Supplementary material:

MicroClimCARCOL: Microclimates under oil palm plantation, secondary riparian forest and pasture land cover in a Colombian Caribbean coastal-plain landscape (San Onofre, Sucre)

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Keywords: sub-hourly record, thermal regimes, relative humidity, severe drought, deadly heat, landuse transition, Latin America.

Study site location: Finca Michigan (also known as El Bajo), rural area of the Palo Alto County (corregimiento), Municipality of San Onofre, Sucre Province, Colombia (9°51'16.6"N 75°25'32.9"W).

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Figure 2. The Colombian Caribbean coastal plain (upper panel). The María La Baja (Bolívar) oil palm district (lower left) and a major palm oil producing state (Hacienda Las Flores: lower right). Base map: World view satellite image from SIAM (Sistema de Información Ambiental Marina:

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Colombian Government Open data repository). Insets: Drone imagery, Finca Michigan, 01/2016 (Juan F. Blanco-Libreros).

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Table 1. Descriptive statistics for mean air temperature and relative humidity in three land cover types in Finca Michigan during 2016.

Statistic	**MEAN_T_C**	**MEAN_RH_%**
Oil palm: Record length:22956		
Min.	20.00	38.90
1st Qu.	24.50	86.00
Median	26.00	98.10
Mean	27.56	91.79
3rd Qu.	30.25	101.60
Max.	41.40	104.10
Sec. Forest: Record length:23254		
Min.	20.00	34.80
1st Qu.	24.70	87.50
Median	26.10	96.60
Mean	27.36	91.82
3rd Qu.	29.70	101.80
Max.	41.80	107.40
Pasture: Record length:23253		
Min.	18.12	22.00

1st Qu.	23.88	76.25
Median	25.62	97.33
Mean	29.25	85.56
3rd Qu.	33.62	101.17
Max.	53.75	106.00

Table 2. General linear model table relating mean air temperature and month in three land cover type s in Finca Michigan during 2016.

Source of variation	Df	Sum Sq	Mean Sq	F value	Pr(>F)
Oil palm plantation					
Month	1	9105	9105	539.1	<0.001
Residual	22000	371544	17		
Secondary forest					
Month	1	10228	10228	768.4	<0.001
Residual	23252	309499	13		
Pasture					
Month	1	33740	33740	589.6	<0.001
Residual	23251	1330514	57		

Table 3. ANOVA table for linear regression models relating relative humidity with air temperature for three land cover types in Finca Michigan during 2016.

Oil palm plantation

Parameter	**Estimate**	**Std. Error**	**t value**	**Pr(>|t|)**
Intercept	171.99668	0.28952	594.1	<0.001
Mean temp.	-2.90987	0.01039	-280.2	<0.001
Residual standard error: 6.408 on 22000 degrees of freedom				
Multiple R-squared: 0.7811; Adjusted R-squared: 0.7811				
F-statistic: >5000 on 1 and 22000 DF, p-value: < 0.001				

