



Climate Observation and Modeling over Land Vines in the Context of Climate Change: a Douro Region Case Study

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Nowadays the scientific community has been interested in the climatic variability at global scale looking for its future impacts within the planetary system scale. However, the consequences of these climatic variations are still little explored in smaller scales. We know that some meteorological processes operate over slightly restricted areas and may bring some risks to people due to their activity, like floods, fog and frost (Monteiro, 2003). This is what happens, for example in viticulture where the quality of the wine, the selection of the grapevines or even the characteristics of the farming soil, also depending from local soil features like topography (soil inclination, exposition) proximity of a river or water body, will act locally on the weather. The choice of this work is due to the importance of vineyards for Portugal concerning the historical, social, economical and agricultural level. The Demarcated Douro Region (DDR): the most ancient viticultural region in the world (since 1756) and where the famous Port Wine is produced as well as the table wines also widely recognized. Not only the unforgettable landscapes with their traditional ledges lined on the slopes of the hills, the result of hard human work during centuries; not only the great number of matrixes between the green and brown colours of the leaves in Autumn; not only that water rivulet, sometimes curled, framed by slopes of a deep descending; not the white points of the manorial or more modest houses in the farms; not the white rows built by the agricultural supplementary huts connected with the production and storage of wine, more or less hidden by the foliage surrounding them, not even the ethnographic and gastronomic peculiarities are the factors which clearly distinguish the producing Region of Port Wine. The reality is the result of all these factors in a very complex tinting (Pina, 2007). This region possesses a high richness of topographic and geomorphologic contexts together with a large variety of climatic mosaics. Furthermore it is absolutely necessary to define the climatic variations which negatively interfere in the profits of the vineyard to avoid very high damages, the improper usage of technology protecting the vineyards and help the farmer to fulfill a more efficient protection against the harms caused by bad weather. Based on these considerations this study aims specifically on deepening and explaining the development of some climatic variations which are able of directly or indirectly, influence the grape grower production and at the same time study the inter connections between the weather elements and the vines behavior. With the implementation of a monitoring system within the micro-climatic scale on a vineyard planted in the DDR, we wish to study the effect of the climatic variations on grape grower areas. The temperature measurements will take place during one year, what corresponds to the active period of the vegetative cycle of the vine and to the phenological states of higher vulnerability. Second we simulated the impacts of climate change on several grapevine in the DDR using the outputs of regional climate model in association with series of climatic elements recorded in the region. This study will enable understanding into how the wine sector should be readjusted itself in order to minimize climate change impacts. This investigation was supported by the research Program TERVICLIM (ANR-JC07-194103).

References:

- MONTEIRO, Ana (2003). Atlas Agroclimatológico do entre Douro e Minho, Projecto POCTI/GEO/14260/1998, Porto, 345 p.
- PINA, Maria Helena (2007). O Alto Douro: Um Espaço Contrastante em Mutação. Imprensa Nacional - Casa da Moeda, Lisboa, 582 p.

