

Table S1. Linear models of *Cedrus atlantica* height (hauteur, m) as a function of log of circumference (lcirconf, m) for each site (see Table 1).

Site1

Call:
lm(formula = hauteur ~ 1 + lcirconf, data = datasite)

Residuals:

Min	1Q	Median	3Q	Max
-15.0555	-1.5439	0.4542	2.2883	13.6456

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	27.648	0.783	35.31	< 2e-16 ***
lcirconf	14.214	1.619	8.78	4.69e-11 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 4.897 on 42 degrees of freedom
Multiple R-squared: 0.6473, Adjusted R-squared: 0.6389
F-statistic: 77.1 on 1 and 42 DF, p-value: 4.692e-11

+++++ Site2

Call:
lm(formula = hauteur ~ 1 + lcirconf, data = datasite)

Residuals:

Min	1Q	Median	3Q	Max
-4.6512	-1.0565	0.1238	1.1993	4.5645

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	25.8614	0.4852	53.3	< 2e-16 ***
lcirconf	12.4989	0.9843	12.7	2.27e-13 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 2.345 on 29 degrees of freedom
Multiple R-squared: 0.8476, Adjusted R-squared: 0.8423
F-statistic: 161.2 on 1 and 29 DF, p-value: 2.267e-13

+++++ Site3

Call:
lm(formula = hauteur ~ 1 + lcirconf, data = datasite)

Residuals:

Min	1Q	Median	3Q	Max
-8.7866	-2.8591	-0.1305	2.1434	8.0788

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	19.595	1.136	17.256	2.42e-10 ***
lcirconf	9.057	2.050	4.419	0.000693 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 4.37 on 13 degrees of freedom
Multiple R-squared: 0.6003, Adjusted R-squared: 0.5696
F-statistic: 19.53 on 1 and 13 DF, p-value: 0.0006934

+++++ Site4

Call:

```
lm(formula = hauteur ~ 1 + lcirconf, data = datasite)
```

```
Residuals:
```

Min	1Q	Median	3Q	Max
-8.4059	-2.3944	-0.2916	1.3125	10.2756

```
Coefficients:
```

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	14.6015	0.6993	20.88	< 2e-16 ***
lcirconf	12.4236	1.1199	11.09	5.23e-13 ***

```
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```

```
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
Residual standard error: 3.847 on 35 degrees of freedom
```

```
Multiple R-squared:  0.7786, Adjusted R-squared:  0.7723
```

```
F-statistic: 123.1 on 1 and 35 DF,  p-value: 5.235e-13
```

```
+++++  
Site5
```

```
Call:
```

```
lm(formula = hauteur ~ 1 + lcirconf, data = datasite)
```

```
Residuals:
```

Min	1Q	Median	3Q	Max
-6.1918	-1.6339	-0.1888	1.6645	8.7275

```
Coefficients:
```

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	18.8394	0.4808	39.19	< 2e-16 ***
lcirconf	13.1117	0.9262	14.16	1.42e-15 ***

```
---
```

```
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
Residual standard error: 2.829 on 33 degrees of freedom
```

```
Multiple R-squared:  0.8586, Adjusted R-squared:  0.8543
```

```
F-statistic: 200.4 on 1 and 33 DF,  p-value: 1.418e-15
```

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Site6
```

```
Call:
```

```
lm(formula = hauteur ~ 1 + lcirconf, data = datasite)
```

```
Residuals:
```

Min	1Q	Median	3Q	Max
-11.4172	-3.7046	-0.6132	2.6224	20.7532

```
Coefficients:
```

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	17.6217	0.8479	20.78	< 2e-16 ***
lcirconf	16.4760	1.4306	11.52	3.65e-16 ***

```
---
```

```
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
Residual standard error: 6.336 on 54 degrees of freedom
```

```
Multiple R-squared:  0.7107, Adjusted R-squared:  0.7053
```

```
F-statistic: 132.6 on 1 and 54 DF,  p-value: 3.651e-16
```

```
+++++  
Site7
```

```
Call:
```

```
lm(formula = hauteur ~ 1 + lcirconf, data = datasite)
```

```
Residuals:
```

Min	1Q	Median	3Q	Max
-11.0117	-2.9157	0.4829	4.4816	8.7883

```
Coefficients:
```

