

DOKTORSKÝ STUDIJNÍ PROGRAM/*DOCTORAL STUDY PROGRAM*

**VYPSÁNÍ TÉMATU/*LISTING OF TOPIC***

Studijní program/*Study Program*: **Agricultural Specialization**

Studijní obor/*Branch of Study*: **Exploitation and Protection of Natural Resources**

Katedra/*Department of*: **Soil Science and Soil Protection**

Školitel, email/*Supervisor, email*: **Prof. Dr. Ing. Luboš Borůvka ([boruvka@af.czu.cz](mailto:boruvka@af.czu.cz))**

Konzultant, email/*Co-supervisor, email*:

Forma studia/*Form of Study*: **Full\_time**

Typ tématu/*Type of Theme*: **disposable**

**Téma/Topic**: Assessment and mapping of organic carbon content and stock in forest soils

**Hypotézy/Hypotheses**: Based on existing soil databases and available spatial data and using advanced prediction models, it is possible to obtain sufficiently reliable data on the contents and stocks of soil organic carbon in forest soils and create maps of these indicators.

**Anotace/Summary**: Soil organic carbon is a very important component of the soil, but at the same time, sequestering carbon in the soil is a very important way to reduce the amount of greenhouse gases in the atmosphere and thus to mitigate climate change. Therefore, much attention is currently being paid to the content and stock of carbon in soils, their quantification, mapping and evaluation of the influencing factors. As part of previous projects, an extensive aggregated database of the forest soil properties in the Czech Republic was created from several different soil surveys, which contains data on soils from more than 8,000 locations, namely from surface organic horizons (forest floor, F+H) and from mineral layers 0-30 and 30-80 cm. The aim of this dissertation will be to: 1) Quantify organic carbon stocks in forest soils based on carbon content values and a suitable estimate of bulk density, taking into account the rock fragments content in the soil; 2) Analyze the spatial distribution of the content and stocks of soil organic carbon and evaluate the influence of stand conditions, or the method of forestry management; 3) Create models for the spatial prediction of the content and stock of organic carbon in forest soils using an existing database and various auxiliary data (digital terrain model, land use and type of vegetation, geological and soil maps, climate data, etc.), using advanced statistical methods, geostatistical methods, machine learning methods, etc.; 4) Evaluate the significance of individual predictors in the models and verify the reliability and accuracy of the models; 5) Using selected models, create maps of prediction of the organic carbon content and stock in forest soils of the Czech Republic and maps of the uncertainty of these estimates.

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V/In Prague

dne/Date: 31.01.2024

Podpis školitele/*Signature of the Supervisor*:

Podpis vedoucího katedry/*Signature of the Head of the Department*: