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Regional SOC inventory in the Belgian loam belt

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Soil organic carbon (SOC) is the largest component of the terrestrial carbon pool and plays a vital role in the terrestrial carbon cycle. However, it remains a challenge to accurately quantify SOC dynamics in intensively cultivated landscapes. The general objective of the research is to improve the regional SOC dynamics by taking into account the lateral fluxes of sediments and carbon. The study focuses on the croplands of the Belgian loam belt.

The first part of the project consists in constructing a 3-dimensional SOC map from soil profile description and ancillary environmental data. A georeferenced soil database provided soil profile description and analyses across the entire Belgian loam belt. A Monte Carlo method was used to account for the uncertainty in the reported SOC content of each horizon. Different methods permitting to construct continuous distribution of SOC density from bulk horizon measurements were compared. Properties that best characterized the erosion-accumulation pattern in the region were searched in the profile description database. Different topographic indices were computed from digital elevation models to assess the influence of the topography on the SOC distribution. A linear regression analysis was conducted in order to predict the SOC spatial distribution at different depth intervals from soil and terrain properties.

Using the resulting model, maps of SOC and other soil properties at different depths, and representative of the situation in $\sim$1960, will be constructed. The total uncertainty will be assessed and the main sources of uncertainty determined. These maps could be used as input data for a processed-based model coupling lateral fluxes of sediment and carbon turnover.