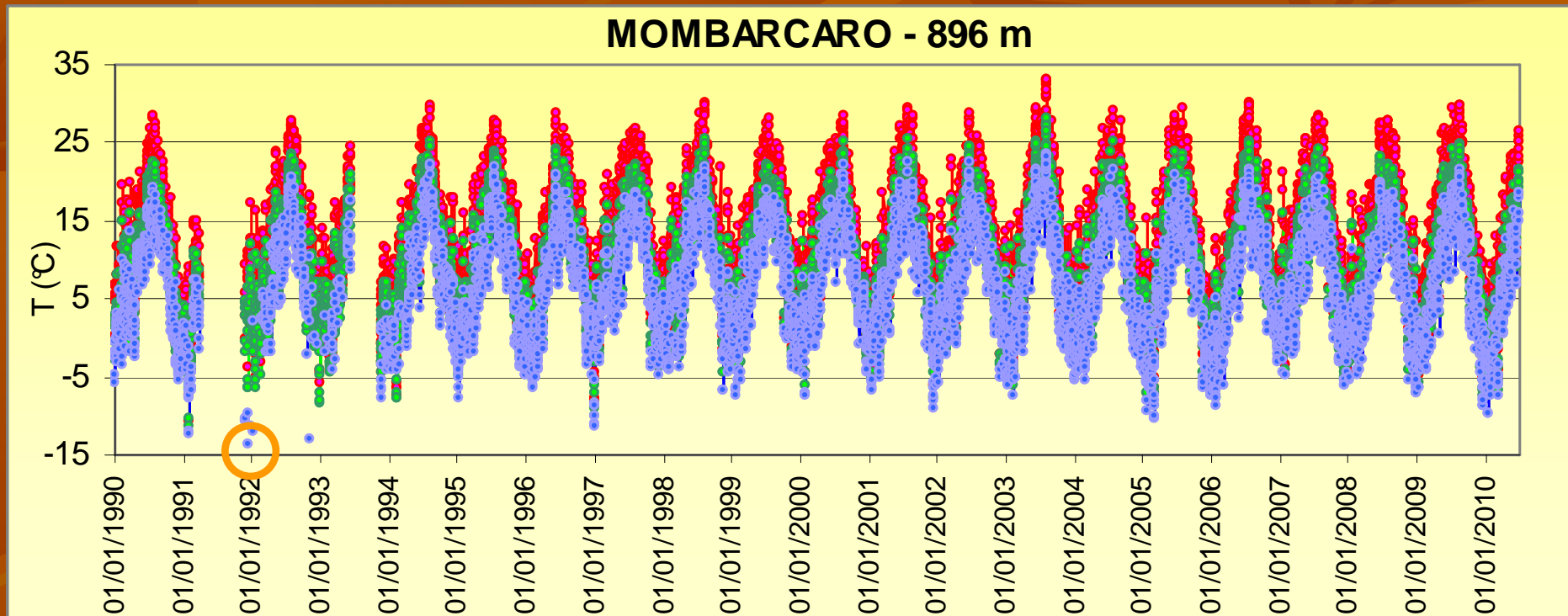
Limit dictated by the isothermal 10°C





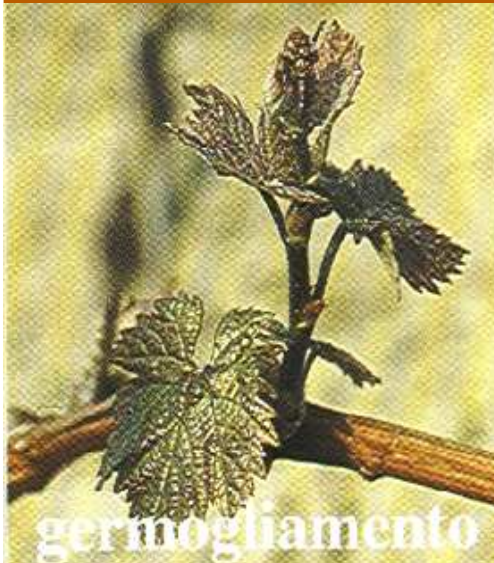
# Winter frost days

During wintertime temperature minimum below  $-15^{\circ}\text{C}$  may damage the root system (A.O.C., 2001).



