



Tillage erosion modelling at the regional/global scale: how simple can we make it?

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Tillage erosion modelling at the field-scale is a well-established, if young, science that has proved valuable in predicting patterns of tillage erosion and soil property evolution and in deconvolving the erosion signature derived from fallout radionuclides. These models are parsimonious compared to water erosion models but require high resolution, accurate topographic data and are most reliable when applied at a fine spatial resolution. However, in order to contribute to the Earth System Science challenges at the forefront of debate in the 21st century it is necessary to deliver reliable soil erosion and soil redistribution data at much large scales and much coarser spatial resolutions than are desirable using existing models developed at the field-scale. Here, we explore the approaches available for simplification of tillage erosion models to meet the need for large-scale, coarse resolution data. We consider both application of existing models to coarse topographic data and simplification of the scientific representation in the models. We evaluate the approaches both with respect to the simulation of soil redistribution and with respect to soil property evolution.