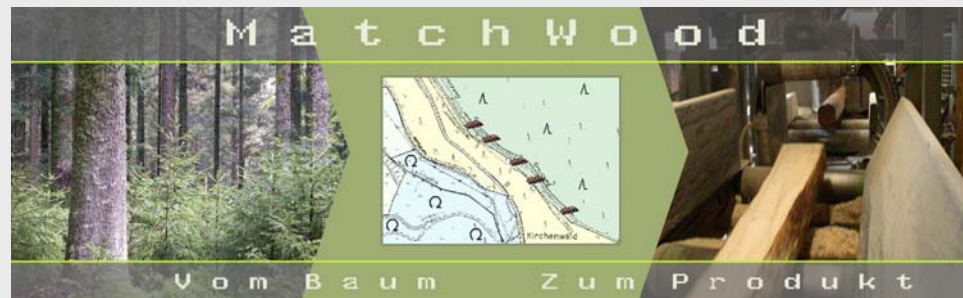


Comparison of Lidar and InSAR Data to Estimate Tree Height in Forest Inventories



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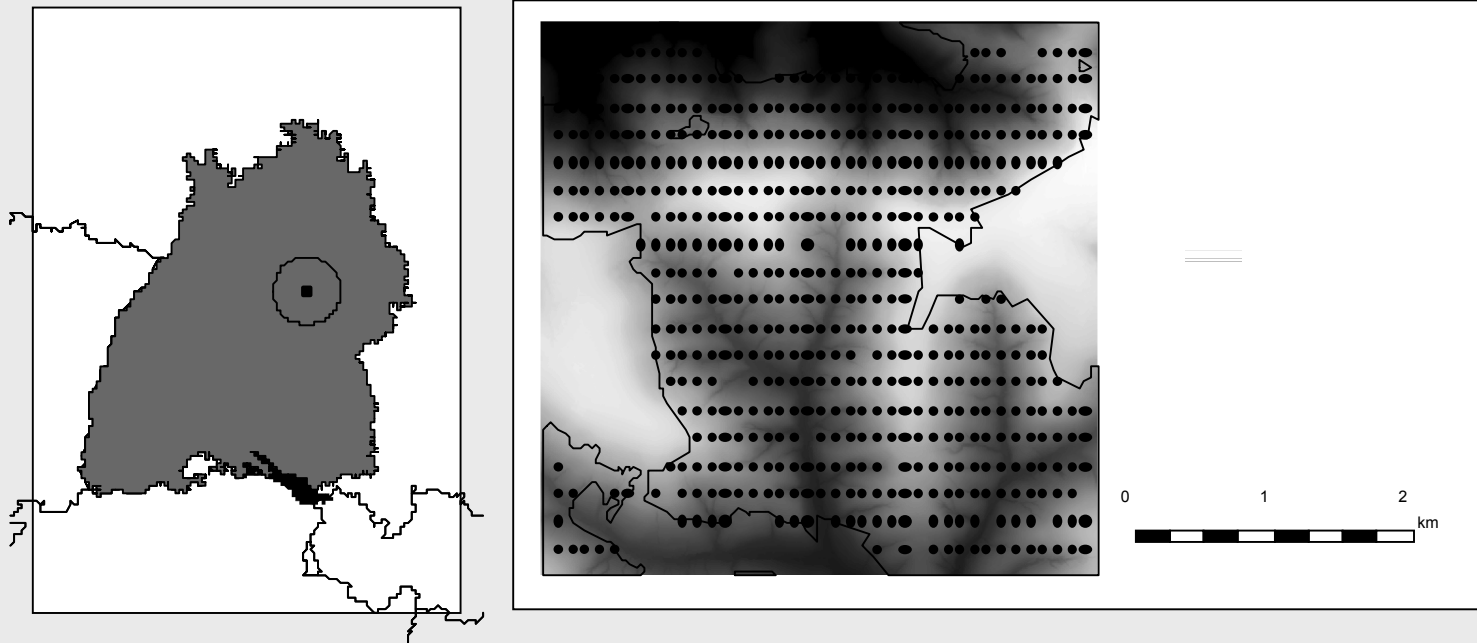
Overview

- Research objectives
- Material and Methods
- Comparison Lidar - InSAR
- Results
- Discussion
- Summary

Research objectives

- RS for non-forestry purposes
- Comparison of 2 veg.height datasources
- regular forest inventory for RS validation

