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# Rainfall/runoff and erosion simulation with a distributed 2D overland flow model: Applicability of empirical models and mesh influence study

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In the last decades, the scientific interest in soil erosion has increased due to the growing awareness of its associated impacts. Hence, a precise and efficient sediment transport quantification is fundamental in order to understand the global land evolution. This is of particular relevance for Mediterranean areas, because of its characteristic torrential rainfall regime. In this work, a simulation of rainfall-runoff-erosion processes is carried out in a Mediterranean watershed by means of a 2D Shallow Water model for the surface flow combined with empirical infiltration and erosion-sedimentation models. The use of a distributed model allows to take into account all the catchment features, including topography, spatial distribution of roughness or different soil areas. The precipitation losses are computed using the Curve Number model (SCS-CN) and the erosion-sedimentation is computed by means of the Hillslope Erosion Model (HEM), which allows an efficient and simple computation of the solid discharge at catchment level. As the study area is large, a mesh influence study is carried out comparing the numerical results with the experimental data at several mesh resolution levels in order to find the optimal choice for an efficient simulation without losing quality in the results.