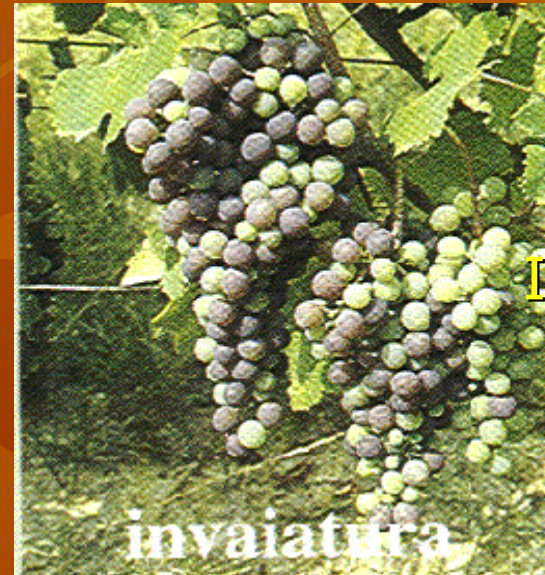
In all the considered stations, the minimum temperature never dropped below  $-15^{\circ}\text{C}$ . The lowest T,  $-13.8^{\circ}\text{C}$  was registered at Mombarcaro (the highest station = 896 m) in December 1991.