Research area

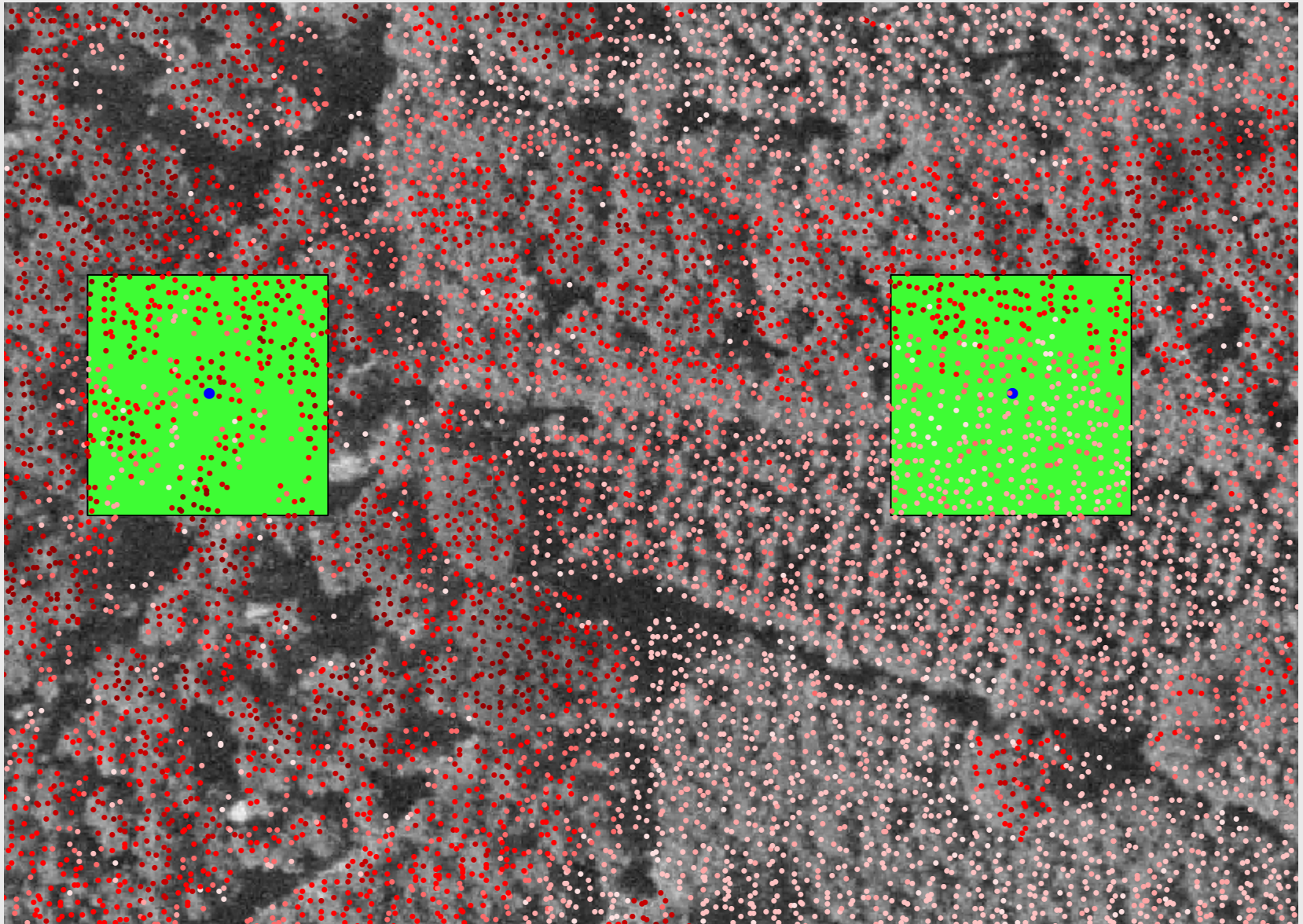


Remote Sensing Data

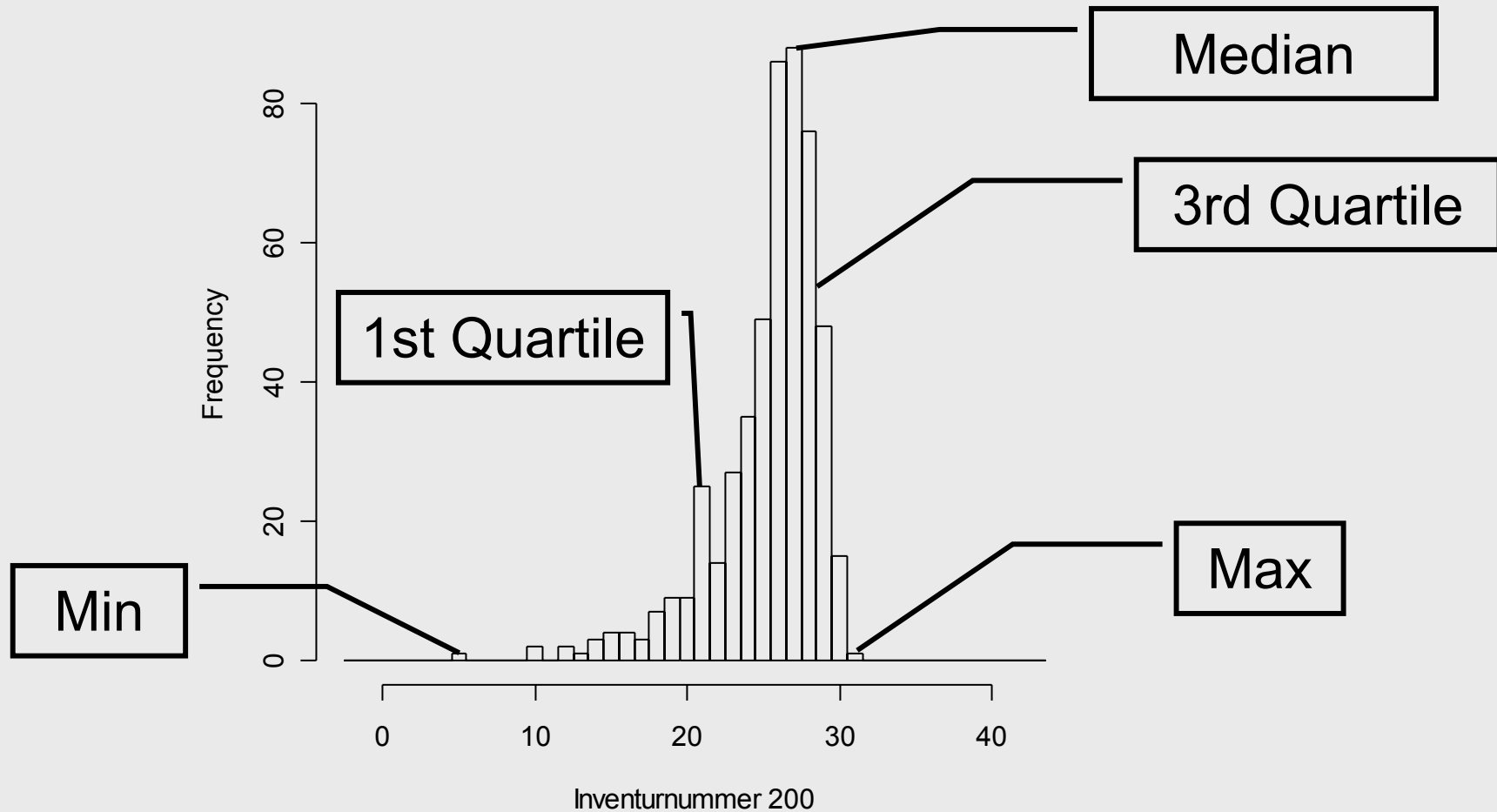
- Lidar: Optec ALTM 1225
 - 1.5 m interval
 - spring 2002
 - InSAR: Star3i
 - 5 m resolution DSM
 - July 1998
 - East-SE looking direction
- Nadir vs. side looking
- 900 m vs. 6000 m

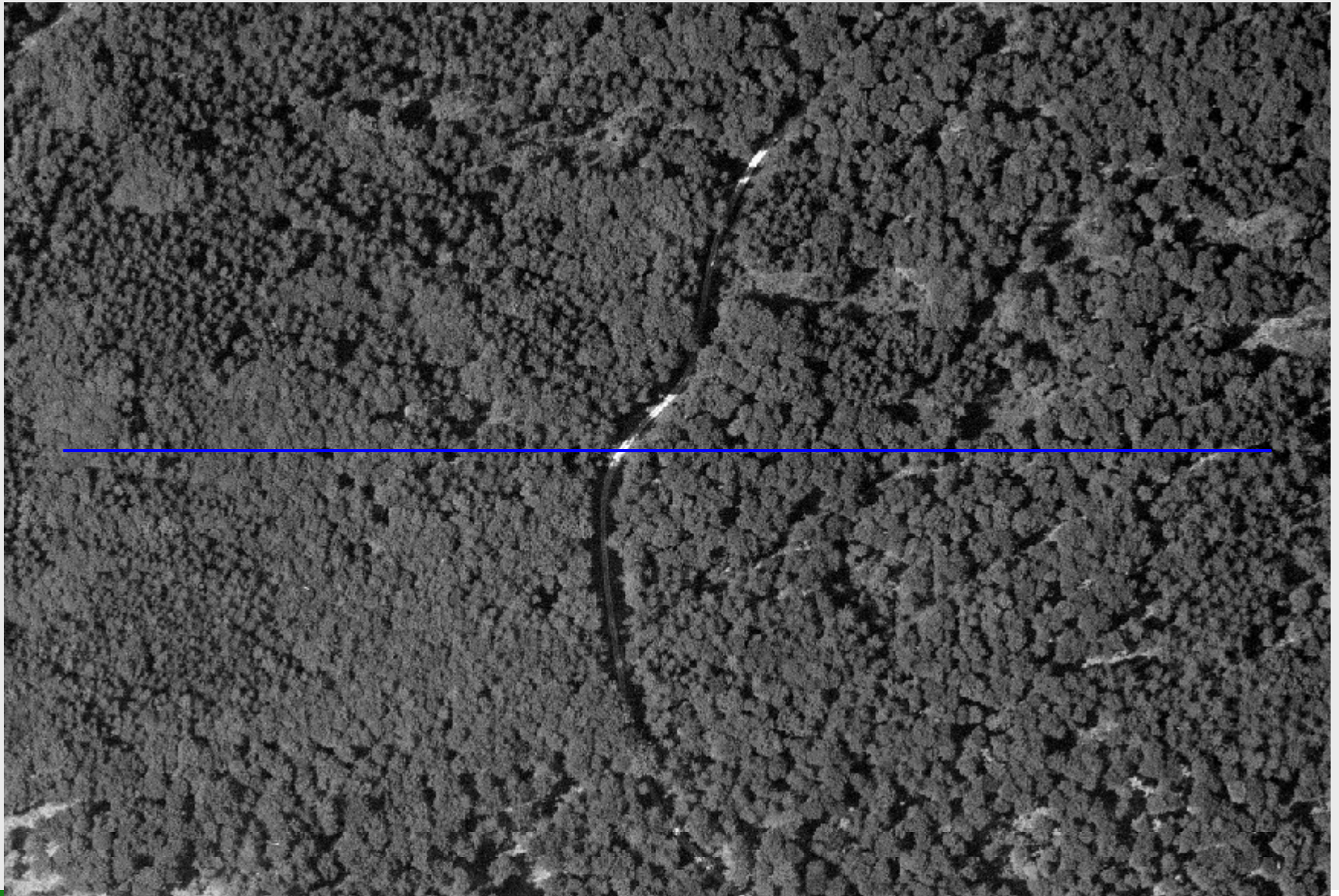
Ground Truth Data

- ~ 250 Inventory Sampleplots
 - summer 2001
 - 450 m² → 11 ha
 - 3-5 height measurements + estimations



