



Gully evolution in field crops on vertic soils under conventional agriculture

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Gully erosion is a major process contributing to soil degradation on cultivated areas. Its effects are especially intense in farms under conventional agriculture characterised by the use of heavy machinery for land levelling and herbicides leading to the depletion of natural vegetation in valley locations. When the soil (e.g. vertic soils) and parent material conditions (e.g. soft erodible marls) are favourable to incision, gully features may present large dimensions, producing the loss of significant proportions of productive land.

This study evaluates the evolution of several gully networks located in Córdoba (Spain) within the Campiña area (a rolling landscape on Miocene marls) with conventional agriculture and gully filling operations as the predominant farm practices. The area of the catchments ranged from 10 to 100 ha, they were covered by field crops (mostly bean, sunflower and wheat) on vertic soils. Firstly, we carried out a historical analysis of the gully development during the last six decades by aerial image interpretation. Secondly, a number of field surveys were conducted to characterise the evolution of the gully morphology in a period of five years (2010-2014). For this purpose, a range of measurement techniques were used: pole and tape, differential GPS and 3D photo-reconstruction. Finally, the influence of topography (slope and drainage area) on gully dimensions along the longitudinal profile was assessed.