# Vineyard phenological phases



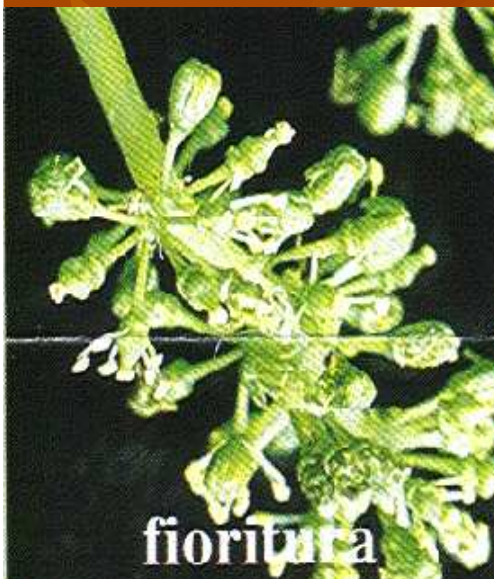
## BUDDING

Early,  
I decade April



## VERAISON

Middle early,  
II decade August



## BLOSSOMING

Early,  
I decade June



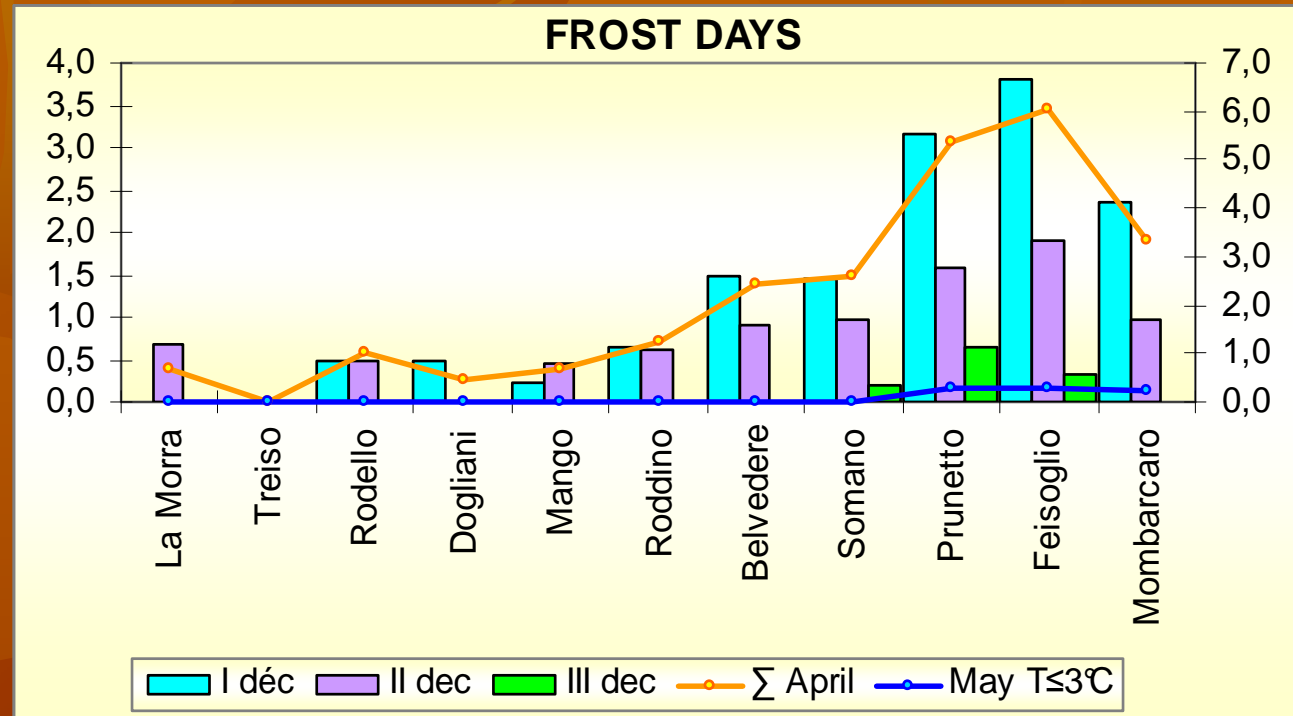
## MATURATION

Late,  
II/III decade  
October

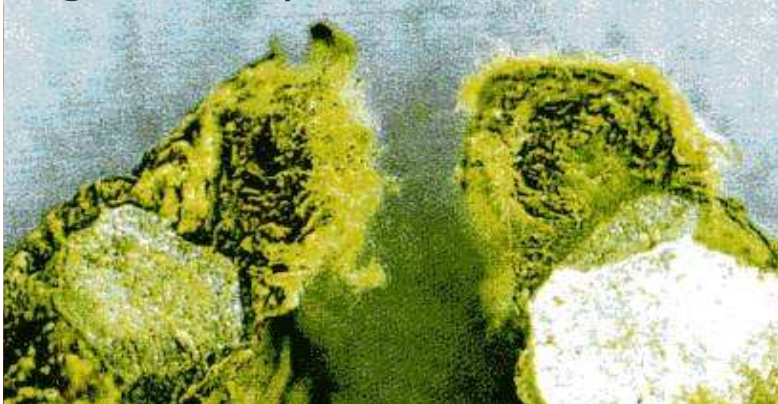


