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Modelling uncertainty propagation in soil loss estimation using RUSLE

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Soil erosion is a form of soil degradation, along with salizing, compacting, nutrient loss, which involves mechanical removal of soil by water and wind. The factors that make this condition are of a dynamic nature, the kinetic energy of water that manifests in the gravitational field through the slope and the wind, and static nature, the extensive soil properties, such as texture, vegetation coverage or agricultural use of land. The interaction between weather, soil properties, and farming practices (including irrigation) determines the rate of soil erosion.
The paper describes the implementation of an uncertainty propagation model for RUSLE soil loss equation model and the corresponding validation procedures. The proposed method is based on Monte Carlo to simulate probable digital elevation models used further in the terrain analysis. It includes an evaluation of the sensitivity of the RUSLE factors to predict soil erosion and deposition patterns at the landscape scale. The method describes the theoretical assumptions and a limitation of the models used in the analysis, and delineates the potential benefits.
The aim is to show a critical view of the soil erosion model, especially RUSLE, and to assess how uncertain digital elevation models influence the estimated soil loss. Primary statistical indices (mean, minimum, maximum and standard deviation) are presented as maps, assessed and discussed. An estimation of the uncertainty in soil loss is also presented for each pixel from the study area.