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# Tropical forest leaves may darken in response to climate change

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## Extended Data for

### *Tropical forest leaves may darken in response to climate change*

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**This PDF file includes:**

Supplementary Tables 1 to 2

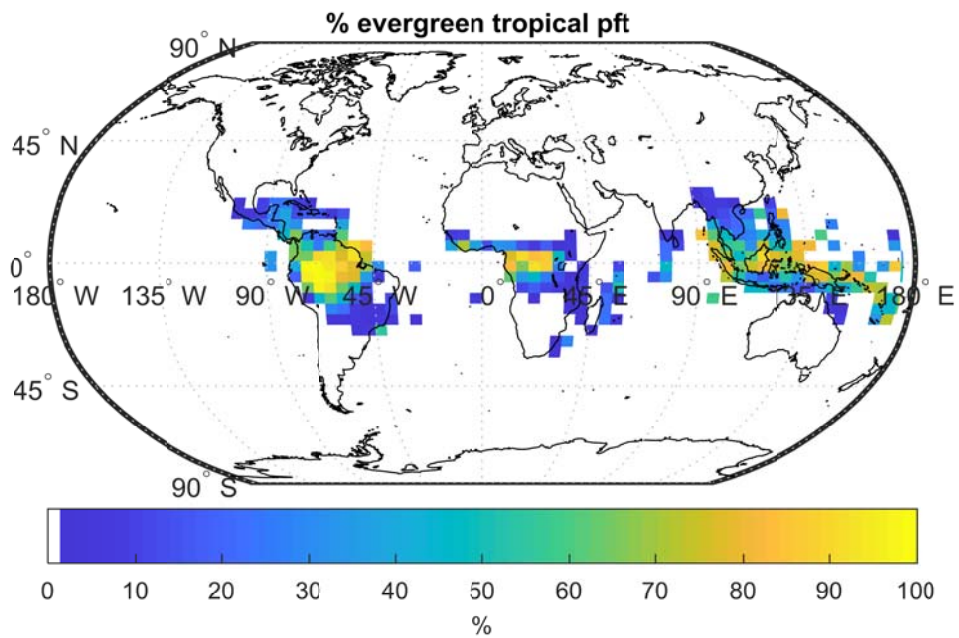
Supplementary Figure 1 to 3

**Supplemental Table 1** – Attributes from the plots.

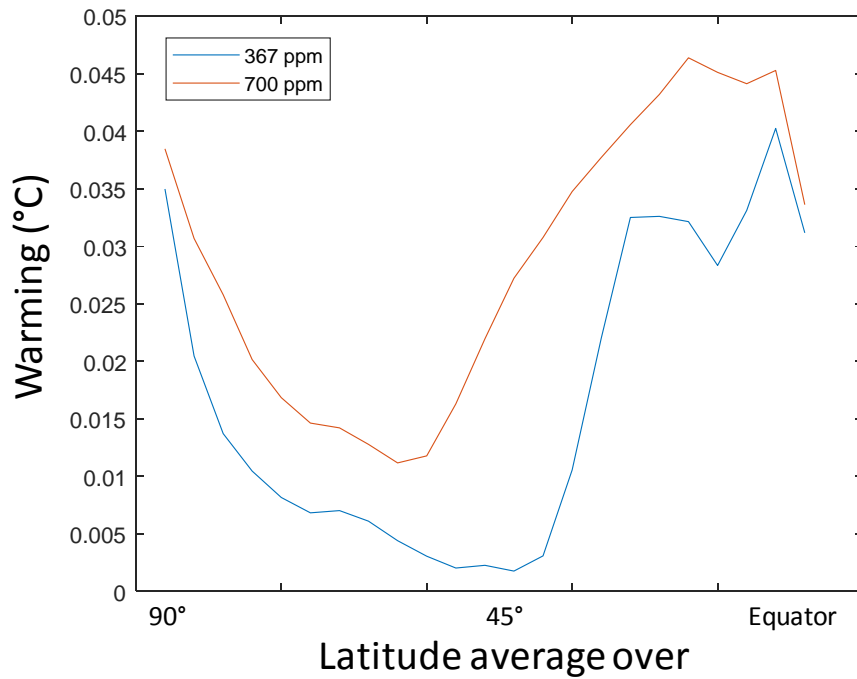
CHAMBASA plot code	Tambopata 5	Tambopata 6	Pantiacolla 2	Pantiacolla 3	San Pedro 2	San Pedro 1	Trocha Union 4	Esperanza	Waygecha	Acjanaco 1
<b>RAINFOR site code</b>	TAM-05	TAM-06	PAN-02	PAN-03	SPD-02	SPD-01	TRU-04	ESP-01	WAY-01	ACJ-01
<b>Latitude</b>	-12.8309	-12.8385	-12.6495	-12.6383	-13.0491	-13.0475	-13.1055	-13.1751	-13.1908	-13.14689
<b>Longitude</b>	-69.2705	-69.2960	-71.2626	-71.2744	-71.5365	-71.5423	-71.5893	-71.5948	-71.5874	-71.6323
<b>Elevation* (m)</b>	223	215	595	859	1494	1713	2719	2868	3045	3537