# Spring frost days

The late frosts will affect vegetation and the rest of the vegetative cycle. It should be checked especially in May (shoot period), if  $T < 3^{\circ}\text{C}$ .



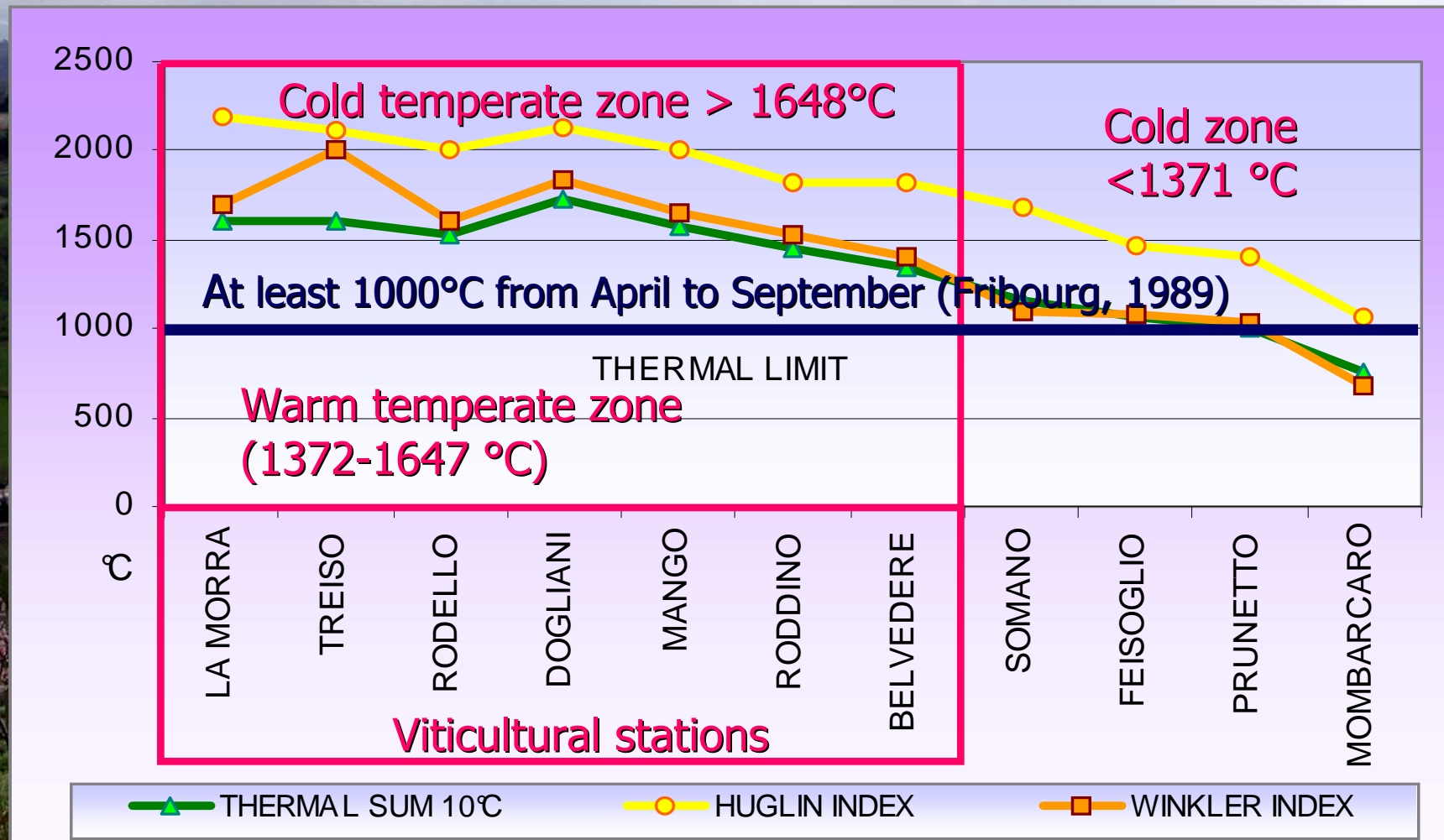
The disasters caused by spring frosts:  
Right: healthy bud; left: frost bud



