



Relations between lithology and soil use in a wine production region (Bairrada region, Portugal)

Pedro Dinis (1,2), João Almeida (1,2), Alexandre Tavares (1,3), Marina Cabral Pinto (4,5)

(1) University of Coimbra, Department of Earth Sciences, Coimbra, Portugal (pdinis@dct.uc.pt), (2) IMAR-CMA, (3) CES, (4) Geosciences Department of University of Aveiro, (5) Geobiotec

It is well known that rock nature determines soil characteristics and the potential for the various types of soil use. Understanding the relations between the lithology and specific types of land use are especially important when dealing with products whose value (economic, cultural or others) are meant to be enhanced. In this work we analyse the spatial relations between soil use and lithology in the region of Bairrada.

The region of Bairrada is a wine production region located in central Portugal for which different limits have been proposed. In this work we use the limits considered in its first definition, from the second half of XIX century, and the present-day boundaries that were legally defined in 2004 and establish the wine that receive the appellation DOC-VQPRD (DOC means Denomination of Origin Controlled; VQPRD means Quality Wines Produced in a Determined Region). Given its location at the contact between the Variscan Massif and the Iberia Atlantic margin, the Bairrada region shows diversified geology comprising Cenozoic sediments, Mesozoic carbonate and siliciclastic units and Precambrian to Paleozoic pelitic and metapelitic units. The present work involved the production in digital form of a new lithological map focused on lithic-homogeneous units that might constrain the cultural occupation of the region, neglecting other information. Land use was based on the representation of CORINE biotopes. For the analysis of the relations between lithology and land use units we used the Spatial Analyst tools of ArcGIS 9.2 (ESRI[®]) software.

Regarding present-day definition, it is possible to differentiate three zones with different geology-land use associations: (1) a western zone, with aeolian sands and coniferous forests; (2) an eastern zone, with Precambrian and Paleozoic units and broad leaf forests; and (3) a central zone, with diversified Mesozoic and Cenozoic units and where the agricultural uses are more frequent. In this central zone the "Complex cultivated patterns" (a type of occupation characterized by small patches of annual and permanent crops sometimes associated with forest species) are the most common type of land use and reveal a fairly homogeneous distribution. The most eastern and western areas of Bairrada show high affinity in terms of supporting lithology and land use with the neighboring regions. The area of the central zone encloses the one that was formerly considered (19th century) for the production of the characteristic wines. This central sector (and the 19th century concept of Bairrada) still reveals significant variability in terms of lithology and land use. The vineyards appear very unevenly distributed, exhibiting strong affinity with a specific group of Jurassic marly and dolomitic carbonate units, which are exclusive of the central zone of today's formally defined region of Bairrada and common in the area of the former concept. In what regards the production of characteristic wines, if one considers lithology a fundamental feature, the relations between lithology and land use established in this work suggest that the limits proposed in the 19th century are more consistent than those considered in the current definition.