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	20.751	3.899	5.322	2.1e-05 ***
lcirconf	23.852	3.598	6.629	9.2e-07 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 5.327 on 23 degrees of freedom

Multiple R-squared: 0.6564, Adjusted R-squared: 0.6415

F-statistic: 43.94 on 1 and 23 DF, p-value: 9.199e-07

+++++
Site8

Call:

lm(formula = hauteur ~ 1 + lcirconf, data = datasite)

Residuals:

Min	1Q	Median	3Q	Max
-7.0714	-1.4357	0.3189	1.2935	6.7653

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	16.6475	0.5593	29.77	< 2e-16 ***
lcirconf	14.6698	1.0086	14.54	1.18e-15 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 3.151 on 32 degrees of freedom

Multiple R-squared: 0.8686, Adjusted R-squared: 0.8645

F-statistic: 211.6 on 1 and 32 DF, p-value: 1.178e-15

+++++
Site9

Call:

lm(formula = hauteur ~ 1 + lcirconf, data = datasite)

Residuals:

Min	1Q	Median	3Q	Max
-5.1465	-1.0865	0.1423	1.4519	3.1973

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	10.8128	0.7595	14.237	1.01e-09 ***
lcirconf	4.4824	1.0511	4.264	0.000786 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 2.303 on 14 degrees of freedom

Multiple R-squared: 0.565, Adjusted R-squared: 0.534

F-statistic: 18.19 on 1 and 14 DF, p-value: 0.0007858

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Site10

Call:

lm(formula = hauteur ~ 1 + lcirconf, data = datasite)

Residuals:

Min	1Q	Median	3Q	Max
-6.949	-2.862	-1.489	4.398	6.551

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	25.132	5.748	4.372	0.000546 ***
lcirconf	11.263	5.025	2.241	0.040566 *

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 4.413 on 15 degrees of freedom

Multiple R-squared: 0.2509, Adjusted R-squared: 0.2009
F-statistic: 5.023 on 1 and 15 DF, p-value: 0.04057

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Site11

Call:
lm(formula = hauteur ~ 1 + lcirconf, data = datasite)

Residuals:
Min 1Q Median 3Q Max
-4.7054 -2.0341 0.2235 1.5737 3.9771

Coefficients:
Estimate Std. Error t value Pr(>|t|)
(Intercept) 21.743 0.449 48.42 < 2e-16 ***
lcirconf 13.854 1.068 12.98 7.71e-14 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 2.521 on 30 degrees of freedom
Multiple R-squared: 0.8488, Adjusted R-squared: 0.8437
F-statistic: 168.4 on 1 and 30 DF, p-value: 7.712e-14

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Site12

Call:
lm(formula = hauteur ~ 1 + lcirconf, data = datasite)

Residuals:
Min 1Q Median 3Q Max
-5.7877 -1.1280 0.1199 1.0318 8.1003

Coefficients:
Estimate Std. Error t value Pr(>|t|)
(Intercept) 15.1279 0.3493 43.31 < 2e-16 ***
lcirconf 7.4605 0.6339 11.77 1.29e-15 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 2.123 on 47 degrees of freedom
Multiple R-squared: 0.7466, Adjusted R-squared: 0.7412
F-statistic: 138.5 on 1 and 47 DF, p-value: 1.294e-15

++++++
Site13

Call:
lm(formula = hauteur ~ 1 + lcirconf, data = datasite)

Residuals:
Min 1Q Median 3Q Max
-5.2786 -2.3136 0.0577 1.5299 8.8095

Coefficients:
Estimate Std. Error t value Pr(>|t|)
(Intercept) 15.7588 0.5329 29.57 < 2e-16 ***
lcirconf 8.2363 0.9391 8.77 1.83e-10 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 2.815 on 36 degrees of freedom
Multiple R-squared: 0.6812, Adjusted R-squared: 0.6723
F-statistic: 76.92 on 1 and 36 DF, p-value: 1.83e-10

++++++
Site14

Call:

```
lm(formula = hauteur ~ 1 + lcirconf, data = datasite)
```

```
Residuals:
```