The frost damage are related to the content in water bodies, so that the dormant buds are frost resistant, while the young sprouts are damaged already below  $3^{\circ}\text{C}$  (Crema, 2003).

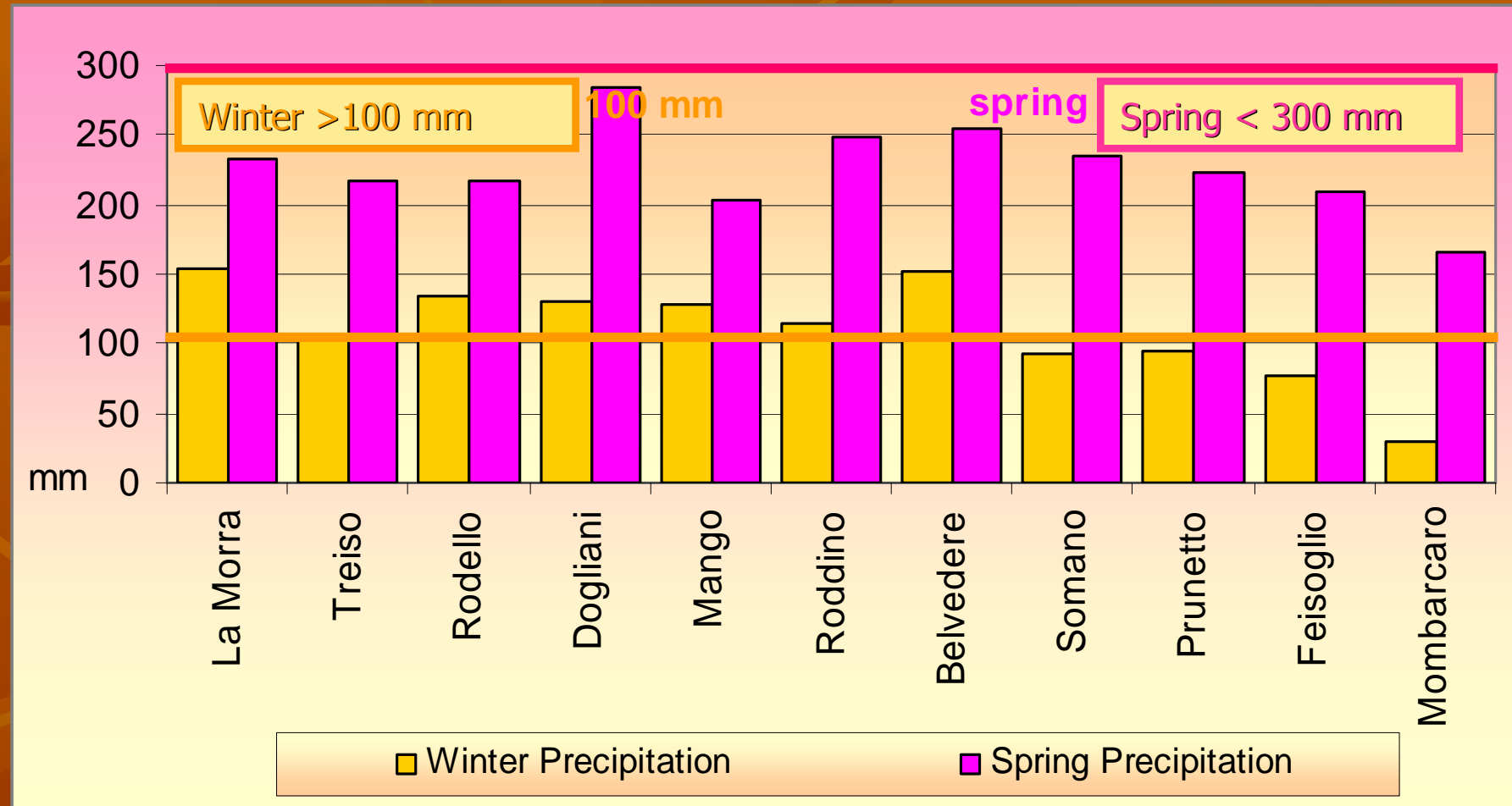
# Thermal sum

Vine needs to accumulate a certain amount of useful temperature degrees (GDD = Growing Degree Days) beyond the threshold of 10°C/day.





# Precipitation



Spring precipitation values  $> 300$  mm  $\Rightarrow$  *plasmopara viticola*

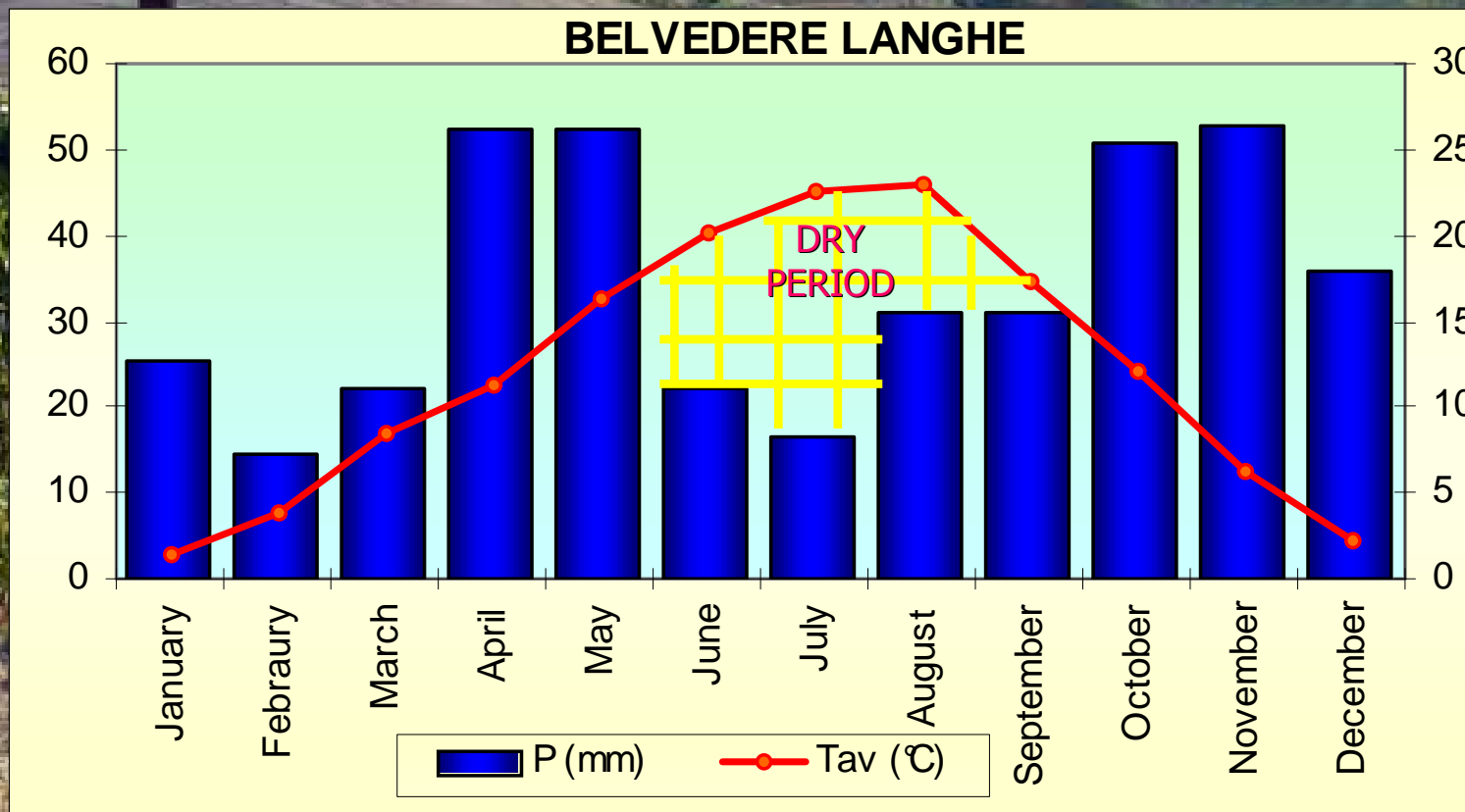
Winter precipitation values  $> 100$  mm  $\Rightarrow$  storage

