Geophysical Research Abstracts
Vol. 20, EGU2018-12099, 2018
EGU General Assembly 2018

Supporting forest inventories by using UAS borne laser scanner

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Forest management relies on several common parameters and characteristics (e.g. tree position, tree height, stem diameter, Taper function (stem curve), volume, etc.) These parameters are mostly estimated on plot level by in-situ measurements and are used for area wide estimations of forest parameters. With the emerge of unmanned aerial systems (UAS) the questions arises if these tools can be used to carry different sensors to acquire more detailed information of these plots. Especially UAS equipped with lightweight laser scanner (ULS - UAS borne laser scanning) are promising to produce high-density point clouds for accurate 3d modelling of the complete stem. This can lead for example to more accurate relations between stem diameter and tree heights or even the taper function and therefore to more accurate volume estimations of the forest. Especially as the taper function is complicated and time consuming to derive with common in-situ methods.
For this study, ULS, TLS and in-situ measurements were collected in a study area located in Austria. Thus we investigate the accuracy of the stem modelling (Taper-function) from ULS compered to TLS. The modelling contains the tree positions, stem curve, stem diameter alongside the stem curve and tree height. First results show centimeter accuracy of the modelled stem and height.
Furthermore, we investigate the use of locally derived models for stem diameter and tree height relations and their effect on volume estimations.

The work was supported by the Austrian Research Promotion Agency (FFG): “Feasibility Studie: Gewinnung von Baum- und Waldparametern aus Laserscanningdaten von Multicopterflügen”