



## **Impacts of climate change on viticultural zoning in Europe**

Aureliano C. Malheiro (1), João A. Santos (1), and Joaquim G. Pinto (2)

(1) UTAD, CITAB, Vila Real, Portugal (jsantos@utad.pt), (2) Institute for Geophysics and Meteorology, University of Cologne, Germany

Climate is a leading forcing factor of winegrape production. Bioclimatic indices describing the suitability of a particular region for wine production are a widely used zoning tool. Seven suitable bioclimatic indices characterize regions in Europe with different viticultural aptitude and their possible geographical shifts under future climate conditions are addressed using regional climate model simulations. The indices are calculated from climatic variables (daily values of temperature and precipitation) obtained from transient ensemble simulations with the regional model COSMO-CLM. Index maps for recent decades (1961-2000) and for the XXI century (following the B1 and A1B scenarios) are compared. It is shown that climate change is projected to have a significant effect on European viticultural geography. Negative impacts on winegrowing are predicted in Southern Europe, mainly due to increased dryness and cumulative thermal effects during the grapevine growing season. These changes represent an important limitation to the grapevine growth and development, making adaptation strategies crucial, such as changing varieties or introducing water supply by irrigation. On the other hand, in Western and Central Europe, projected future changes might be beneficial not only to wine quality, but might also create new potential areas for viticulture, despite some likely threats imposed by excessively humid climates (e.g. diseases and pests). Regardless of the inherent uncertainties, this approach provides valuable information for implementing suitable adaptation measures, adapted to the different European regions and to their heterogeneous climate change projections.