<b>Mean annual air temperature** (°C)</b>	24.4	24.4	23.5**	21.9**	18.8	17.4	13.5	13.1	11.8	9
<b>Precipitation (mm yr<sup>-1</sup>)</b>	1900	1900	2366**	2835**	5302	5302	2318	1560	1560	3487
<b>Vegetation height*</b>	27.5	28.2	24.4	18.7	22.8	14.0	15.7	16.9	14.3	12.5
<b>Soil type</b>	Cambisol	Alisol	Plintico	Alisol	Cambisol	Cambisol	Umbrisol	Umbrisol	Umbrisol	Cambisol
<b>Skewness LMA field</b>	2.0	3.1	3.6	2.4	2.1	3.5	1.2	1.9	8.4	4.4
<b>Skewness LMA RS (1ha)</b>	0.8	0.2	0.7		1.4	1.0	0.9	1.3	0.9	0.3
<b>Mean LMA field</b>	103.7+2 1.3	107.3+1 8.5	103.5+2 3.1		108.7+31 .7	134.8+42 .1	136.8+5 6.6	127.8+2 4.8	152.4+31 .6	146.1+49 .5
<b>Mean LMA RS (1ha)</b>	104.9 ±5.6	100.4 ±3.7	104.4 ±4.0		117.4 ±14.6	120.5 ±11.2	137.3 ±19.7	138.0 ±23.3	138.3 ±21.6	138.3 ±21.6

**Supplementary Table 2** - We parameterized the PROSPECTv4 model using measured basal area weighted plot level values of chlorophyll ( $\mu\text{g}/\text{cm}^2$ ), water ( $\text{g}/\text{cm}^2$ ) and dry matter ( $\text{g}/\text{cm}^2$ ) as shown below.