Min	1Q	Median	3Q	Max
-7.0352	-2.0681	0.1675	2.2738	5.9823

```
Coefficients:
```

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	19.7603	0.6645	29.739	< 2e-16 ***
lcirconf	13.7485	1.4694	9.356	2.72e-11 ***

```
---
```

```
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
Residual standard error: 3.175 on 37 degrees of freedom
```

```
Multiple R-squared:  0.7029, Adjusted R-squared:  0.6949
```

```
F-statistic: 87.54 on 1 and 37 DF,  p-value: 2.724e-11
```

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Site15
```

```
Call:
```

```
lm(formula = hauteur ~ 1 + lcirconf, data = datasite)
```

```
Residuals:
```

Min	1Q	Median	3Q	Max
-5.6641	-1.1241	-0.0975	1.3891	6.1298

```
Coefficients:
```

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	23.4559	0.4132	56.77	<2e-16 ***
lcirconf	13.5695	0.8768	15.48	<2e-16 ***

```
---
```

```
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
Residual standard error: 2.275 on 39 degrees of freedom
```

```
Multiple R-squared:  0.86, Adjusted R-squared:  0.8564
```

```
F-statistic: 239.5 on 1 and 39 DF,  p-value: < 2.2e-16
```

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+++++  
Site16
```

```
Call:
```

```
lm(formula = hauteur ~ 1 + lcirconf, data = datasite)
```

```
Residuals:
```

Min	1Q	Median	3Q	Max
-7.6139	-0.7320	0.2499	1.6722	4.5142

```
Coefficients:
```

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	24.849	1.001	24.831	< 2e-16 ***
lcirconf	13.193	1.564	8.437	2.04e-10 ***

```
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```

```
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
Residual standard error: 2.94 on 40 degrees of freedom
```

