

Influence of the Spatial Heterogeneity of Vegetation on Carbon Fluxes in Nordic Ecosystems

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In this study the main objective is to understand the influence of spatial heterogeneity of vegetation on ecosystem carbon fluxes, namely gross primary production (GPP). Vegetation variation near a flux tower has a strong influence on observed carbon fluxes and therefore an accurate description of surface characteristics within a flux tower footprint area is important for understanding the ecosystem carbon exchange. The project is based on novel methodology and combines carbon flux measurements from eddy covariance towers with remote sensing data. Improved understanding of the ecosystem scale carbon cycle will be used to upscale carbon fluxes to landscape level using optical remote sensing data.

Research infrastructures such as SITES (Swedish Infrastructure for Ecosystem Science) and ICOS (Integrated Carbon Observation System) will be used to obtain ecosystem level measurements of carbon exchange in major Nordic ecosystems: forests, wetlands and agriculture sites. Field stations in Sweden, Denmark and Finland represent different climatic zones from temperate to boreal and sub-arctic areas. New European Sentinel-2 satellite provides high-resolution (10 meters) data for mapping the land surface properties such as land use classification and spectral vegetation indices. The combination of footprint modeling and high-resolution remote sensing data can be used to describe the land surface heterogeneity over the footprint area and improve the accuracy of footprint models.