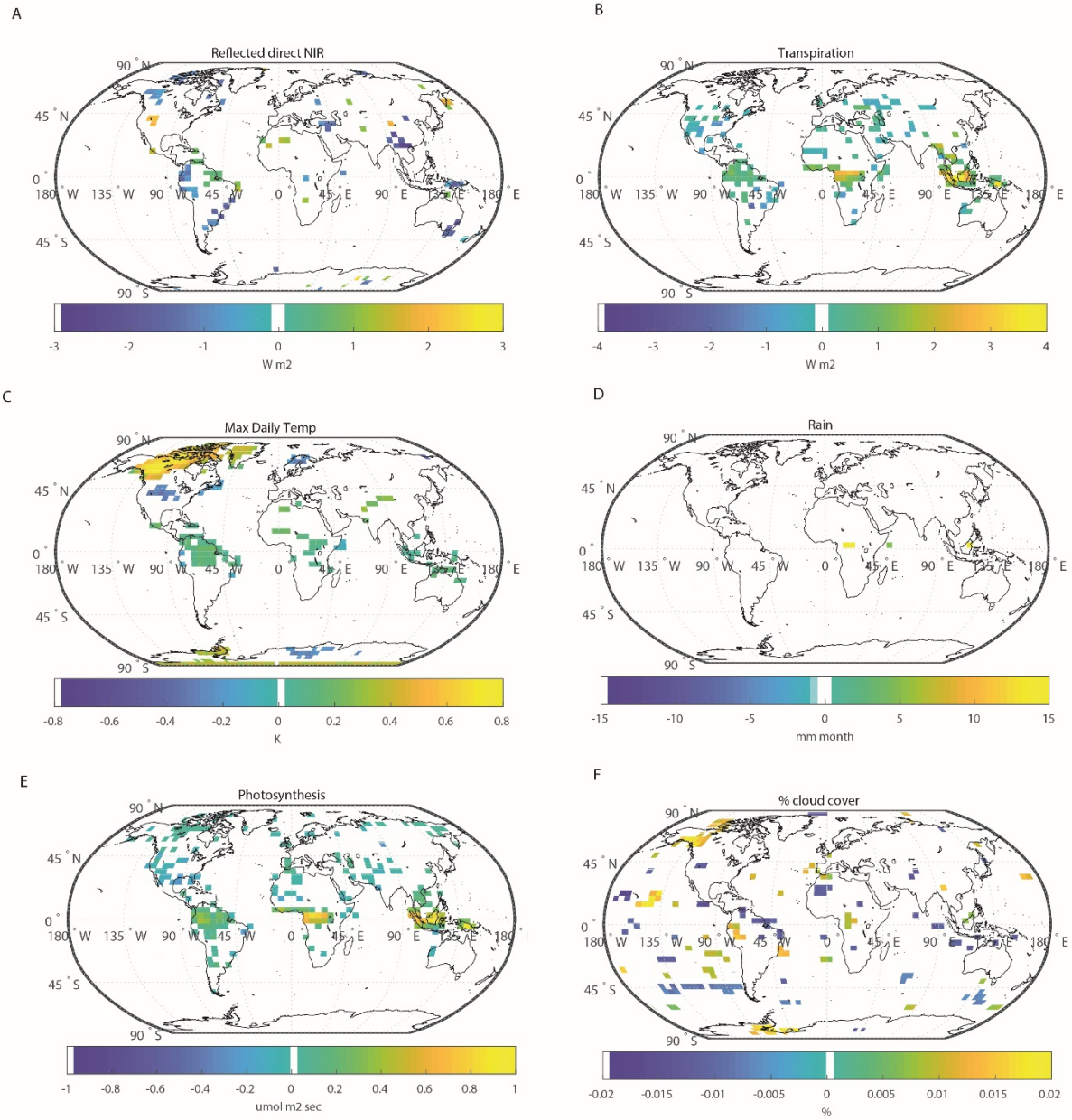
<b>CHAMBASA plot code</b>	<b>Mean annual Temperature (C)</b>	<b>Leaf structure parameter</b>	<b>Chlorophyll a+b content - <math>\mu\text{g}/\text{cm}^2</math></b>	<b>Equivalent water thickness - <math>\text{g}/\text{cm}^2</math></b>	<b>Dry matter content in <math>\text{g}/\text{cm}^2</math></b>
<b>Tam -5</b>	24.40	1.05	74.36	0.0058	0.0049
<b>Tam-6</b>	24.40	1.04	65.75	0.0053	0.0051
<b>Pan-02</b>	23.50	1.04	50.82	0.0056	0.0047
<b>SPD-02</b>	18.80	1.05	79.35	0.0062	0.0047
<b>SPD-03</b>	17.40	1.12	58.77	0.0075	0.0060
<b>TRU-04</b>	13.50	1.12	64.57	0.0081	0.0056
<b>ESP-01</b>	13.10	1.10	80.77	0.0079	0.0049
<b>WAY-01</b>	11.80	1.16	77.27	0.0098	0.0054
<b>ACJ-01</b>	9.00	1.14	72.90	0.0092	0.0054



**Supplementary Figure 1** – The percentage of the grid cell composed of broadleaf evergreen tropical plant functional type.



**Supplementary Figure 2** – The average change in maximum daily temperature with a 0.2 change in NIR tropical leaf albedo for simulations at 367 (blue) and 700 ppm (red) atmospheric CO<sub>2</sub> concentrations. At the left, 90° represents an average from 90° N to 90° S. Moving to the right averages over gradually less area until the equator, which averages only the equatorial band.



**Supplementary Figure 3** – Same as Figure 4, but only showing significant ( $P < 0.05$ ) pixels using a simple two-tailed paired t-test.