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Effects of land use systems on soil erosion in a sloping Mediterranean watershed in Cyprus: From qualitative assessments to quantitative models

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In arid and semi-arid regions, water catchment sediment yield as a result of water erosion is difficult to model. Applicability of quantitative, process-based soil erosion models at a catchment scale is often problematic due to large data requirements and difficulty of describing all erosion and sediment transport processes. On the other hand, qualitative models require less data and include almost all evident erosion processes, which make them especially suited for watershed erosion assessments. The objective of this study is to compare water erosion estimates of the quantitative PESERA model with qualitative assessments obtained by WOCAT mapping methodology. The PESERA model simulates soil loss based on land cover, soil, climate and vegetation data, while the WOCAT methodology is based on expert observations per land use systems. This study is conducted in the Peristerona Watershed in Cyprus. The study area is 106.4 km2 and has a mean local slope higher than 40% for the mountainous upstream area and less than 8% for plain. Sixteen different land cover types with varying intensity of agriculture were distinguished during the WOCAT field assessment. WOCAT methodology ranked the land cover “complex cultivation” as the most degraded (degree: evident signs of water erosion, extent: 50% of the area, rate: moderately increasing in time),”agriculture, significant area natural vegetation” as less degraded (degree: evident signs of water erosion, extent: 30% of the area, rate: decreasing slowly in time) and “forests” the least degraded (some signs of water erosion, extent 5% of the area, rate: decreasing slowly in time). The classified WOCAT units will be compared with the erosion estimates obtained by the PESERA model. This study provides a linkage between qualitative soil erosion methods with quantitative models and helps to translate the outcomes of the former into latter.