



## Topographic controls on the spatial distribution of ground cover in the Tabernas badlands of SE Spain

Y. Cantón<sup>a,\*</sup>, G. Del Barrio<sup>b</sup>, A. Solé-Benet<sup>b</sup>, R. Lázaro<sup>b</sup>

<sup>a</sup>*Departamento de Edafología y Química Agrícola, Escuela Politécnica Superior, Universidad de Almería, Despacho 101, La Cañada de San Urbano S/N, 04120, Almería, Spain*

<sup>b</sup>*Estación Experimental de Zonas Áridas, Consejo Superior de Investigaciones Científicas, Almería, Spain*

Received 6 August 2002; received in revised form 2 April 2003; accepted 15 May 2003

### Abstract

The relationships between the spatial distribution of ground-cover and terrain attributes were examined in the Tabernas badlands (SE Spain) in order to understand the terrain-dependent driving forces of the spatially heterogeneous ground cover. Ground cover was mapped in the field and terrain attributes were derived from a 1-m resolution Digital Elevation Model (DEM). The association of spatial distribution of the landforms resulting from a regionalisation (using a nonhierarchical classification of the topographic overlays) and the ground-cover pattern was proved. From the analysis of relationships between terrain attributes and proportional abundance of ground-cover types, it was found that ground cover is arranged along topographic gradients: plant-covered surfaces are more abundant on low slope angles, concave slopes, relatively large contributing areas and with low length slope factor values. Unvegetated surfaces show contrary trends and lichens are associated with intermediate conditions. Relationships with local terrain attributes, such as slope angle or elevation, are more pronounced than those with terrain attributes related to sediment and water transfer, such as contributing area, wetness index or length slope factor which could be explained by the heterogeneity of runoff that is usually shorter than the hillslope length. The relationships established between the spatial distribution of ground-cover types and terrain attributes provide the basis for future development of a tool for mapping spatial distribution of ground cover in similar areas from only topographic information.

© 2003 Elsevier B.V. All rights reserved.

*Keywords:* Terrain attributes; Soil surface; GIS; Lichens; Badlands

\* Corresponding author. Tel.: +34-950-01-59-59; fax: +34-950-01-53-19.

*E-mail addresses:* [ycanton@ual.es](mailto:ycanton@ual.es), [yola@eeza.csic.es](mailto:yola@eeza.csic.es) (Y. Cantón).