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Viticultural zoning in Portugal: current conditions and future scenarios

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Viticulture and wine production represent a main economic activity of the agro-production sector in Portugal, particularly over some world famous winemaking regions, such as the Port Wine / Douro Valley, Minho and Alentejo. As viticultural zoning provides valuable information regarding the suitability of a given grapevine variety to local climatic conditions, it is thus of great interest to the Portuguese winemaking sector. Furthermore, projected future climates are also likely to have important impacts on this zoning. Therefore, in the current study we aim at 1) discussing the current viticultural zoning in Portugal, and 2) assessing its future changes under anthropogenic greenhouse gas forcing (A1B SRES scenario) in the 2011-2070 time period. A set of appropriate bioclimatic indices, computed using temperatures and precipitations defined on a daily basis, is used for viticultural zoning. For the assessment of the recent-past conditions an observational gridded dataset (E-OBS) is used, while for future climate change projections, a 16-member ensemble of model experiments (ENSEMBLES project dataset), is considered. Overall, statistically significant increases (decreases) in the thermally-based (humidity-based) indices are projected to occur in the future throughout the country, particularly over its southern and innermost regions. All these changes are in agreement with the widely accepted projections for warmer and dryer Southern European climates. High impacts are found in the most important winemaking regions in Portugal, highlighting the urgent need for developing suitable adaptation and mitigation measures so as to cope with a changing climate. A reshaping of the viticultural regions is thereby expected to occur within the next decades over Portugal.