The integration of bioclimatic indices in an objective probabilistic model for establishing and mapping viticulture suitability in a region

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Different bioclimatic indices have been proposed to determine the wine suitability in a region. Some of them are related to the air temperature, but the hydric component of climate should also be considered which, in turn, is influenced by the precipitation during the different stages of the grapevine growing and ripening periods.

In this work we propose using the information obtained from 10 bioclimatic indices and variables (heliothermal index, HI, cool night index, CI, dryness index, DI, growing season temperature, GST, the Winkler index, WI, September mean thermal amplitude, MTA, annual precipitation, AP, precipitation during flowering, PDF, precipitation before flowering, PBF, and summer precipitation, SP) as inputs in an objective and probabilistic model, the Rasch model, with the aim of integrating the individual effects of them, obtaining the climate data that summarize all main bioclimatic indices which could influence on wine suitability, and utilize the Rasch measures to generate homogeneous climatic zones.

The use of the Rasch model to estimate viticultural suitability constitutes a new application of great practical importance, enabling to rationally determine locations in a region where high viticultural potential exists and establishing a ranking of the bioclimatic indices or variables which exerts an important influence on wine suitability in a region. Furthermore, from the measures of viticultural suitability at some locations, estimates can be computed using a geostatistical algorithm, and these estimates can be utilized to map viticultural suitability potential in a region. To illustrate the process, an application to Extremadura, southewestern Spain, is shown.

Keywords: Rasch model, bioclimatic indices, GIS.