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Simulation of dust emissions with respect to agricultural landscape structure

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Dust emission of agricultural fields into the atmosphere is one source for processes of climate change, but their fraction is still vague. The aim of this work has been to quantify dust emissions of agricultural fields with respect to the time frame 1970 to 2000. Three major reasons can be identified in regard to agricultural landuse in the last 40 years: (I) the intensity and frequency of tillage operations, (II) the changes in crop rotations and (III) the increase in field sizes and removal of hedges. A variety of methods have been used to quantify the different changes. Field measurements for different tillage operations at an experimental field site were used to quantify the effects of tillage operations. Statistical databases were used to account for frequency of tillage operations and the changes in crop rotation. Satellite imagery from MSS, TM and ETM was analyzed for different time periods to quantify the changes in field sizes. Results indicate that areas exists where the mean field size of the agricultural landscape did show only minor changes in the last 30 years. Differences in dust emission in these areas are mainly due to changes in crop rotations and tillage intensity. These differences are used in a simulation model to quantify dust emissions. Results of wind erosion simulations with regards to changes in agricultural landuse and landscape structure will be presented.