Using R as an environment for automatic extraction of forest growth parameters from terrestrial laser scanner data

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Terrestrial Laserscanner
R-Package „RLaserForest“
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case study „Selb“

50°09’12“ N
12°11’55“ O
Images of case study stand
description of data

measurement in field

• 37 Norway spruce trees + 13 Scots pine trees

Applicated in RLaserForest

37 Norway spruce trees + 9 Scots pine trees

Norway spruce: mean DBH 38.54 cm (20.65-61.25 cm); mean height: 30.9 m (21.35-38.32 m)

Scots pine: mean DBH 38.07 cm (31.25-49.9 cm); mean height: 32.10 m (26.08-34.22 m)
Results (case study „Selb“)

here: length of stems

Manual measured stem length vs. Terrestrial laserscanner stem length

Deviation between manual and terrestrial laser stem length measurement

Scots pine
Norway spruce

mean: -0.169
mean: -0.046
Results (case study „Selb“)
here: volume of stem axis

Calculated in sections vs. volume by quadrature of cubic spline

![Graph showing volume comparison](image)
Results

here: attempt to explain the deviation between real and calculated volume
Summary and perspectives

TODOs:

- improvement of volume calculation
- improvement of diameter estimation for excentric stems
- afterwards: automated determination of tree species (classification)
- afterwards: automated separation of crown parameters (spectral clustering)

Objective: modular built R-Package „RLaserForest“ for automatic extraction of forest growth relevant inventory parameters by the use of the statistic programming language R
I want to say thank you to:

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Thank you very much for your attention!

I am looking forward to a fruitful discussion …