# Dry period

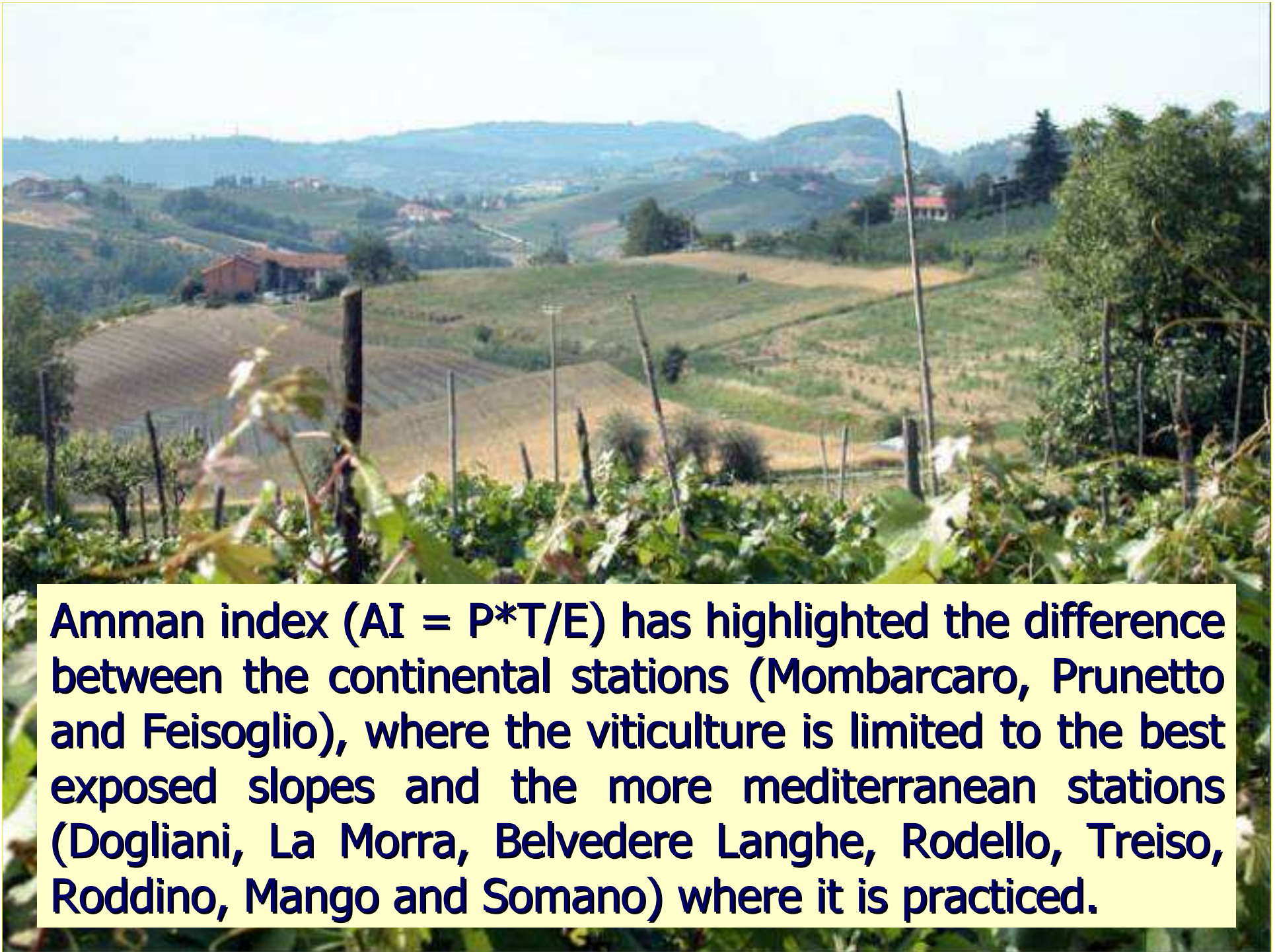
The vine is a xerophilous plant, it needs a water-poor soil.

