

## S2 Table. Lidar variables

Note: To explore the use of lidar data in mapping and quantifying forest C stocks we used echoes from the *first* returns only and a combination of *both* first and last returns. *From* represent the cutoff height or bin range (in m) of lidar echo.

<b>Id</b>	<b>From</b>	<b>Name</b>	<b>Short</b>	<b>First/combined</b>	<b>Reference/Note</b>
1	Field	Basal area	Ba	Both	
2	Lidar ground	Elevation	Elev	Both	
3	Lidar ground	Slope	Slope	Both	
4	Lidar ground	Aspect	Aspect	Both	
5	Lidar ground	Slope Degrees	SlopeDeg	Both	Stage (1976)
6	Lidar ground	Aspect Degrees	AspectDeg	Both	Stage (1976)
7	Lidar ground	Topographic Ruggedness Index	TRI	Both	Riley et al. (1999)
8	Lidar ground	Topographic Position Index	TPI	Both	Guisan et al. (1999)
9	Lidar ground	Curvature	Curvature	Both	Zevenbergen and Thorne (1987)
10	Lidar ground	Topographic Wetness Index	TWI	Both	Gessler et al. (1995)
11	Lidar Overstory	Height Percentile <sub>10</sub>	h <sub>10</sub>	First	
12	Lidar Overstory	Height Percentile <sub>20</sub>	h <sub>20</sub>	First	
13	Lidar Overstory	Height Percentile <sub>30</sub>	h <sub>30</sub>	First	
14	Lidar Overstory	Height Percentile <sub>40</sub>	h <sub>40</sub>	First	
15	Lidar Overstory	Height Percentile <sub>50</sub>	h <sub>50</sub>	First	
16	Lidar Overstory	Height Percentile <sub>60</sub>	h <sub>60</sub>	First	
17	Lidar Overstory	Height Percentile <sub>70</sub>	h <sub>70</sub>	First	
18	Lidar Overstory	Height Percentile <sub>80</sub>	h <sub>80</sub>	First	
19	Lidar Overstory	Height Percentile <sub>90</sub>	h <sub>90</sub>	First	
20	Lidar Overstory	Height Percentile <sub>95</sub>	h <sub>95</sub>	First	
21	Lidar Overstory	Height Percentile <sub>mean</sub>	h <sub>mean</sub>	First	
22	Lidar Overstory	Height <sub>CV</sub>	h <sub>CV</sub>	First	
23	Lidar Overstory	Canopy Density <sub>0</sub>	Cd <sub>0</sub>	First	
24	Lidar Overstory	Canopy Density <sub>10</sub>	Cd <sub>10</sub>	First	
25	Lidar Overstory	Canopy Density <sub>20</sub>	Cd <sub>20</sub>	First	
26	Lidar Overstory	Canopy Density <sub>30</sub>	Cd <sub>30</sub>	First	
27	Lidar Overstory	Canopy Density <sub>40</sub>	Cd <sub>40</sub>	First	
28	Lidar Overstory	Canopy Density <sub>50</sub>	Cd <sub>50</sub>	First	
29	Lidar Overstory	Canopy Density <sub>60</sub>	Cd <sub>60</sub>	First	
30	Lidar Overstory	Canopy Density <sub>70</sub>	Cd <sub>70</sub>	First	
31	Lidar Overstory	Canopy Density <sub>80</sub>	Cd <sub>80</sub>	First	
32	Lidar Overstory	Canopy Density <sub>90</sub>	Cd <sub>90</sub>	First	
33	Lidar Overstory	Stratum 1	Strat <sub>1</sub>	First	From 1.5 - 2.5
34	Lidar Overstory	Stratum 2	Strat <sub>2</sub>	First	From 2.5 - 5
35	Lidar Overstory	Stratum 3	Strat <sub>3</sub>	First	From 5 - 10
36	Lidar Overstory	Stratum 4	Strat <sub>4</sub>	First	From 10 - 20
37	Lidar Overstory	Stratum 5	Strat <sub>5</sub>	First	From >20

