Supplementary Material

A Method for Tree Detection Based on Similarity with Geometric Shapes of 3D Geospatial Data

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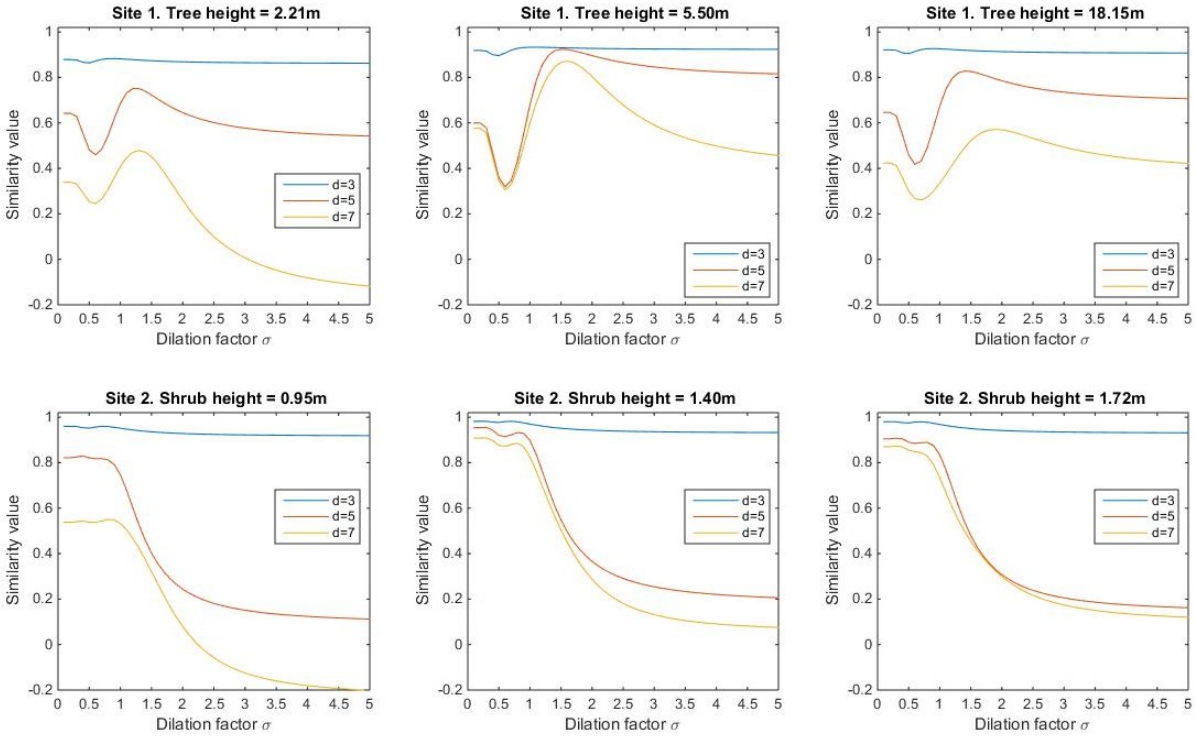

Figure S1: Plots of similarity values for three trees from Site 1 (row above) and three juniper shrubs from Site 2 (row below). The dilation factor ranges from 0.0 to 5.0 and the size of the matrices compared is d = 3, 5, 7.

Quantile	0.025	0.250	0.500	0.750	0.975
Size					
$d = 3$	0.25	0.74	0.97	1.40	5.00
$d = 5$	0.10	1.05	1.39	1.78	5.00
$d = 7$	0.10	1.00	1.53	2.35	4.44

Table S1: Quantiles for optimal dilation factor σ for Site 1.

Quantile	0.025	0.250	0.500	0.750	0.975
Size					
$d = 3$	0.27	0.68	0.77	0.89	1.32
$d = 5$	0.10	0.11	0.47	1.03	1.27
$d = 7$	0.10	0.10	0.26	0.87	1.56

Table S2: Quantiles for optimal dilation factor σ for Site 2.

