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Agricultural soil carbon mapping at national scale – integrating different data sources for pedometric modelling

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The recently completed first national German Agricultural Soil Inventory provides a reliable and harmonized database consisting of 3104 sampling points under croplands and grassland with soil data for 0 to 100 cm soil depth. The data of this survey along with newly available high resolution geo-data sources, including sentinel-2 satellite data, provides new opportunities for soil regionalization and mapping. Carbon is considered as one of the most important variables in soil due to its crucial role for many soil processes. Moreover, altering carbon storage in soil has the potential to mitigate greenhouse gas emission and subsequently has impact on climate. This is important, since greenhouse gas emissions from agricultural soils are a major source of CO_2. Assessing and predicting the soil′s CO_2 emissions under different management and climate scenarios require high resolution maps for soil organic carbon and other soil parameters at national scale. Therefore, the aim of this project is to produce national scale maps for soil organic carbon stocks and soil organic carbon quality. Machine learning algorithms, such as random forest, are powerful techniques to make use of the wealth of soil and driver data to develop national scale models. The challenge is the scale (national with resolution <500 m) and the integration of these different and heterogeneous data sources into a common modelling framework. We will present the framework and data sources of this soil modelling approach and discuss the methods and challenges.