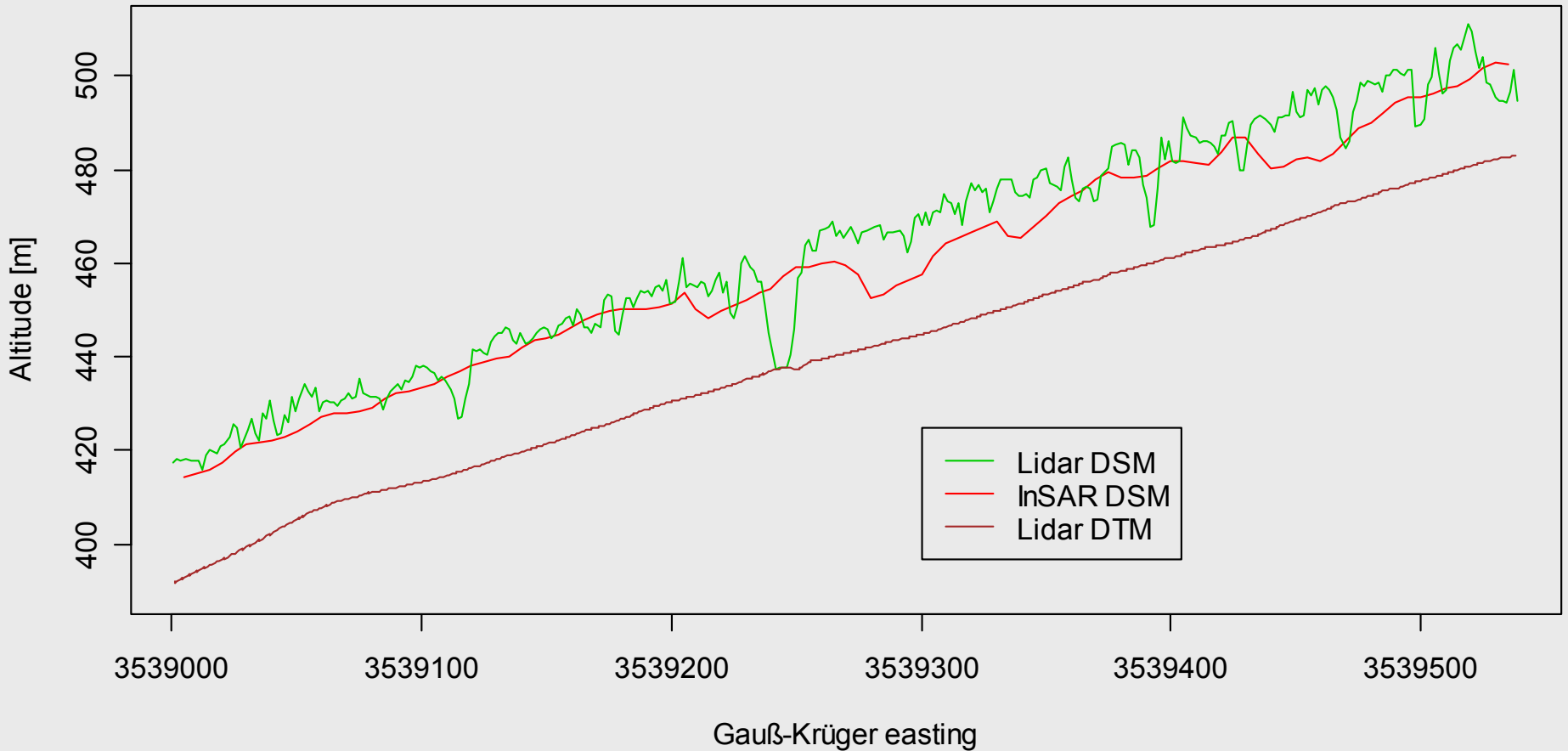
Methods

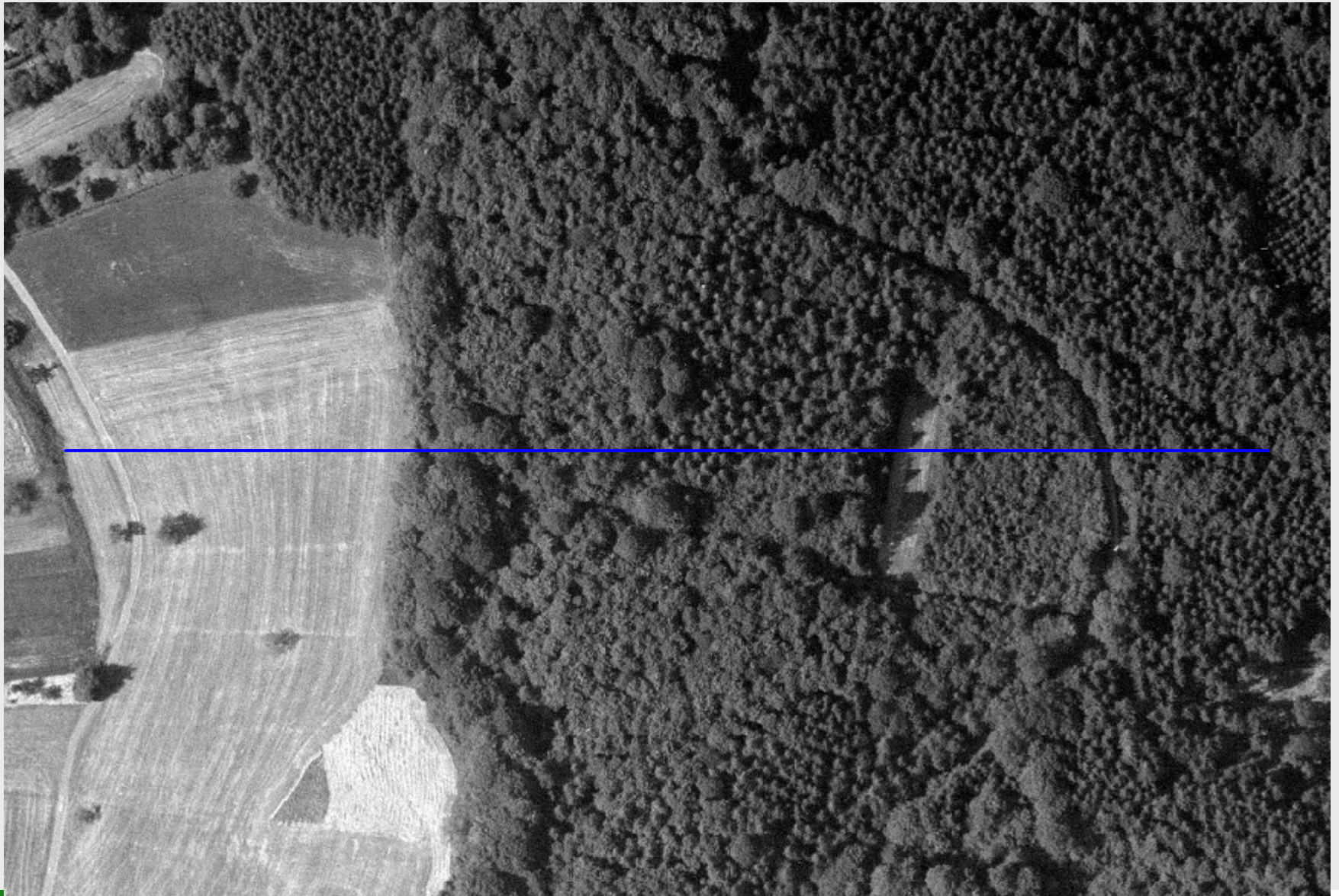




Comparison InSAR Lidar

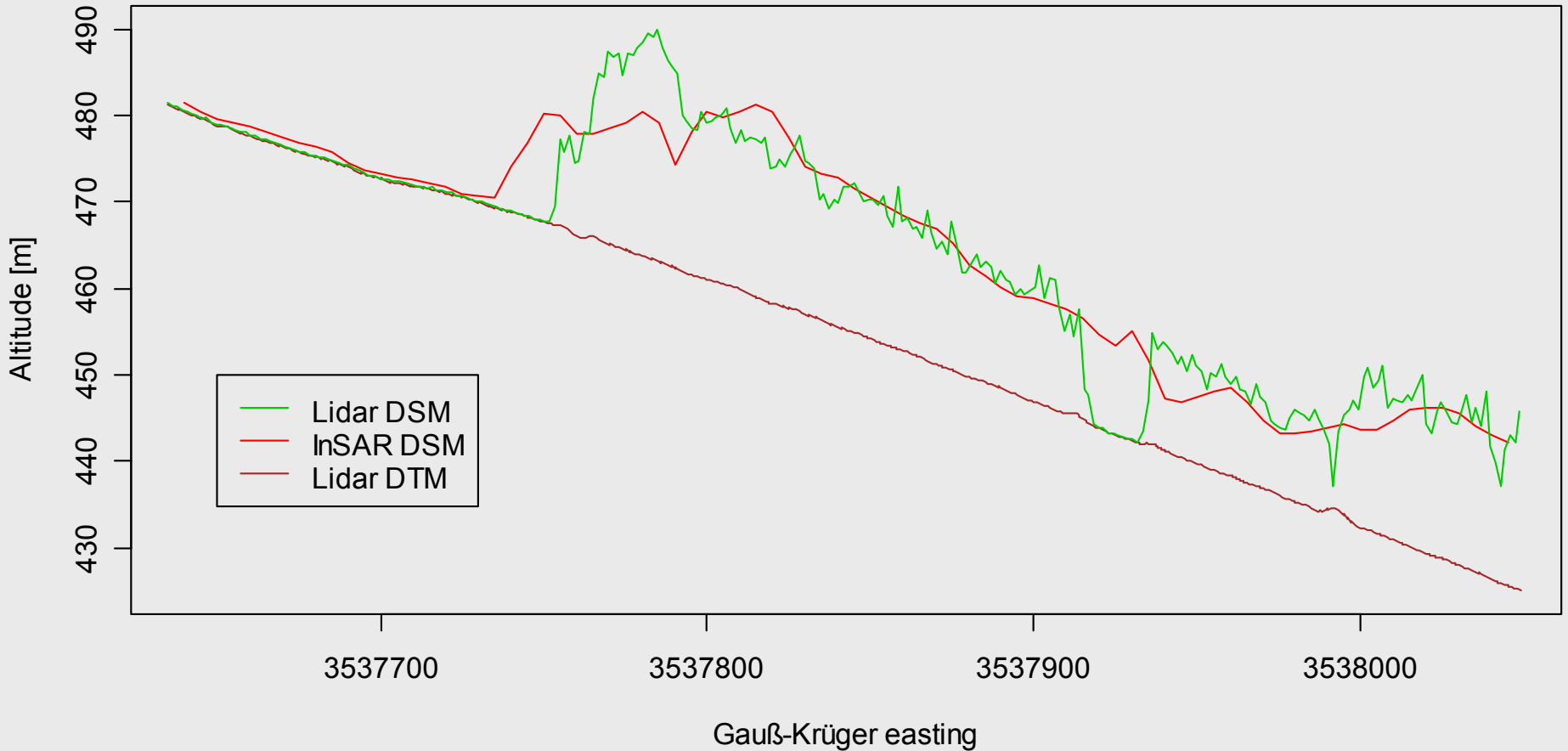
West aspect transect





