TREE BIOMASS IN THE SWISS LANDSCAPE: NATION-WIDE MODELLING FOR FOREST AND NON-FOREST TREES USING REMOTELY SENSED DATA

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ABSTRACT:

The Swiss national greenhouse gas (GHG) inventory requires reporting on above ground biomass (AGB) as part of the commitment to the UN framework convention on climate change (UNFCCC) and it's Kyoto protocol. Swiss within-forest AGB estimates are based on extensive National Forest Inventory (NFI) data. However, in addition to forest, IPCC defines five other key land use categories to which the GHG inventory reporting applies. Across Switzerland over 6% of trees are located outside forest areas. Currently biomass reporting for these trees outside forest (TOF) relies on basic estimates related to land use type or tree cover estimates. In this study we take advantage of point cloud data from nation-wide wall-to-wall LiDAR and airborne stereo imagery (ADS80) in combination with satellite imagery (LANDSAT and the Disaster Monitoring Constellation DMC) to develop a consistent nation-wide approach to modelling tree AGB and more detailed models of AGB for trees outside forest. The approach relies on calibrating the remote sensing geo-data models in areas of known (from NFI field data) AGB within forest plots which have characteristics considered similar to non-forest trees (e.g. coppice, talus and disperse forests). Stratification by elevation, forest type, and image reflectance is tested. Model evaluation shows that simple models relying on plot height metrics performed most efficiently, allowing for effective application to non-forest areas.