



Rush hour on arable soils - A spatial analysis of three-year traffic intensity on arable land.

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Soil compaction is a widespread phenomenon in today's intensive agriculture. Fields are frequented by agricultural machinery several times a year. Wheel load, contact area and the number of rollovers are important factors that determine the intensity and effect of agricultural machinery on the soil and its functionality. Unfortunately, knowledge about spatial distribution of wheel load or number of wheel passages is limited. Thus, an assessment of field traffic effects on soil functionality at spatial scales is impeded.

Therefore, a model (called FiTraM; Field Traffic Model) has been developed that enables the reconstruction of the tracks and intensities of agricultural machinery at field scale using GPS tracks. To demonstrate its usability, FiTraM was applied at a study area in Lower Saxony to model the field traffic intensity for a 3-year crop-rotation. As a result, the headlands are crossed 50 times a year in some areas of the field- about 95 % of all areas with a wheel load over 5 tonnes. The crop zone of the field is crossed 30 times a year at certain points - the proportion of area driven with a wheel load over 5 tonnes is lower than in the headlands.

The results provide initial indications of field traffic intensity at field scale and its impact on the soil.