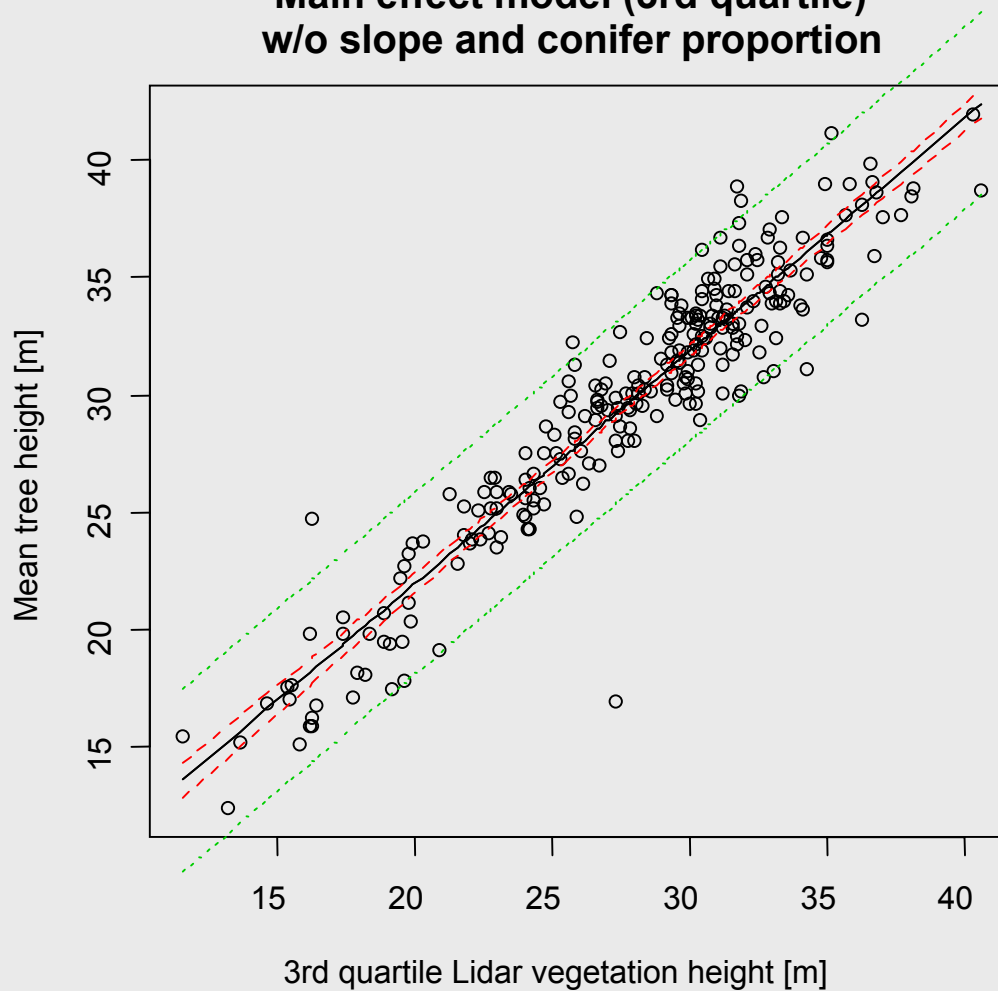
Comparison InSAR Lidar

East aspect transect

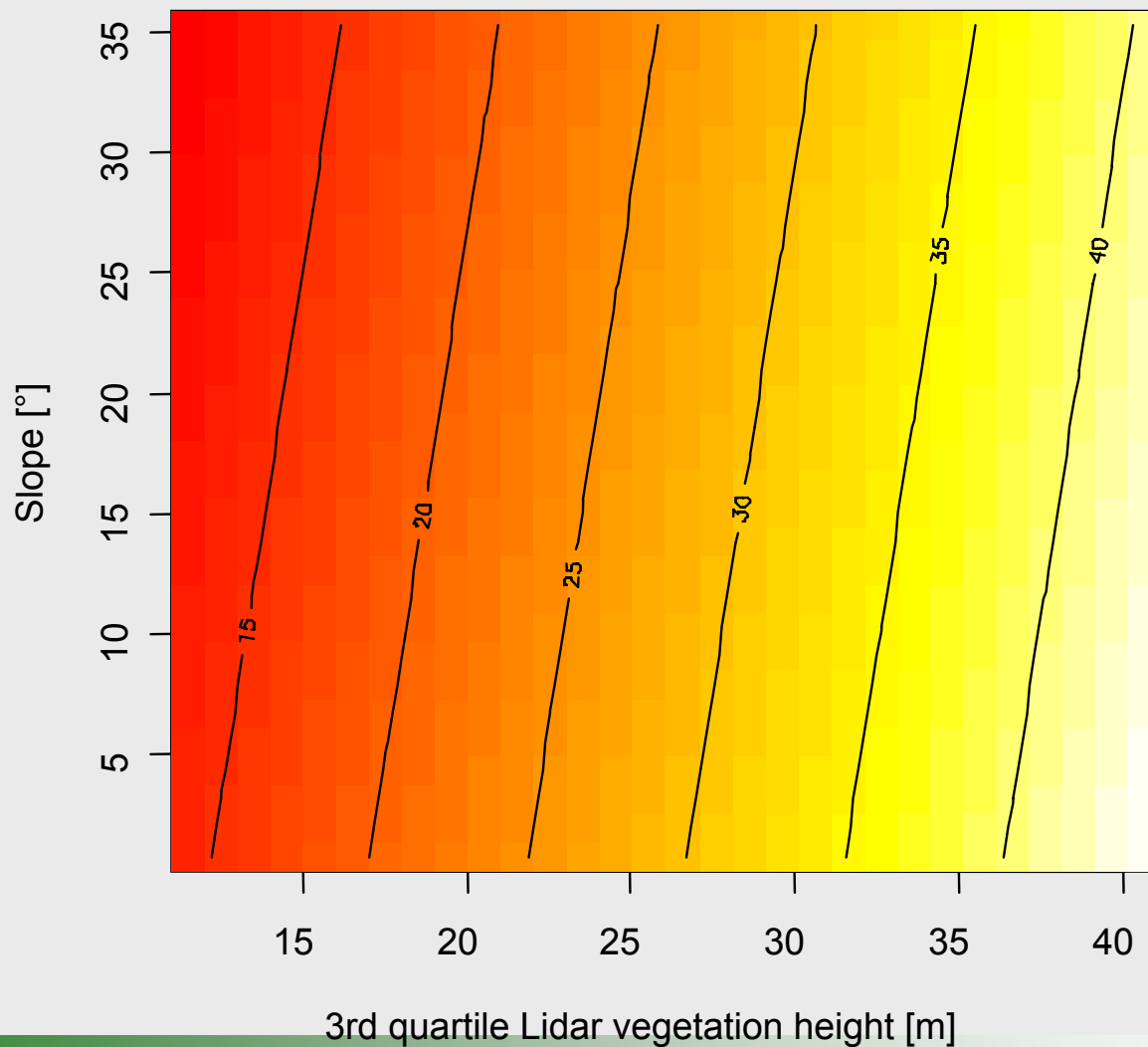


Results - Lidar

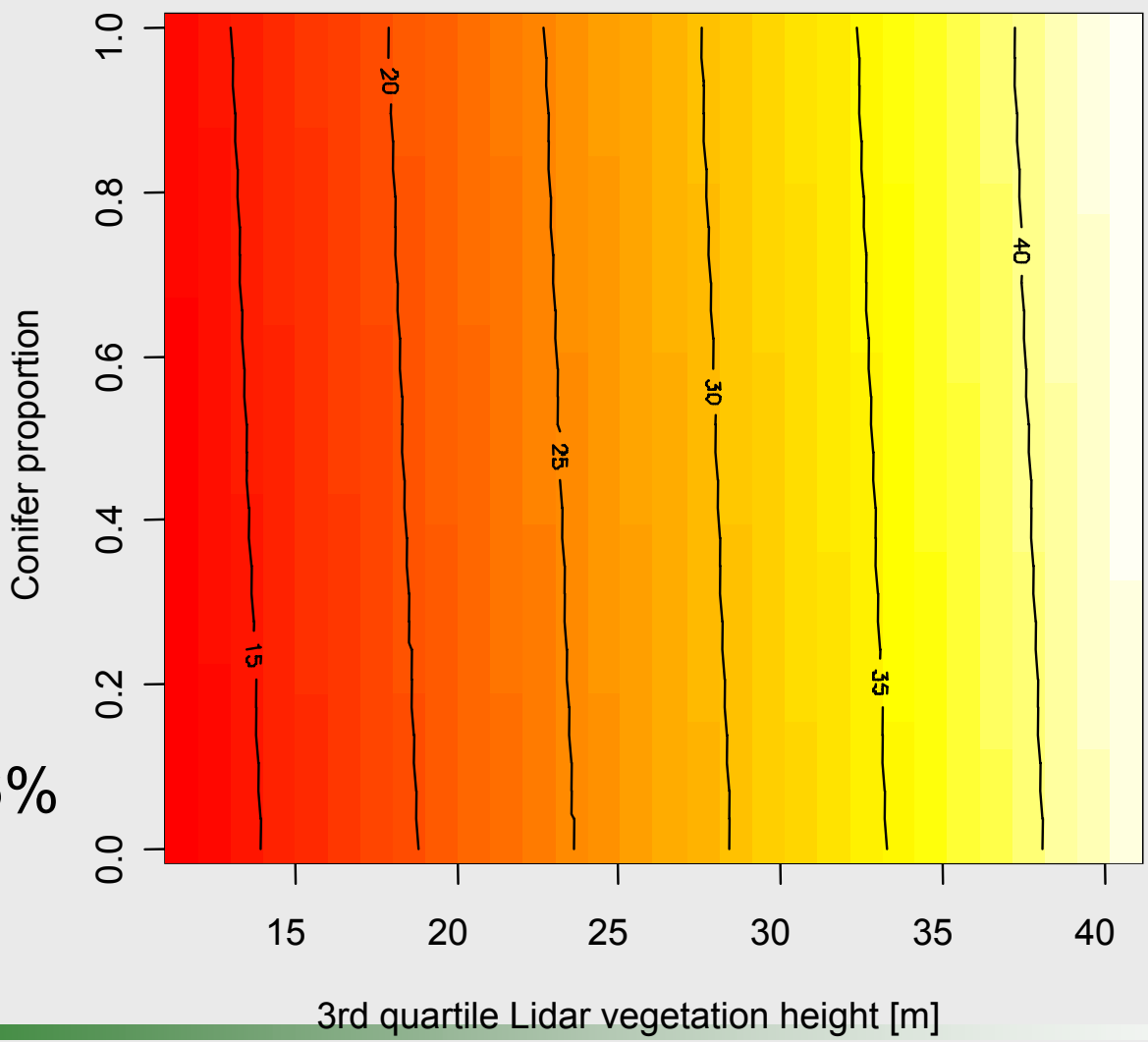
Main effect model (3rd quartile)
