



Integrated Analysis of Climate, Soil, Topography and Vegetative Growth in Iberian Viticultural Regions

Helder Fraga (1), Aureliano C. Malheiro (1), José Moutinho-Pereira (1), Rita M. Cardoso (2), Pedro M. M. Soares (2), Javier J. Cancela (3), Joaquim G. Pinto (4,5), and João A. Santos (1)

(1) Centre for the Research and Technology of Agro-Environmental and Biological Sciences, Universidade de Trás-os-Montes e Alto Douro, UTAD, Vila Real, Portugal (hfraga@utad.pt), (2) Instituto Dom Luiz, CGUL, Universidade de Lisboa, Lisbon, Portugal, (3) GI-1716, Proyectos y Planificación. Dpto. Ingeniería Agroforestal, Universidad de Santiago de Compostela, Escuela Politécnica Superior, Lugo, Spain, (4) Department of Meteorology, University of Reading, Reading, United Kingdom, (5) Institute for Geophysics and Meteorology, University of Cologne, Cologne, Germany

The Iberian viticultural regions are convened according to the Denomination of Origin (DO) and present different climates, soils, topography and management practices. All these elements influence the vegetative growth of different varieties throughout the peninsula, and are tied to grape quality and wine type. In the current study, an integrated analysis of climate, soil, topography and vegetative growth was performed for the Iberian DO regions, using state-of-the-art datasets. For climatic assessment, a categorized index, accounting for phenological/thermal development, water availability and grape ripening conditions was computed. Soil textural classes were established to distinguish soil types. Elevation and aspect (orientation) were also taken into account, as the leading topographic elements. A spectral vegetation index was used to assess grapevine vegetative growth and an integrated analysis of all variables was performed. The results showed that the integrated climate-soil-topography influence on vine performance is evident. Most Iberian vineyards are grown in temperate dry climates with loamy soils, presenting low vegetative growth. Vineyards in temperate humid conditions tend to show higher vegetative growth. Conversely, in cooler/warmer climates, lower vigour vineyards prevail and other factors, such as soil type and precipitation acquire more important roles in driving vigour. Vines in prevailing loamy soils are grown over a wide climatic diversity, suggesting that precipitation is the primary factor influencing vigour. The present assessment of terroir characteristics allows direct comparison among wine regions and may have great value to viticulturists, particularly under a changing climate.