```
Multiple R-squared:  0.6402, Adjusted R-squared:  0.6312
```

```
F-statistic: 71.18 on 1 and 40 DF,  p-value: 2.042e-10
```

```
+++++
```

Table S2. Linear mixed model of *Cedrus atlantica* wood density (densitym) as a function of linear and quadratic effects of the log of ring width (lwidth in m and lwidth2 in m², respectively) and tree diameter at breast height (dbh, m) as fixed effects and tree identity (tree) as random effect.

Linear mixed model fit by REML ['lmerMod']

Formula: densitym ~ 1 + lwidth + lwidth2 + dbh + (1 | tree)

Data: wd

REML criterion at convergence: -2348.2

Scaled residuals:

Min	1Q	Median	3Q	Max
-7.5678	-0.4975	-0.0809	0.5084	4.2034

Random effects:

Groups	Name	Variance	Std.Dev.
tree	(Intercept)	0.001672	0.04089
Residual		0.004002	0.06326

Number of obs: 921, groups: tree, 44

Fixed effects:

	Estimate	Std. Error	t value	Pr(> t)	
(Intercept)	0.568018	0.010839	52.404	< 2e-16	***
lwidth	-0.032469	0.005460	-5.946	5.06e-09	***
lwidth2	0.007769	0.002512	3.093	0.00206	**
dbh	-0.093230	0.023239	-4.012	0.00025	***

Correlation of Fixed Effects:

	(Intr)	lwidth	lwidth2
lwidth	-0.049		
lwidth2	-0.132	0.795	
dbh	-0.780	-0.008	0.027

Table S3. Traits estimated for each site

Site #	Region	Specific leaf area sq. cm/g	Leaf C:N g/g	Sapwood C:N g/g
1	Rif	58.79	37.05	643.94
2	Rif	52.9	41.33	580.87
3	Rif	46.03	60.24	595.24
4	Middle Atlas	52.35	45.8	149.49
5	Middle Atlas	60.34	42.15	297.51
6	Middle Atlas	57.1	45.21	437.62
7	Middle Atlas	50.48	40.19	277.24
8	Middle Atlas	56.27	48.07	315.2
9	Middle Atlas	53.76	51.05	412.29
10	Middle Atlas	45.74	45.68	335.16
11	Middle Atlas	51.2	52.78	434.31
12	Rif	45.8	61.35	439.32
13	Rif	42.33	48.21	437.5
14	Middle Atlas	51.6	39	470.8
15	Middle Atlas	42.3	41.19	504.17
16	Middle Atlas	43.64	41.61	500.52

Table S4. Linear models of three traits (specific leaf area, leaf C:N and sapwood C:N) as a function of climate factors (means over 2014, 2015 and 2016 of precipitation: prc, of daily temperature range: dte, of temperature: tem, of sunshine hours: shr, wind speed: wnd, of potential evapotranspiration: pet, of relative humidity: rhu) effects (linear effects and pairwise interactions). Best models (with maximum 5 terms for sample sizes = 16) after exhaustive searches and selections on the basis of AIC and F tests

Dependent variable: Specific leaf area

Residuals:

	Min	1Q	Median	3Q	Max
	-4.6246	-2.6909	-0.8697	1.6137	8.1141

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	101.92593	36.02038	2.830	0.01786 *
prc	-0.33714	0.08410	-4.009	0.00248 **
shr	28.51272	21.12181	1.350	0.20680
prc:shr	-0.04793	0.03157	-1.518	0.15999
tem:dte	-1.13449	0.36338	-3.122	0.01084 *
prc:tem	0.04271	0.01371	3.115	0.01097 *

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 4.191 on 10 degrees of freedom

Multiple R-squared: 0.6551, Adjusted R-squared: 0.4826

F-statistic: 3.798 on 5 and 10 DF, p-value: 0.03451

+++++
Dependent variable: Leaf C:N

Residuals:

	Min	1Q	Median	3Q	Max
	-5.6949	-0.9922	0.0846	1.7691	2.7622

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	-146.50095	31.07147	-4.715	0.000635 ***
prc	0.97443	0.10517	9.266	1.58e-06 ***
prc:tem	-0.08982	0.01054	-8.525	3.55e-06 ***
wnd:rhu	-0.93009	0.11324	-8.214	5.08e-06 ***
tem:wnd	10.72044	1.31609	8.146	5.50e-06 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 2.511 on 11 degrees of freedom

Multiple R-squared: 0.9088, Adjusted R-squared: 0.8756

F-statistic: 27.4 on 4 and 11 DF, p-value: 1.144e-05

+++++
Dependent variable: Sapwood C:N

Residuals:

	Min	1Q	Median	3Q	Max
	-156.74	-20.32	-10.03	42.35	120.05

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	-1086.6345	493.1687	-2.203	0.04785 *
shr:prc	-0.4740	0.1522	-3.115	0.00893 **
wnd:rhu	6.4534	3.1204	2.068	0.06089 .
shr:wnd	108.2430	31.6157	3.424	0.00504 **

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 75.74 on 12 degrees of freedom

Multiple R-squared: 0.7248, Adjusted R-squared: 0.656

F-statistic: 10.53 on 3 and 12 DF, p-value: 0.001114

Table S5. Estimations of mean biomass for 2013 to 2017 (kg C/sq. m) and of net primary productivity (NPP) for years 2012 to 2016 (g C/sq. m/yr).

Site #	Region	Biomass 2013-2017	NPP 2016	NPP 2015	NPP 2014	NPP 2013	NPP 2012
1	Rif	190.3	736.7	691.0	640.2	594.7	601.4
2	Rif	78.9	266.2	261.9	255.0	257.3	270.5
3	Rif	114.6	187.9	112.4	159.8	87.8	185.7
4	Middle Atlas	151.8	165.3	210.8	194.1	156.7	180.9
5	Middle Atlas	162.4	29.4	399.0	390.0	284.0	247.1
6	Middle Atlas	249.3	209.8	224.8	238.4	210.8	200.7
7	Middle Atlas	393.4	225.9	273.3	232.8	222.4	221.4
8	Middle Atlas	193.1	197.7	271.0	265.0	307.0	230.8
9	Middle Atlas	11.2	20.0	24.5	26.1	30.3	31.3
10	Middle Atlas	267.6	73.1	85.6	80.5	91.56	81.2
11	Middle Atlas	197.6	152.8	307.3	289.4	367.1	260.7
12	Rif	86.7	80.0	120.3	107.3	138.8	93.3
13	Rif	116.0	158.3	140.3	142.3	114.7	97.7
14	Middle Atlas	149.4	131.9	186.5	159.4	173.8	155.6
15	Middle Atlas	165.7	219.6	265.3	283.4	274.4	273.1
16	Middle Atlas	345.1	253.6	352.1	364.5	413.1	372.4