w/o slope and conifer proportion



Mean tree height vs. Lidar quartile and slope



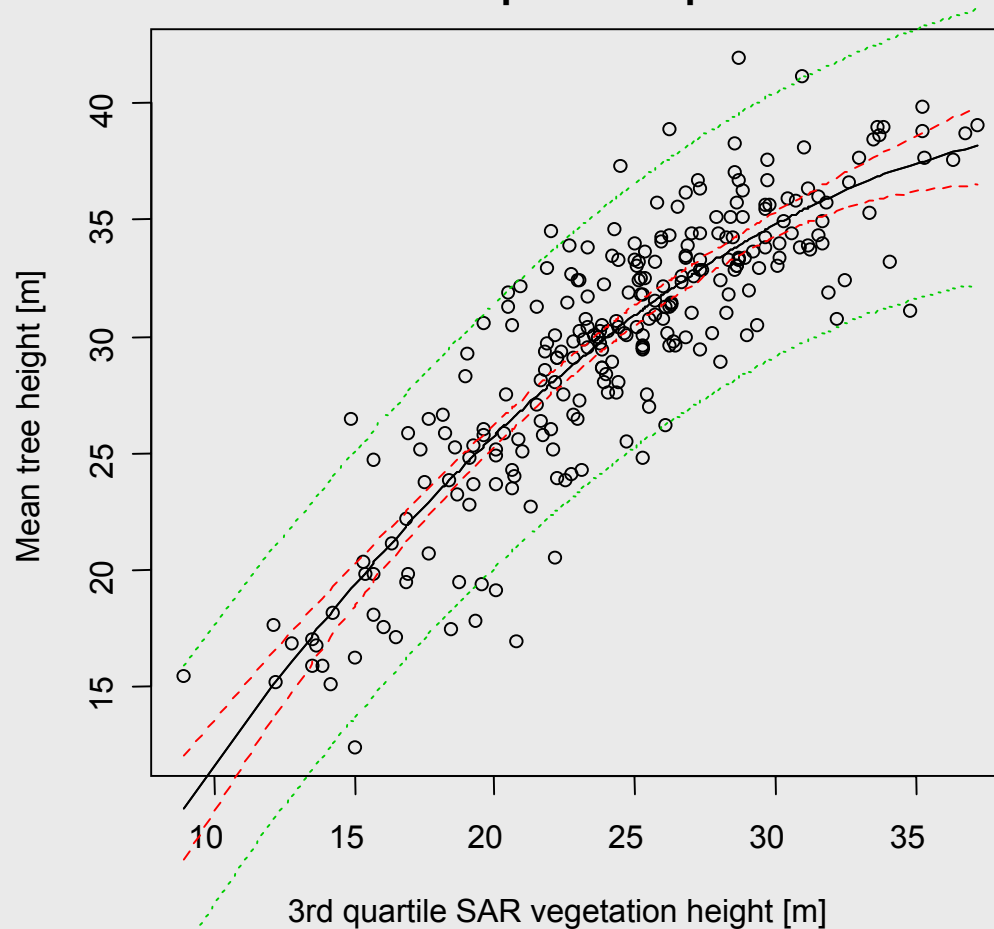
Mean tree height vs. Lidar quartile and conifer proportion



