



Project acronym: LIDCarbon

Project title: Drone borne LiDAR and Artificial Intelligence for assessing Carbon storage

Project leader: Katerina Trepekli, University of Copenhagen, Denmark

Discipline: Earth Sciences & Environment: Other - Environment

Station(s): Abisko Scientific Research Station (Sweden)

In this project we aim to utilize the newly developed drone based Lidar scanners to measure above ground biomass, and estimate the terrestrial carbon (C) sequestration in peatland sites characterized by humid subarctic climate. The ambition is the development of a standardized protocol for automated processing of Lidar data utilizing drones as platforms and deep learning capabilities. The process will produce information of the bare-earth and vegetation structure and based on the retrievals the spatial distribution of biomass will be calculated in both high temporal and spatial resolution.

In this framework a series of experiments monitoring above ground biomass will be conducted among different environmental conditions and vegetation types. As a platform for the Lidar scanner a Matrice 600 Pro will be utilized. The derived point cloud data will be labeled in order to train various deep learning networks that will be suitable for processing 3-D point cloud data with high density.

The first experiment would ideally take place in the Abisko Scientific station where its infrastructure includes an eddy covariance (EC) station. The CO₂ fluxes from the EC mast would be assessed along with the estimated carbon storage using the UAV-Lidar to describe the carbon budget of the ecosystem at the local scale.

Mapping C storage across different types of ecosystems may enhance the development of reliable and easy to use research tools to map carbon storage in order to facilitate the design of efficient strategies for mitigating greenhouse gasses.