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Climate variability and Port wine quality

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Recent warming trends for Portugal have been found to be steepest in winter and spring and more pronounced for minimum than for maximum values of temperature (Miranda et al, 2002). These trends and associated changes in temperature and precipitation regimes may exert strong influences on agriculture systems. For instance, high values of the North Atlantic Oscillation (NAO) index have been shown to significantly reduce precipitation over Iberia and therefore induce low yield wheat crops in Portugal (Gouveia and Trigo, 2006).
Port wine is produced from grapes grown in selected areas of the Douro valley, the so-called Região Demarcada do Douro, the first wine-producing region of the world (dating from 1758). A vintage wine is made from grapes that were grown and harvested in a single specified year and is classified as such because of the above average quality, a status that is attributed by Port houses in their best years.
The Douro region presents distinctive climatic, topographic and soil characteristics. While the latest factors are fixed in time, the former may considerably change from year to year, exposing the Port wine productions to a large risk associated to interannual and intra-seasonal climatic variations. It is therefore to be expected that high quality wines are generally associated to optimum climatic conditions.
In this work we have performed an analysis of the distinct behaviour of several meteorological fields in vintage versus non-vintage years. The relative importance of maximum and minimum temperature, precipitation and frost days is assessed for each individual month of the vegetative cycle and their importance to a high quality wine year is evaluated. Composites of 500 hPa geopotential height and sea level pressure fields over the Euro Atlantic region are also compared for vintage and non-vintage years.
Results reveal a strong dependence of vintage production on maximum temperature and precipitation during spring and summer (the growing season), suggesting that this type of analysis may be used in developing a tool that may help anticipating a vintage year, based on already available seasonal climate outlooks.

Célia Gouveia and Ricardo M. Trigo. “Influence of climate variability on wheat production in Portugal”. GeoENV2006- 6th International Conference on Geostatistics for Environmental Applications, Rhodes, October, 25-27, 2006

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