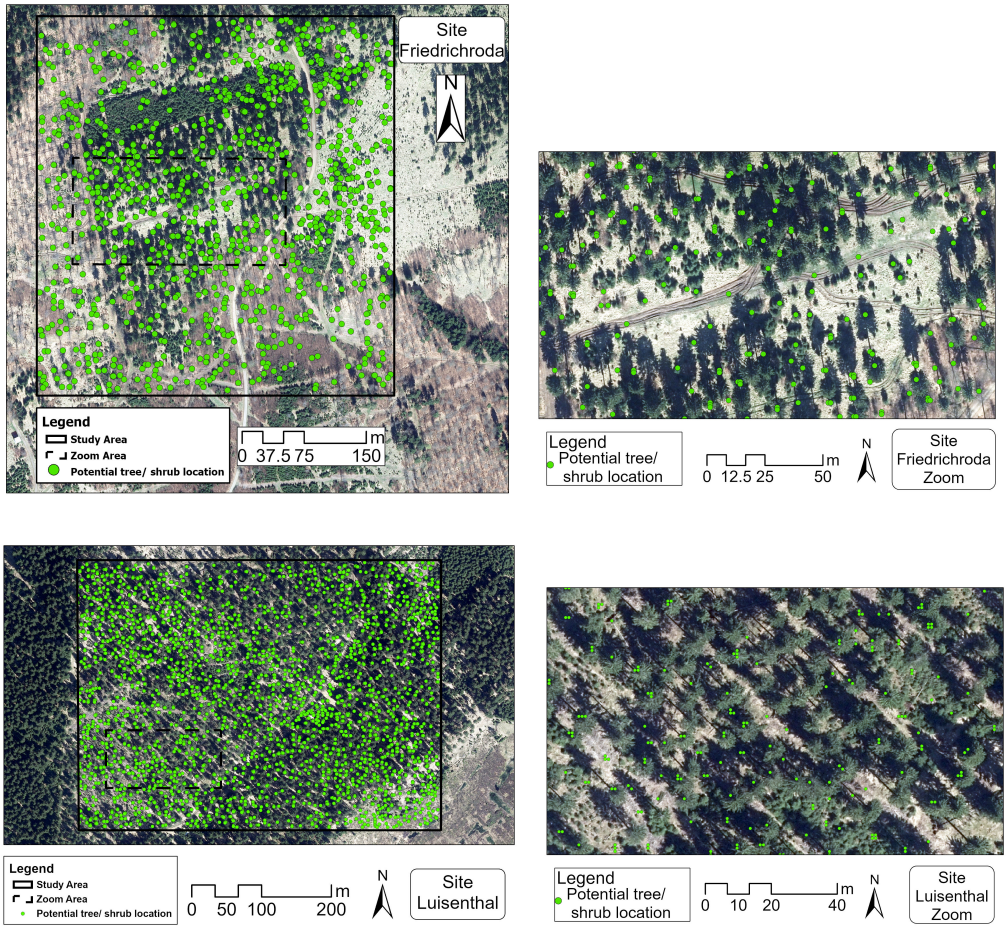

Figure S2: Potential locations of scattered trees labelled on orthophotomaps for two replicate sites in Germany. Row above: site Friedrichroda; row below: site Luisenthal. Since no obvious pattern of scattered trees was identified in the examples, we included, for each site, a zoom area, in order to show how the detected locations match the ground truth data. The LiDAR point cloud data and the high resolution RGB imagery were obtained from the Thuringian State Office for Soil Management and Geographic Information (Thüringer Landesamt für Bodenmanagement und Geoinformation). The Geoportal (https://www.geoportal-th.de/de-de/, accessed at 12 December 2019) allows to download pre-processed LiDAR datasets as point clouds to directly derive the Digital Surface Model (DSM) through interpolation, without the need of other processing steps. We used ArcGIS Pro software to generate the DSM model from the LiDAR data at 1m spatial resolution.