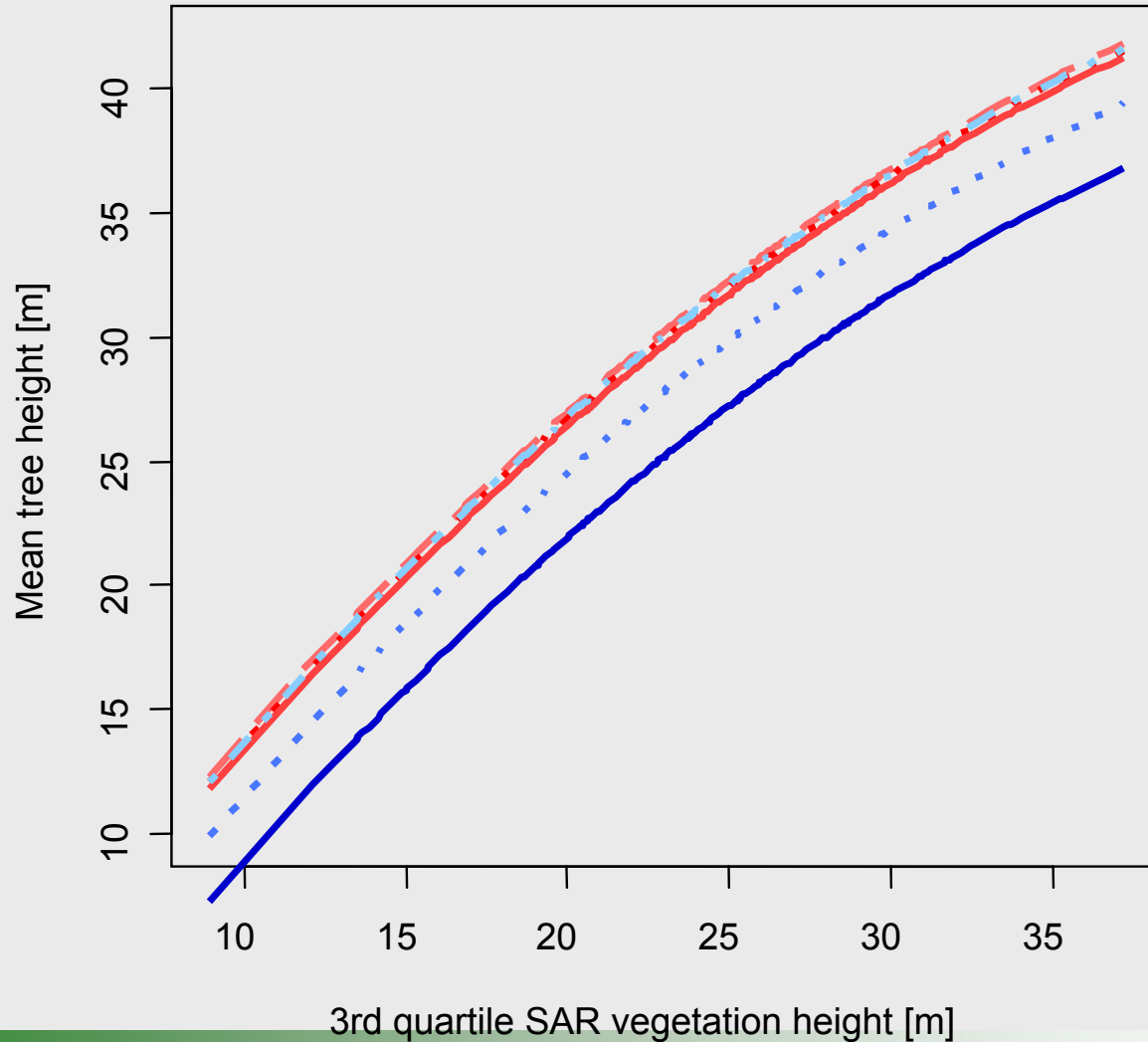
RMSE=6.6%

Results - InSAR

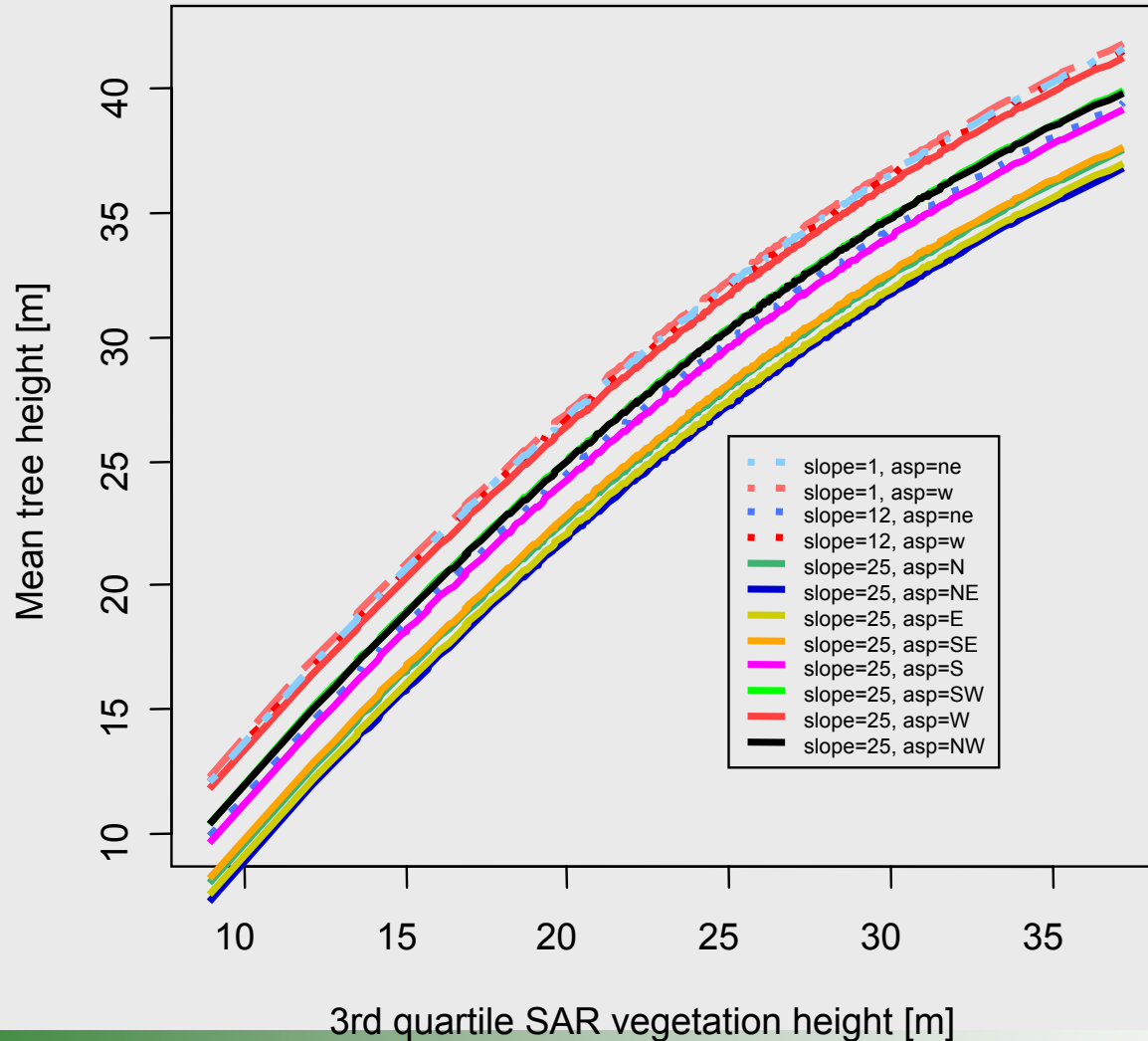
Main effect model (3rd quartile)
w/o slope and aspect



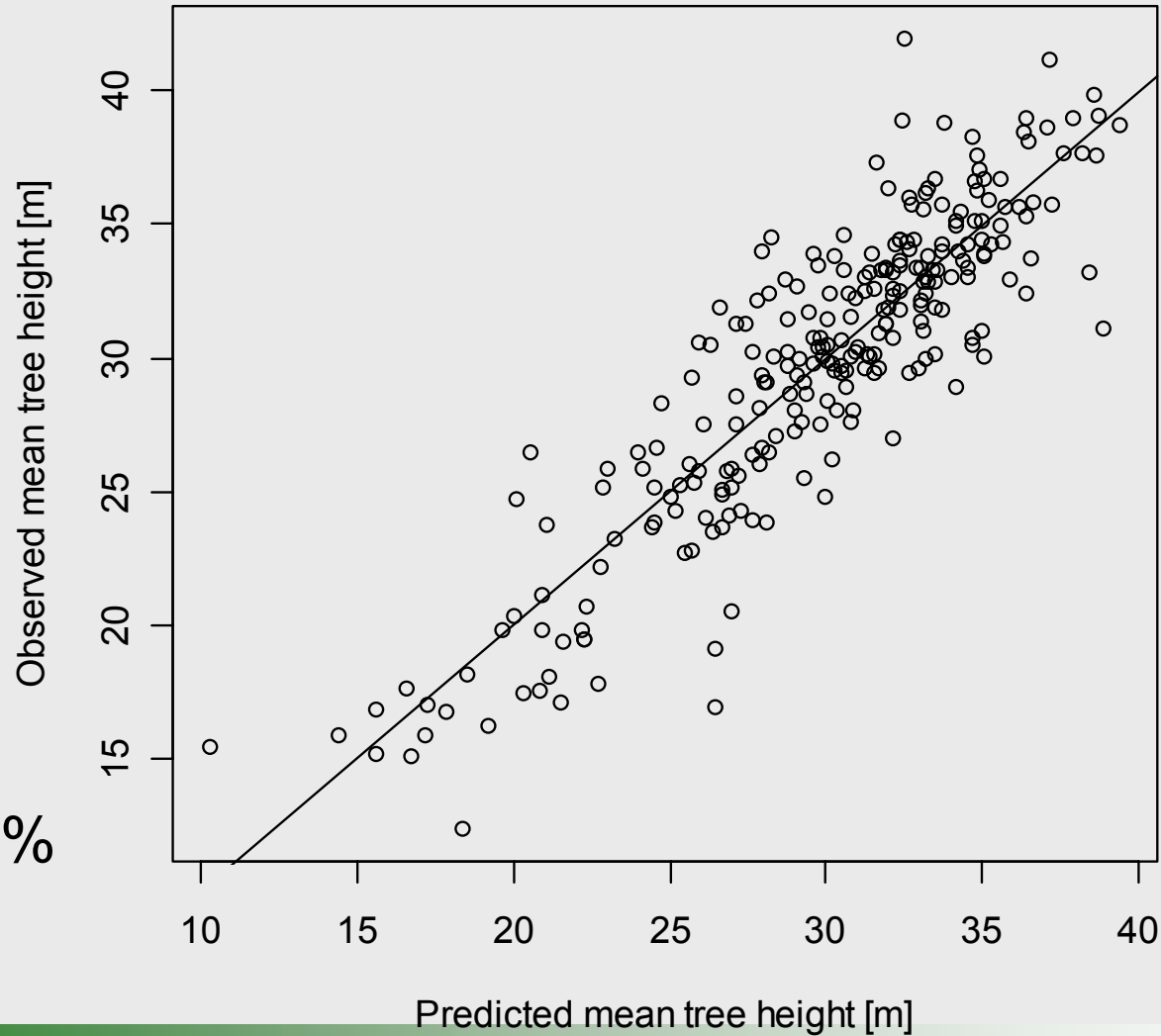
Mean tree height predictions at varying slopes and aspects



