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Visible and near infrared reflectance spectroscopy as a tool to monitor in situ soil organic carbon content.

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The demand for up-to-date soil information has driven the development of rapid techniques to determine soil properties such as soil organic carbon (SOC) in situ. Proximally sensed diffuse reflectance has produced promising results. However, large scale applications are difficult to develop because the relationship between spectral data and soil properties depend on soil type and therefore is inherently local.
This study aims to generate robust and locally-relevant calibration models that are applicable to a large scale database in order to provide accurate measures of SOC content in Belgian agricultural land. We collected more than 400 soil samples in South of Belgium covering 6 out 14 agro-ecological zones of the country. Soil samples were spectrally measured in laboratory with an ASD FieldSpec Pro spectroradiometer. By means of cluster analysis of the spectral library linked with several soil attributes (geographical locations, soil types, etc.) multivariate calibration models were built for each identified cluster. Based on their spectral characteristics and easy-obtainable soil attributes, these local calibration models will allow to determine the SOC content of unknown soil samples at large scales.