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Using Vegetation Maps to Provide Information on Soil Distribution

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Many different types of maps (geology, hydrology, soil, vegetation, etc.) are created to inventory natural resources. Each of these resources is mapped using a unique set of criteria, including scales and taxonomies. Past research has indicated that comparing the results of different but related maps (e.g., soil and geology maps) may aid in identifying deficiencies in those maps. Therefore, this study was undertaken in the Almería Province (Andalusia, Spain) to (i) compare the underlying map structures of soil and vegetation maps and (ii) to investigate if a vegetation map can provide useful soil information that was not shown on a soil map. To accomplish this soil and vegetation maps were imported into ArcGIS 10.1 for spatial analysis. Results of the spatial analysis were exported to Microsoft Excel worksheets for statistical analyses to evaluate fits to linear and power law regression models. Vegetative units were grouped according to the driving forces that determined their presence or absence (P/A): (i) climatophilous (climate is the only determinant of P/A) (ii); lithologic-climate (climate and parent material determine PNV P/A); and (iii) edaphophylous (soil features determine PNV P/A). The rank abundance plots for both the soil and vegetation maps conformed to Willis or Hollow Curves, meaning the underlying structures of both maps were the same. Edaphophylous map units, which represent 58.5% of the vegetation units in the study area, did not show a good correlation with the soil map. Further investigation revealed that 87% of the edaphohygrophylous units (which demand more soil water than is supplied by other soil types in the surrounding landscape) were found in ramblas, ephemeral riverbeds that are not typically classified and mapped as soils in modern systems, even though they meet the definition of soil given by the most commonly used and most modern soil taxonomic systems. Furthermore, these edaphophylous map units tend to be islands of biodiversity that are threatened by anthropogenic activity in the region. Therefore, this study revealed areas in Almería Province that need to be revisited and studied pedologically. The vegetation mapped in these areas and the soils that support it are key components of the earth's critical zone that must be studied, understood, and preserved.