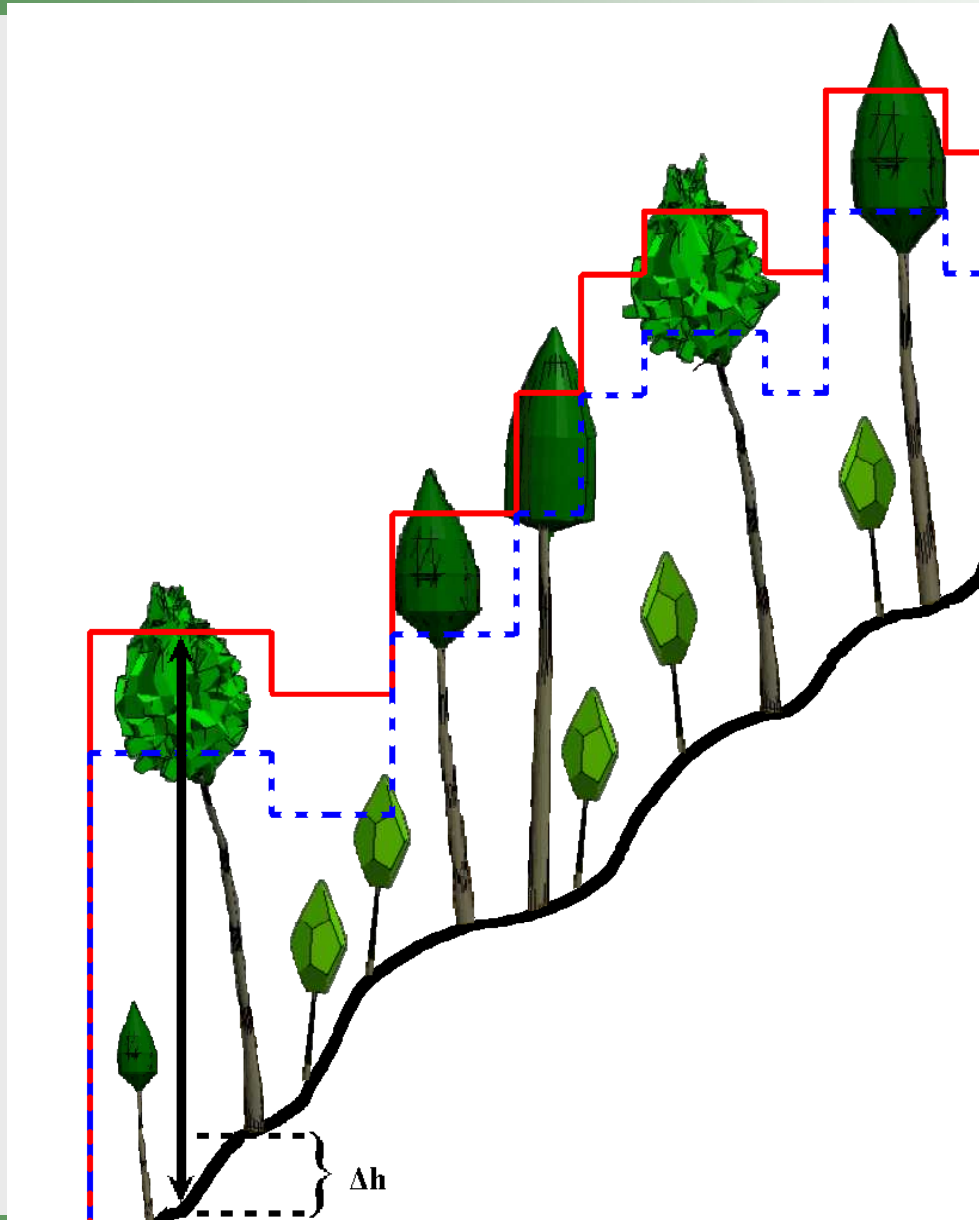
Mean tree height predictions at varying slopes and aspects



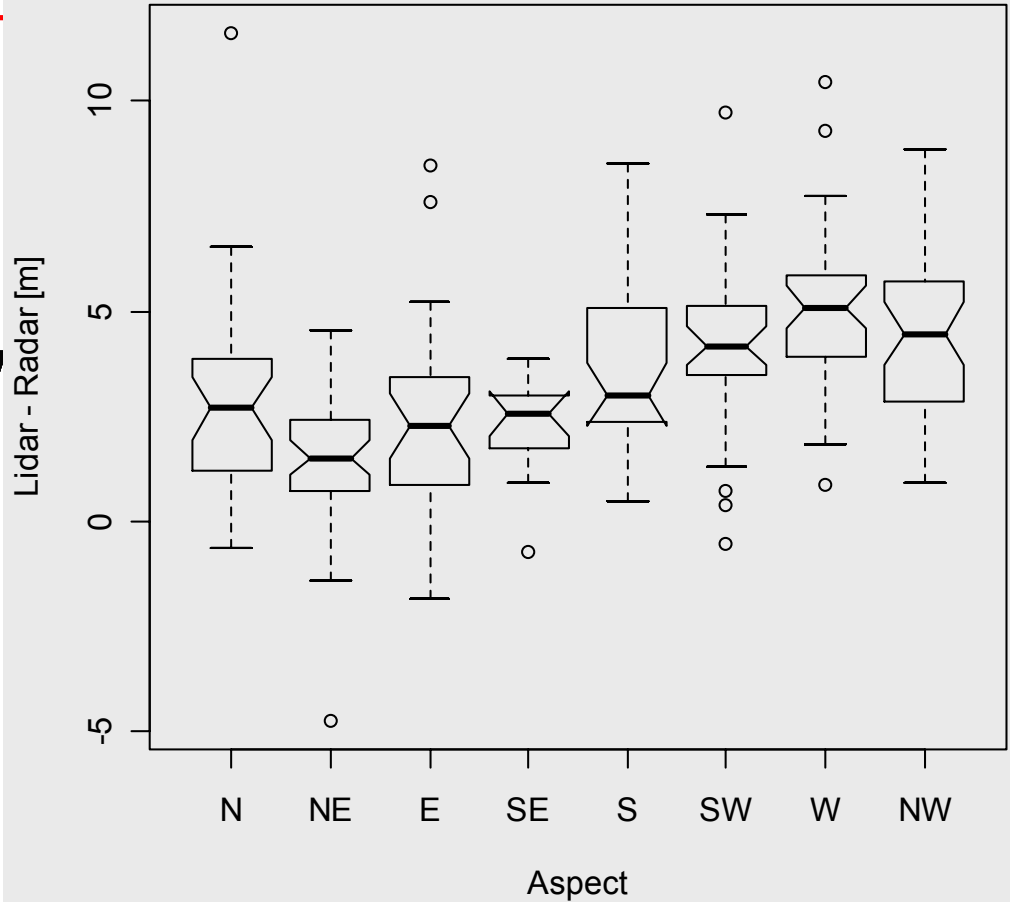
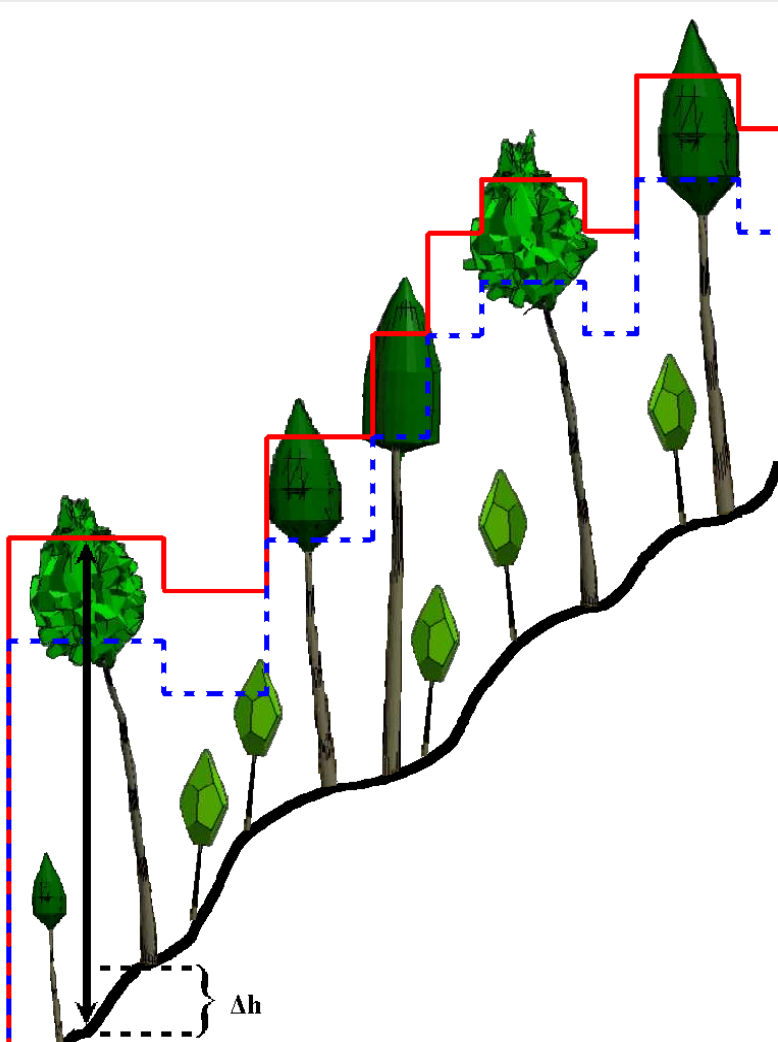
Best Model



