Session 7: The urban soil working group in the German Soil Science Society

Carbon in previously and currently sealed soils of Berlin

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Abstract (max. 400 words)

Cities are hotspots of anthropogenic CO_2 emissions assigning them a special responsibility for implementation of strategies and measures to reduce greenhouse gas emissions. The city of Berlin set the goal of a "climate-neutral Berlin" by 2050 (cf. Berlin Energy and Climate Protection Program 2030). To achieve this goal, including urban soils in urban development and planning is vital. For example, the sealing of soils with impervious surfaces severely impairs soil functions and services, like carbon (C) storage capacity, and poses ecological and economic problems. Strategies to mitigate these impairments include the reduction of future sealing of soil and the opening of sealed surfaces. To legitimate a strategy to unseal surfaces, cities need to assess and evaluate the soil-related climate impacts of urban constructions. Scientifically sound figures and arguments are needed to evaluate the impacts of measures to unseal urban soils. In Berlin, one third of the city´s area is covered by impervious surfaces. However, no data on previously and currently sealed soils, like their chemical and physical properties, profile structure or typical C stocks, is available for Berlin. Moreover, international publications on C stocks of urban soils, especially with a focus on soils under impervious surfaces, are rare.

The research project "Kosie" at the Humboldt-Universität zu Berlin (2020–2022) aims to support urban planning by providing data and information on previously and currently sealed soils in Berlin. In this study, a systematic soil database is created focussing on C contents and C stocks. A differentiated assessment of the quantity and quality of C stocks in these soils is carried out. Sixty sites in Berlin are investigated. In the field, detailed soil profile descriptions up to a minimum of 1 m depth are carried out according to German soil mapping instructions (Ad-hoc-AG Boden, 2005) and the instructions for soil mapping in the state of Berlin (Makki & Thestorf, 2020). Nitrogen and carbon content (various fractions), pH, bulk density, carbonate content, and grain size distribution are analysed. Current and historical site characteristics are researched. The site selection and evaluation and analysis of the data is based on the concept of "C-storage types". This concept allows to group urban soil C stocks based on relevant, i.e. frequent or influential, site and soil properties. First results of the research project regarding C stocks and characteristic properties of previously and currently sealed soils in Berlin are presented.

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