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Land-use scenarios and the related streamflows and soil erosion dynamics: Aplication of the LandSoil model to a Mediterranean mountainous catchment characterized by high density of small terraces

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Regional and local studies assessing the effects of landscape evolution on hydrology and soil erosion dynamics are fundamental to develop adaptive watershed management. This is especially important in the Mediterranean region given its high natural variability but also the expected negative impacts of global change on water resources.
LandSoil model was applied to the Can Vila catchment (0.6 km2, Vallcebre Research catchments, NE Spain) in order to compare runoff and soil erosion between different projected socio-economic scenarios. This work presents the first results of the ongoing study.
The model was first subjected to a calibration/validation procedure considering historical data series of runoff and sediment yield from the catchment outlet at the event scale. To this end, we derived an actual land use map (S0) in which terraces and roads were identified and also DEMs at 1- and 2-m resolutions from national airborne LIDAR. In addition, four different socio-economic scenarios were considered based on socio-economic surveys and translated into land use maps for the 2041-2061 period: as usual (S1), high-intensive agriculture (S2), environmental protection (S3) and sustainable (S4). The land use maps were derived based on biological, biophysical and management constraints.
For both the actual (1990-2010) and future scenarios (2041-2061), 5min synthetic series of precipitation were obtained for the RCP 4.5 scenario (RCM Aladdin) and properly downscaled.
Comparisons of LandSoil results corresponding to actual (S0) and future (S1 to S4) conditions are being performed in order to improve the management of Mediterranean watersheds located in mountainous regions.