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INVENTORY AND CHARACTERIZATION OF SICILIAN BADLANDS

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The *United Nations Convention to Combat Desertification* (UNCCD, 1994) addressed desertification as a global problem defining it as "land degradation in arid, semi-arid, and dry sub-humid areas, resulting from various factors, including climate variations and human activity". In the Mediterranean areas, this phenomenon results from the interaction of various factors such as climate, lithology, vegetation and land use. The study of the predisposing factors allows the time/space assessment of the phenomenon and a continuous field monitoring allows to quantify the data in terms of vulnerability degree and to develop decision-making tools for integrated land use planning. One of the most fragile ecosystems are the badlands areas in Sicily. Their geological and climatic features (erosive rocks and marginal soils, and highly variable rainfall) and often a negative human impact (inadequate land use and agricultural practices) led to increasing soil erosion and vegetation degradation, predisposing the terrain to the badlands. Moreover, the slope topography is a driver factor for the inception and the evolution of the badlands, in particular if we considered the badlands as miniature drainage systems, fully comparable to small river basins.
The present work focused on the role of the pre-incision slope topography on the typologies and characteristics of the Sicilian badlands. The badlands of the entire Sicily were mapped in order to create an inventory of landforms based on morphological criteria. The digital orthophotos (2007-2008) at a nominal scale of 1:10.000 available in the WebGIS server of the Regione Sicilia and the Google Earth images of the same periods were closely examined. The badlands were digitized as polygons by means of a GIS software and recorded into a geo-database. The channel networks of each badland were traced and their drainage density (*D*) was calculated. The numbers of furrows directly tributary to the external drainage network were measured by using the index Gully Tributary (*GT*). This allowed distinguishing two typologies of badlands drainage pattern: dendritic for $GT=1$ (with only one main furrow) and parallel for $GT>1$ (with several parallel furrows). For each landform, the pre-erosion topography was reconstructed by filling the incision, using the heights of the watershed divide as point values in a topography interpolation tool in GIS. It represented the slope topography prior to the development of the current drainage network. The pre-incision slope morphometry of each landform was characterized by calculating the *Morphometric Slope Index* (*MSI*) considered as general index for slope morphometry. *MSI*, *GT* and *D* were compared via statistics in order to detect the influence of pre-erosion slope morphometry on the typology and the arrangement of the badlands drainage networks.
This study provides a basis either for a complete characterization of the driver factors of the Sicilian badlands, either for a following monitoring.