Soil erosion in Mediterranean landscapes - Experimental investigation on crusted surfaces by means of the Portable Wind and Rainfall Simulator

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The influence of wind on raindrops and subsequent processes of soil detachment and transport on natural soil surfaces is an essential gap of knowledge. The urgently required data about reactions, interactions and actual impact on soil erosion rates are generally produced under laboratory conditions on highly disturbed substrates, which cannot reflect natural system responses. The Portable Wind and Rainfall Simulator was applied on autochthonous soils in semi-arid Spain to investigate and quantify the relative impact of wind-driven rain on total erosion. On highly degraded crusted soils and freshly ploughed orchard soils in semi-arid Spain, total erosion measured during experiments (30 min; 96 mm h1) were 28.8e150.4 g m2 and 29.5e30.7 g m2, respectively. Concerning the relative impact of wind-driven rain on total erosion, ambiguous results were obtained: the difference to erosion generated by windless rain ranged from þ37.4 to 24.2%, to sediment concentration from þ46.7 to 20.6% and to runoff coefficients from þ18.8 to 7.4%. The study indicates a potentially very strong impact of wind-driven rain and underlines the paramount importance of experimental data derived on autochthonous soil surfaces for process understanding, realistic assessment of soil erosion rates and application in soil erosion models.
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