

Supplementary Information for

Large-scale Mapping of complex Forest Typologies Using Multispectral Imagery and Low-Density Airborne LiDAR: A Case Study in Pinsapo Fir Forests

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Description of LiDAR metrics

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Description of LiDAR metrics

1. Height Metrics:

- Maximum Height
- Minimum Height
- Mean Height
- Median Height
- Height Percentiles (e.g., 25th, 50th, 75th, 90th, 95th, 99th percentiles)

2. Canopy Metrics:

- Canopy Cover: The percentage of ground covered by vegetation.
- Canopy Relief Ratio (CRR): The ratio of the mean canopy height to the maximum canopy height.

3. Statistical Metrics:

- Standard Deviation: A measure of the amount of variation or dispersion of height values.
- Variance: The square of the standard deviation.
- Skewness: The measure of asymmetry of the height distribution.
- Kurtosis: The measure of the "tailedness" of the height distribution.

TABLES

Table S1. Number of plots of each silvicultural type found in the sampled plots (n = 694).

Type*	I0	I1	I2	II0a	II0b	II0c	II1a	II1b	II1c	III0	III1
SN	-	-	-	16	20	91	31	12	130	-	4
SG	-	-	-	-	6	142	2	12	220	-	8

*see Table 1 (main manuscript) for typology types description

Table S2. Main structural characteristics of the seven types of pinsapo fir forests found in the sampled plots.

	SN			SG		
	dbh (± sd)	ba (± sd)	N (± sd)	dbh (± sd)	ba (± sd)	N (± sd)
II0a	58.41(±19.55)	16.51(±5.16)	45.08(±8.45)	-	-	-
II0b	18.64(±10.43)	16.22(±2.14)	867.35(±110.68)	27.44(±19.17)	31.14(±5.14)	878.96(±155.84)
II0c	24.44(±15.45)	20.19(±2.14)	691.81(±91.59)	37.62(±22.01)	52.78(±4.50)	631.76(±53.18)
II1a	10.24(±7.07)	2.72(±0.57)	552.29(±190.54)	24.47(±19.59)	5.59(±1.31)	329.61(±157.68)
II1b	17.28(±11.91)	17.34(±1.74)	800.48(±62.78)	27.59(±17.88)	20.03(±2.49)	591.73(±78.50)
II1c	20.89(±14.79)	16.55(±1.70)	602.88(±68.12)	32.83(±23.12)	34.95(±3.91)	577.68(±75.46)
III1	25.47(±15.12)	13.87(±1.47)	705.12(±81.65)	18.64(±10.85)	16.57(±2.40)	541.88(±45.12)

Table S3. Importance values (%) of trees (dbh > 5 cm) found in sampled plots (n = 694) at pinsapo fir forests in SN and SG.

Spp.	SN	SG
<i>Rhamnus frangula</i> L.	< 0.01	-
<i>Phillyrea latifolia</i> L.	< 0.01	-
<i>Cedrus atlantica</i> (Endl.) Manetti ex Carriere	0.06	-
<i>Pinus sylvestris</i> L.	0.82	-
<i>Pinus halepensis</i> Mill.	10.4	-
<i>Pinus pinaster</i> Aiton	2.32	-
<i>Abies pinsapo</i> Boiss.	66.6	62.9
<i>Cupressus sempervirens</i> L.	0.02	-
<i>Juniperus communis</i> L.	9.50	-
<i>Juniperus phoenicea</i> L.	9.36	-
<i>Quercus faginea</i> Lam.	0.11	5.25
<i>Quercus ilex</i> L. subsp. <i>ballota</i> (Desf.) Samp.	0.73	31.9

<i>Olea europaea</i> var. <i>syvestris</i> (Mill.) Lehr	< 0.01	0.02
<i>Ceratonia siliqua</i> L.	< 0.01	-
<i>Castanea sativa</i> Mill.	0.02	-
<i>Acer campestre</i> L.	0.02	-
<i>Robinia pseudoacacia</i> L.	< 0.01	-