All the stations have a dry period in the summer.

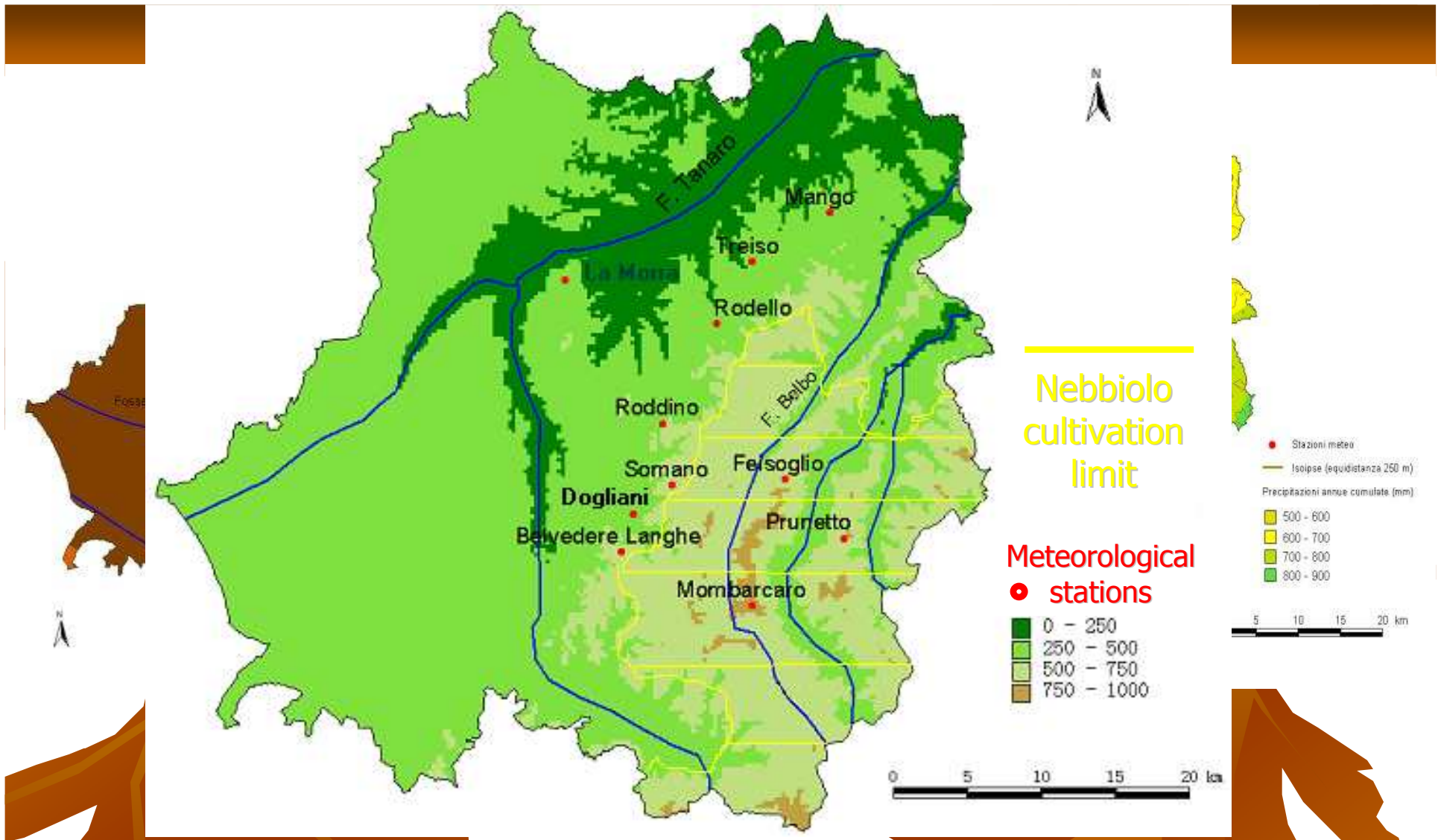
This is a climatic peculiarity in Piedmont and it means that the Langhe area is suitable for viticulture.








**Amman index ( $AI = P \cdot T / E$ ) has highlighted the difference between the continental stations (Mombarcaro, Prunetto and Feisoglio), where the viticulture is limited to the best exposed slopes and the more mediterranean stations (Dogliani, La Morra, Belvedere Langhe, Rodello, Treiso, Roddino, Mango and Somano) where it is practiced.**



The limit of viticulture is around 600 m and the vine Nebbiolo is not performed in the eastern and southern part of the Langhe area (yellow horizontal lines).