38	Lidar Understory	Height Percentile <sub>10</sub> - Filter 1	UhF1B <sub>10</sub>	Both	From 0.01
39	Lidar Understory	Height Percentile <sub>20</sub> - Filter 1	UhF1B <sub>20</sub>	Both	From 0.01
40	Lidar Understory	Height Percentile <sub>30</sub> - Filter 1	UhF1B <sub>30</sub>	Both	From 0.01
41	Lidar Understory	Height Percentile <sub>40</sub> - Filter 1	UhF1B <sub>40</sub>	Both	From 0.01
42	Lidar Understory	Height Percentile <sub>50</sub> - Filter 1	UhF1B <sub>50</sub>	Both	From 0.01
43	Lidar Understory	Height Percentile <sub>60</sub> - Filter 1	UhF1B <sub>60</sub>	Both	From 0.01
44	Lidar Understory	Height Percentile <sub>70</sub> - Filter 1	UhF1B <sub>70</sub>	Both	From 0.01
45	Lidar Understory	Height Percentile <sub>80</sub> - Filter 1	UhF1B <sub>80</sub>	Both	From 0.01
46	Lidar Understory	Height Percentile <sub>90</sub> - Filter 1	UhF1B <sub>90</sub>	Both	From 0.01
47	Lidar Understory	Height Percentile <sub>mean</sub>	UhB <sub>mean</sub>	Both	From 0.01
48	Lidar Understory	Height Percentile <sub>10</sub> - Filter 2	UhF2B <sub>10</sub>	Both	From 0.2
49	Lidar Understory	Height Percentile <sub>20</sub> - Filter 2	UhF2B <sub>20</sub>	Both	From 0.2
50	Lidar Understory	Height Percentile <sub>30</sub> - Filter 2	UhF2B <sub>30</sub>	Both	From 0.2
51	Lidar Understory	Height Percentile <sub>40</sub> - Filter 2	UhF2B <sub>40</sub>	Both	From 0.2
52	Lidar Understory	Height Percentile <sub>50</sub> - Filter 2	UhF1B <sub>50</sub>	Both	From 0.2
53	Lidar Understory	Height Percentile <sub>60</sub> - Filter 2	UhF2B <sub>60</sub>	Both	From 0.2
54	Lidar Understory	Height Percentile <sub>70</sub> - Filter 2	UhF2B <sub>70</sub>	Both	From 0.2
55	Lidar Understory	Height Percentile <sub>80</sub> - Filter 2	UhF <sub>2</sub> B <sub>80</sub>	Both	From 0.2
56	Lidar Understory	Height Percentile <sub>90</sub> - Filter 2	UhF <sub>2</sub> B <sub>90</sub>	Both	From 0.2
57	Lidar Understory	Height Percentile <sub>mean</sub> - Filter 2	UhF <sub>2</sub> B <sub>mean</sub>	Both	From 0.2
58	Lidar Understory	Height Percentile <sub>10</sub> - Filter 1	UhF1F <sub>10</sub>	First	From 0.01
59	Lidar Understory	Height Percentile <sub>20</sub> - Filter 1	UhF1F <sub>20</sub>	First	From 0.01
60	Lidar Understory	Height Percentile <sub>30</sub> - Filter 1	UhF1F <sub>30</sub>	First	From 0.01
61	Lidar Understory	Height Percentile <sub>40</sub> - Filter 1	UhF1F <sub>40</sub>	First	From 0.01
62	Lidar Understory	Height Percentile <sub>50</sub> - Filter 1	UhF1F <sub>50</sub>	First	From 0.01
63	Lidar Understory	Height Percentile <sub>60</sub> - Filter 1	UhF1F <sub>60</sub>	First	From 0.01
64	Lidar Understory	Height Percentile <sub>70</sub> - Filter 1	UhF1F <sub>70</sub>	First	From 0.01
65	Lidar Understory	Height Percentile <sub>80</sub> - Filter 1	UhF1F <sub>80</sub>	First	From 0.01
66	Lidar Understory	Height Percentile <sub>90</sub> - Filter 1	UhF1F <sub>90</sub>	First	From 0.01
67	Lidar Understory	Height Percentile <sub>mean</sub>	UhF1F <sub>mean</sub>	First	From 0.01
68	Lidar Understory	Height Percentile <sub>10</sub> - Filter 2	UhF2F <sub>10</sub>	First	From 0.2
69	Lidar Understory	Height Percentile <sub>20</sub> - Filter 2	UhF2F <sub>20</sub>	First	From 0.2
70	Lidar Understory	Height Percentile <sub>30</sub> - Filter 2	UhF2F <sub>30</sub>	First	From 0.2
71	Lidar Understory	Height Percentile <sub>40</sub> - Filter 2	UhF2F <sub>40</sub>	First	From 0.2
72	Lidar Understory	Height Percentile <sub>50</sub> - Filter 2	UhF2F <sub>50</sub>	First	From 0.2
73	Lidar Understory	Height Percentile <sub>60</sub> - Filter 2	UhF2F <sub>60</sub>	First	From 0.2
74	Lidar Understory	Height Percentile <sub>70</sub> - Filter 2	UhF2F <sub>70</sub>	First	From 0.2
75	Lidar Understory	Height Percentile <sub>80</sub> - Filter 2	UhF2F <sub>80</sub>	First	From 0.2
76	Lidar Understory	Height Percentile <sub>90</sub> - Filter 2	Uh <sub>F2</sub> F <sub>90</sub>	First	From 0.2
77	Lidar Understory	Height Percentile <sub>mean</sub> - Filter 2	UhF2F <sub>mean</sub>	First	From 0.2
78	Lidar Understory	Density Stratum 1 - Filter 1	UdF1B <sub>1</sub>	Both	From 0.01 - 0.5
79	Lidar Understory	Density Stratum 2 - Filter 1	UdF1B <sub>2</sub>	Both	From 0.5 to 1
80	Lidar Understory	Density Stratum 3 - Filter 1	UdF1B <sub>3</sub>	Both	From 1 to 1.5
81	Lidar Understory	Density Stratum 1 - Filter 2	UdF2B <sub>1</sub>	Both	From 0.2 - 0.5
82	Lidar Understory	Density Stratum 2 - Filter 2	UdF2B <sub>2</sub>	Both	From 0.5 to 1

