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Carbon sequestration to different green urban land-use types in Helsinki Finland

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Solutions to reduce carbon dioxide (CO₂) emissions and to achieve carbon neutrality have become an important subject. Thus, there is a growing interest in accelerating also the carbon sinks of urban vegetation and finding the best practices for designing green areas that maximize their carbon sinks and stocks. In cities, heavy management alters the natural carbon flows compared with the non-urban environment as green areas are usually irrigated and mowed, trees may have limited space to grow, and the aboveground litter is removed. Also, urban temperatures are increased due to heat island effect. Therefore, it is important to quantify urban carbon sequestration and develop models to describe urban carbon cycling. The aim of this study was to test the applicability of the different C cycling models to describe urban ecosystems and to determine the rate of carbon sequestration at different urban vegetation types.

Model performances were tested at different green spaces in Helsinki, Finland. Measurements of leaf area index, sap flow, soil respiration, soil temperature, soil moisture and photosynthesis were collected in the footprint area of the SMEAR III ICOS station in a small urban birch forest (*Betula pubescens*), in botanical garden with *Tilia* trees (*Tilia cordata*), in a partly irrigated lawn and in a non-irrigated lawn during 2020-2021. In addition, ecosystem-level net CO₂ exchange over the whole area was measured at the SMEAR III. The models tested were LPJ-GUESS, JSBACH, SUEWS and SURFEX-ISBA.