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RAINFALL SIMULATIONS ON STEEP CALANCO BADLANDS TO GENERATE INPUT FOR EROSION MODELLING

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Physically based erosion modelling represents an established tool in agricultural landscapes and is applied frequently for forecasting event based erosion rates, sediment transport, surface runoff and also for planning purposes and risk management. Various studies successfully tested and validated physical erosion models for above described arable land but have not yet been tested on steep terrain.
A field campaign in the upper Val d'Orcia in central Italy close to the village of Radicofani was carried out to generate input data for the soil erosion model EROSION 3D. Vast areas in the region are affected by large scale erosion features (ital. Calanchi). A large branching calanco badland of 12 ha was subject to our experiments and monitoring.
Artificial rainfall simulations were carried out for evaluating runoff and infiltration. The rainfall simulator (1x1 m² plot size) is equipped with a circulation of sediment-loaded water to virtually increase plot lengths to up to 25 m. We furthermore collected disturbed and undisturbed soil samples for density, soil moisture content and grain size determination. As additional model input we produced multitemporal high resolution surface models (TLS and UAV, 0.1 m cell size) and measured meteorological data on site.
Results were then compared to digital elevation models of difference (DoD) generated from TLS and UAV measurements since 2013 for validation. Long term simulations are planned to forecast future behaviour of the landscape in the region. Furthermore, a separation of fluvial erosion versus gravitational processes (such as rotational slides) is to be achieved by combining erosion modelling and DoD analysis.