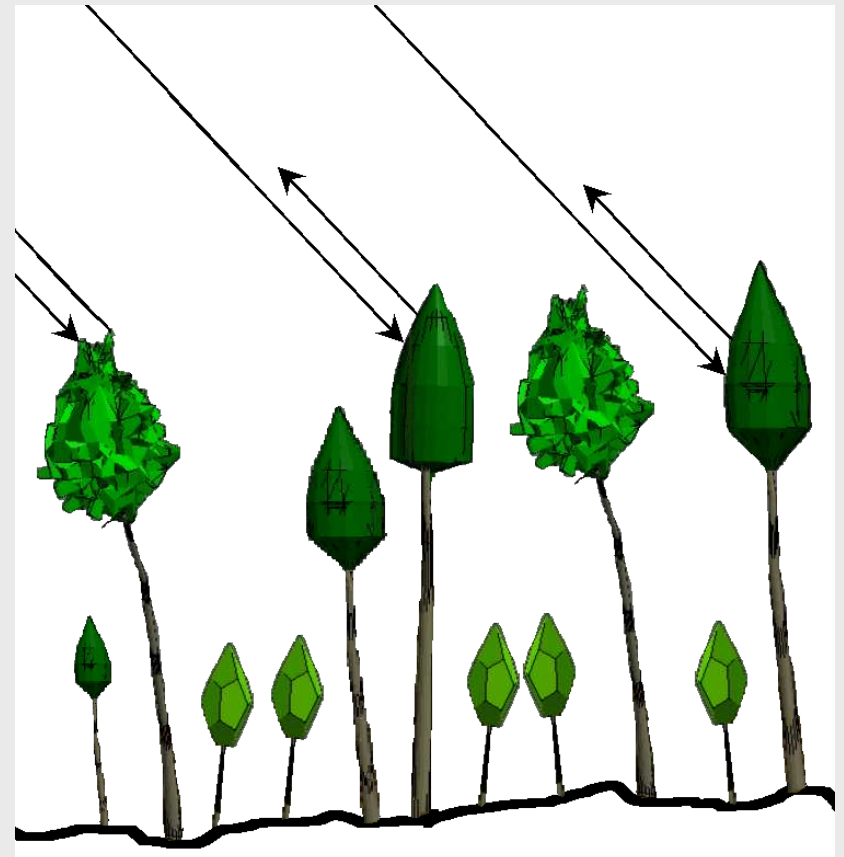
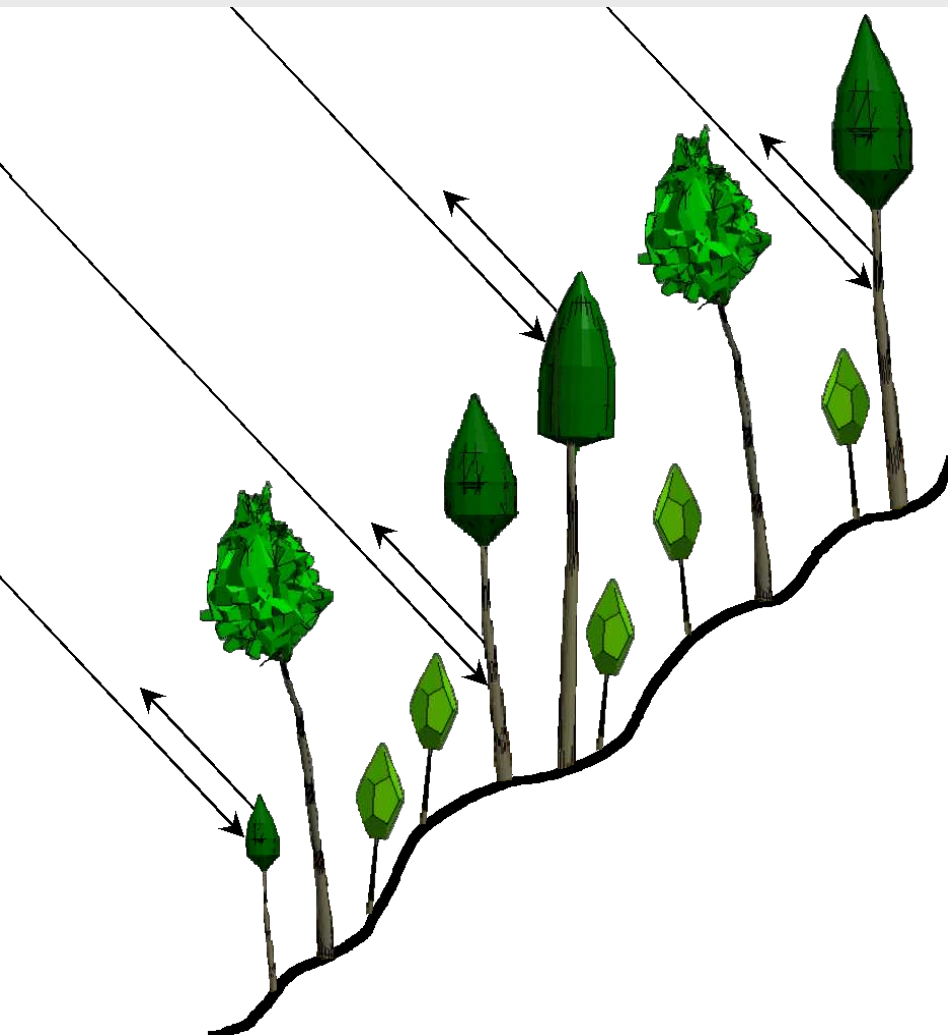
RMSE=9.5%



Discussion aspect



Discussion aspect



Summary

- Lidar + InSAR RMSE < 10%
- 3rd Quartile: Systematical underestimation
- slope → less underestimation
- InSAR
 - facing slopes → DSM more below tree tops
 - edge effects → fragmented forests
- Lidar
 - higher accuracy
 - more detail
 - more expensive

Future research