83	Lidar Understory	Density Stratum 3 - Filter 2	UdF2B <sub>3</sub>	Both	From 1 to 1.5
84	Lidar Understory	Density Stratum 1 - Filter 1	UdF1F <sub>1</sub>	First	From 0.01 - 0.2
85	Lidar Understory	Density Stratum 2 - Filter 1	UdF1F <sub>2</sub>	First	From 0.2 to 1
86	Lidar Understory	Density Stratum 3 - Filter 1	UdF1F <sub>3</sub>	First	From 1 to 1.5
87	Lidar Understory	Density Stratum 1 - Filter 2	UdF2F <sub>1</sub>	First	From 0.01 - 0.2
88	Lidar Understory	Density Stratum 2 - Filter 2	UdF2F <sub>2</sub>	First	From 0.2 to 1
89	Lidar Understory	Density Stratum 3 - Filter 2	UdF2F <sub>3</sub>	First	From 1 to 1.5
90	Lidar Understory	Proportion Non Ground - Filter 1	UF1B <sub>i</sub>	Both	From 0.01 to 1.5
91	Lidar Understory	Proportion Non Ground - Filter 2	UF2B <sub>i</sub>	Both	From 0.2 to 1.5
92	Lidar Understory	Proportion Non Ground - Filter 1	UF1F <sub>i</sub>	First	From 0.01 to 1.5
93	Lidar Understory	Proportion Non Ground - Filter 2	UF2F <sub>i</sub>	First	From 0.2 to 1.5