*The climate does not directly contribute to the determination of the terroir but it is still the most important physical factor that limits and conditions the vine's cultivation and growth.*

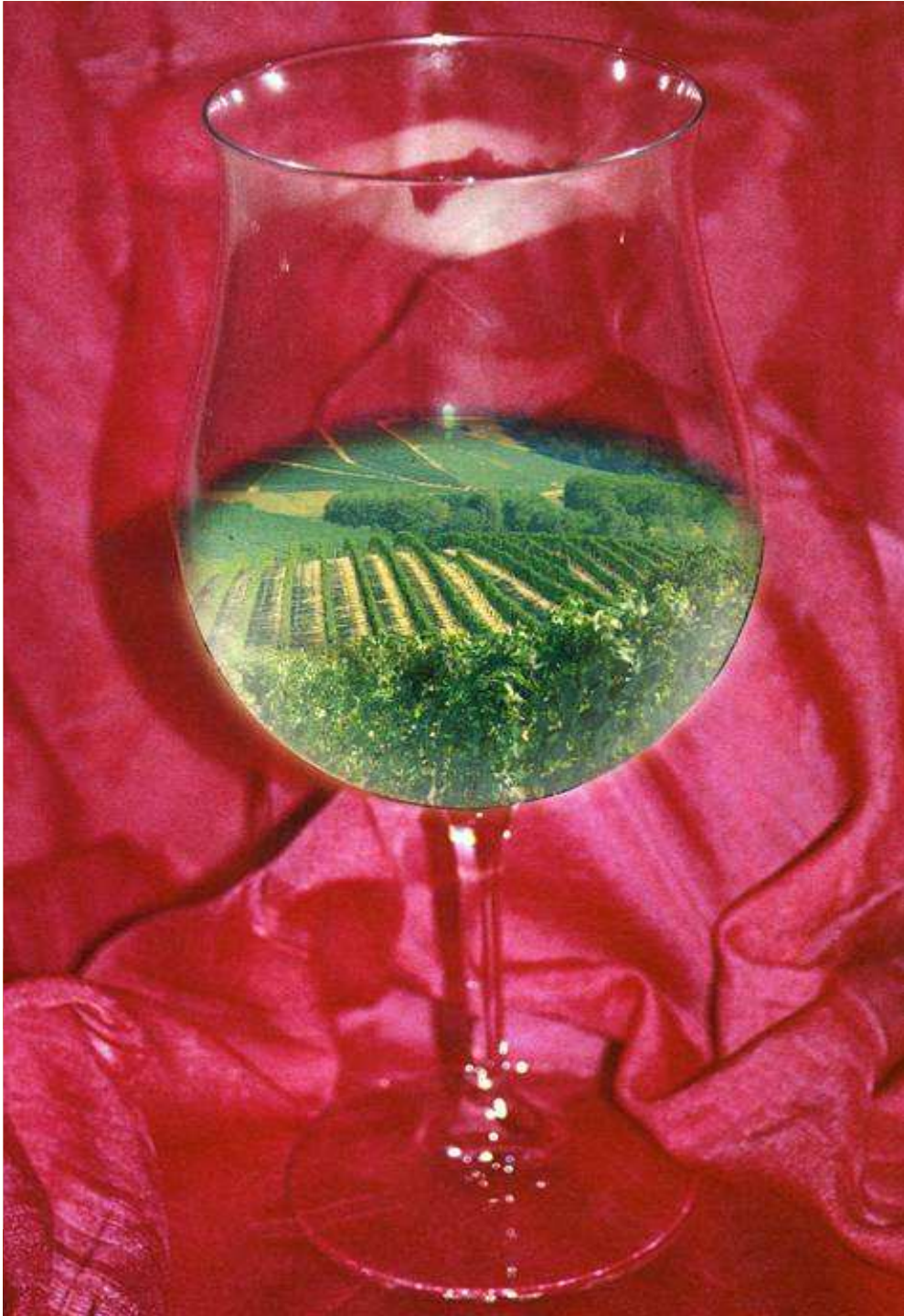
# Climatic change

In the last years a marked increase in temperatures has been recorded, particularly in the minimum values ( $0.7^{\circ}\text{C}/50\text{y}$  in Piedmont).

If this trend will be confirmed, in the coming years the vineyards cultivation limits could rise significantly.







**Thank you  
for your  
attention!**