

Publication

Objectoriented soil erosion modelling: A possible paradigm shift from potential to actual risk assessments in agricultural environments

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Over the last 2 decades, geospatial technologies such as Geographic Information System and spatial interpolation methods have facilitated the development of increasingly accurate spatially explicit assessments of soil erosion. Despite these advances, current modelling approaches rest on (a) an insufficient definition of the proportion of arable land that is exploited for crop production and (b) a neglect of the intraannual variability of soil cover conditions in arable land. To overcome these inaccuracies, this study introduces a novel spatiotemporal approach to compute an enhanced covermanagement factor (C) for revised universal soil loss equationbased models. It combines highly accurate agricultural parcel information contained in the Land Parcel Identification System with an objectoriented Landsat imagery classification technique to assess spatial conditions and interannual variability of soil cover conditions at field scale. With its strong link to Land Parcel Identification System and Earth observation satellite data, the approach documents an unprecedented representation of farming operations. This opens the door for the transition from the currently used potential soil erosion risk assessments towards the assessment of the actual soil erosion risk. Testing this method in a mediumsize catchment located in the Swiss Plateau (Upper Enziwigger River Catchment), this study lays an important foundation for the application of the very same methods for largescale or even panEuropean applications. Soil loss rates modelled in this study were compared with the insights gained from emerging techniques to differentiate sediment source contribution through compoundspecific isotope analysis on river sediments. The presented technique is adaptable beyond revised universal soil loss equationtype soil erosion models.

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