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1 Intercomparison of SAIL and DART over a Pine forest using Laserscan derived structural parameters

J. Timmermans, C. van der Tol, W. Verhoef, Z. Vekerdy, P.E van Laake, and Z. Su

(1) International institute for Geo-Information Sciences and Earth Observation (ITC), Enschede, the Netherlands, j_timmermans@itc.nl

Directional radiative transfer of a true three dimensional canopy is highly dependent on the structural parameters of the canopy. In remote sensing this directional dependence is modeled using the directional signatures, BRDF and thermal directional signature. For the interpretation of these directional signatures radiative transfer models (RTM) are used. An RTM requires structural properties of the surface as input and calculates the BRDF. By inverting the model, surface structural properties can be retrieved from the BRDFs.

The validation of these models is very difficult as measurements of the structural parameters are not only time-consuming but are also very difficult for high trees and large canopies. In this study, laser scanning us used to measure forest structural parameters. Laserscanning is a new technique for non-destructive mapping of forest structural parameters, like stem diameter, stem height and crown diameter. The high density of the laserscanning point cloud enables accurate and fast determination of the structural parameters.

The accurate determination of the structural parameters allows us to compare different RTMs and their underlying assumptions. The results of the forest structural parameters are provided as input for two RTMs: SAIL, a one-dimensional model (computationally

efficient) and DART a three-dimensional (computationally demanding) model. The directional signatures obtained with these two models are compared to the directional signatures obtained by directional radiance measurements over a pine forest in the Netherlands.