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Title	**Soil surface spatial heterogeneity along hillslopes under inspection: a 1D approach**
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Abstract	Drylands ecosystems functioning is highly dependent on the resources redistribution (water, sediments and nutrients), by overland flow, being the most remarkable characteristic the spatial heterogeneity. The actual paradigm describes the functioning as a resource transfer within a mosaic of sources and sinks commanded by the differences in soil infiltration capacity between bare and vegetated patches. It is under these assumptions that from an eco-hydrological perspective, the analysis has been focused on the vegetation patterns from binary maps of vegetated / bare. However, differences in the hydrological and erosive response of the abiotic components has been evidenced. From a geomorphological perspective, our general purpose is to develop a methodological framework to incorporate all the diversity of abiotic surface components and analyse their distribution in the continuum of a hillslope. Scale at which all the interacting scales resulting from spatial heterogeneity at the patch level are manifest and emergent organization patterns inform about their eco-hydro-geomorphological functioning. High-resolution mapping and hillslope-scale patterns analysis, transcending the binary scheme are required, increasing the degree of analytical complexity. With this objective, we propose a rationale for the elaboration of a Soil Surface Components (SSC) mapping legend meaningful from the point of view of the erosion processes. Criteria that is applied in the photointerpretation of high-resolution images of 3 mm. After testing the low lateral variability in the hillslope SSC distribution, in contrast with a high longitudinal variability, we applied a 1D analysis by

	means of aggregation of each SSC in successive 50 cm bands parallel along the hillslopes: (i) characterising the longitudinal heterogeneity by means of the Simpson diversity index (composition) and (ii) verifying the non-randomness in the distribution, and therefore the existence of distribution patterns (configuration), using Time Series Analysis tools (autocorrelograms and periodograms). To test the ability of the method in highlighting the eco-hydro-geomorphological dynamics, the analysis was applied in two well known hillslopes with contrasting environments (i.e. south-facing in semi-arid and degraded Mediterranean subhumid climates). Results showed a marked heterogeneity in the internal composition and a distribution of SSC in concentrated and multi-scale periodic patterns along each hillslope, although with relevant differences between both areas that fits with the difference in their hydrological behaviour. This methodological approach can be suitable to disentangle hillslopes spatial heterogeneity, both in the composition and configuration dimensions.
Keywords	Soil Surface Components (SSC); Spatial Heterogeneity; Hillslope Scale; Diversity Analysis; Time Series Analysis
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