

## CO<sub>2</sub> balance of agricultural grassland on peat – A comparison of chamber and eddy covariance measurements

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Finland has a globally high areal proportion of peatlands and greenhouse gas (GHG) emissions from cultivated peat soils contribute over 10 % of the total GHG emissions in Finland. Climate change mitigation requires – besides greenhouse gas emission reductions – actions to increase carbon sinks and storages in terrestrial ecosystems. Agricultural lands have a high potential for increased carbon sequestration through climate-smart land management and agricultural practices. However, quantification of sources and sinks of carbon depends on reliable estimates of the net ecosystem exchange of greenhouse gases. Two widely used independent methods for estimating greenhouse gas fluxes include the micrometeorological eddy covariance (EC) method and flux chambers. Chamber-based methods enable small-scale measurements and can be used to study spatial variability or different small-scale management options. However, the chamber itself can have an impact on the gas concentration gradient, temperature and pressure inside the chamber, and therefore also on flux. The eddy covariance method, on the other hand, does not disturb the measured surface and is well suited for measuring CO<sub>2</sub> fluxes on an ecosystem level. However, the method assumes ideal conditions, such as horizontally homogenous and flat terrain and sufficient turbulence, which are only seldom fully achieved. This study compares CO<sub>2</sub> balance estimates using both methods on a peatland growing grass in Ruukki, Siikajoki (64.68399°N, 25.10632°E) located in western Finland. Chamber measurements started in May 2019 and are performed with a closed dynamic chamber using Li840 CO<sub>2</sub>/H<sub>2</sub>O gas analyzer (Li-Cor, Inc). The eddy covariance instrumentation consists of a three-axis ultrasonic anemometer uSonic-3 (METEK) and a LI-7200 CO<sub>2</sub>/H<sub>2</sub>O gas analyzer (Li-Cor, Inc) and started operating in June 2019. In addition to comparing carbon balance estimates using both methods, possible sources of discrepancies and uncertainties will be discussed.