Secondary riparian forest

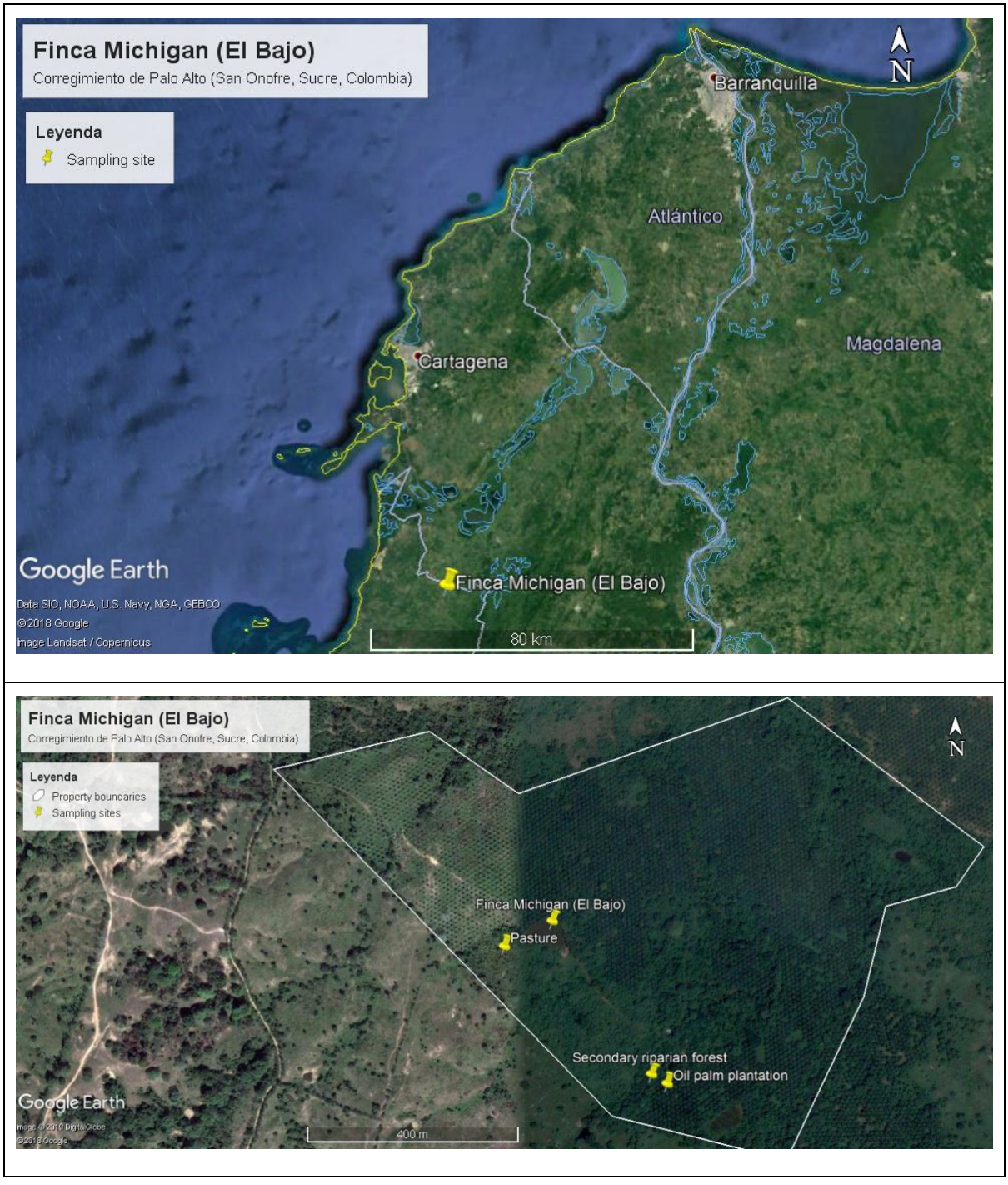
Parameter	**Estimate**	**Std. Error**	**t value**	**Pr(>|t|)**
Intercept	178.06172	0.36119	493.0	<0.001
Mean temp.	-3.15227	0.01308	-240.9	<0.001
Residual standard error: 7.398 on 23252 degrees of freedom				
Multiple R-squared: 0.714; Adjusted R-squared: 0.714				
F-statistic: >5000 on 1 and 23252 DF, p-value: < 0.001				

Pasture

Parameter	**Estimate**	**Std. Error**	**t value**	**Pr(>|t|)**
Intercept	164.666559	0.218521	753.5	<0.001
Mean temp.	-2.704612	0.007228	-374.2	<0.001
Residual standard error: 8.442 on 23251 degrees of freedom				
Multiple R-squared: 0.8576; Adjusted R-squared: 0.8576				
F-statistic: >5000 on 1 and 23251 DF, p-value: < 0.001				

Table 4. Multiple linear regression model results considering mean relative humidity as response vari able and mean air temperature, hour (decimal format) and month (numerical format) as independent v ariables in the oil palm plantation in Finca Michigan during 2016.

Parameter	**Estimate**	**Std. Error**	**t value**	**Pr(>|t|)**
Intercept	158.729281	0.243060	653.046	<0.001
Mean temp.	-2.756559	0.008136	-338.803	<0.001
Hour	0.011491	0.004826	2.381	<0.05
Month	1.379123	0.010829	127.350	<0.001
Residual standard error: 4.859 on 21998 degrees of freedom				
Multiple R-squared: 0.8741; Adjusted R-squared: 0.8741				
F-statistic: >5000 on 3 and 21998 DF, p-value: < 0.001				



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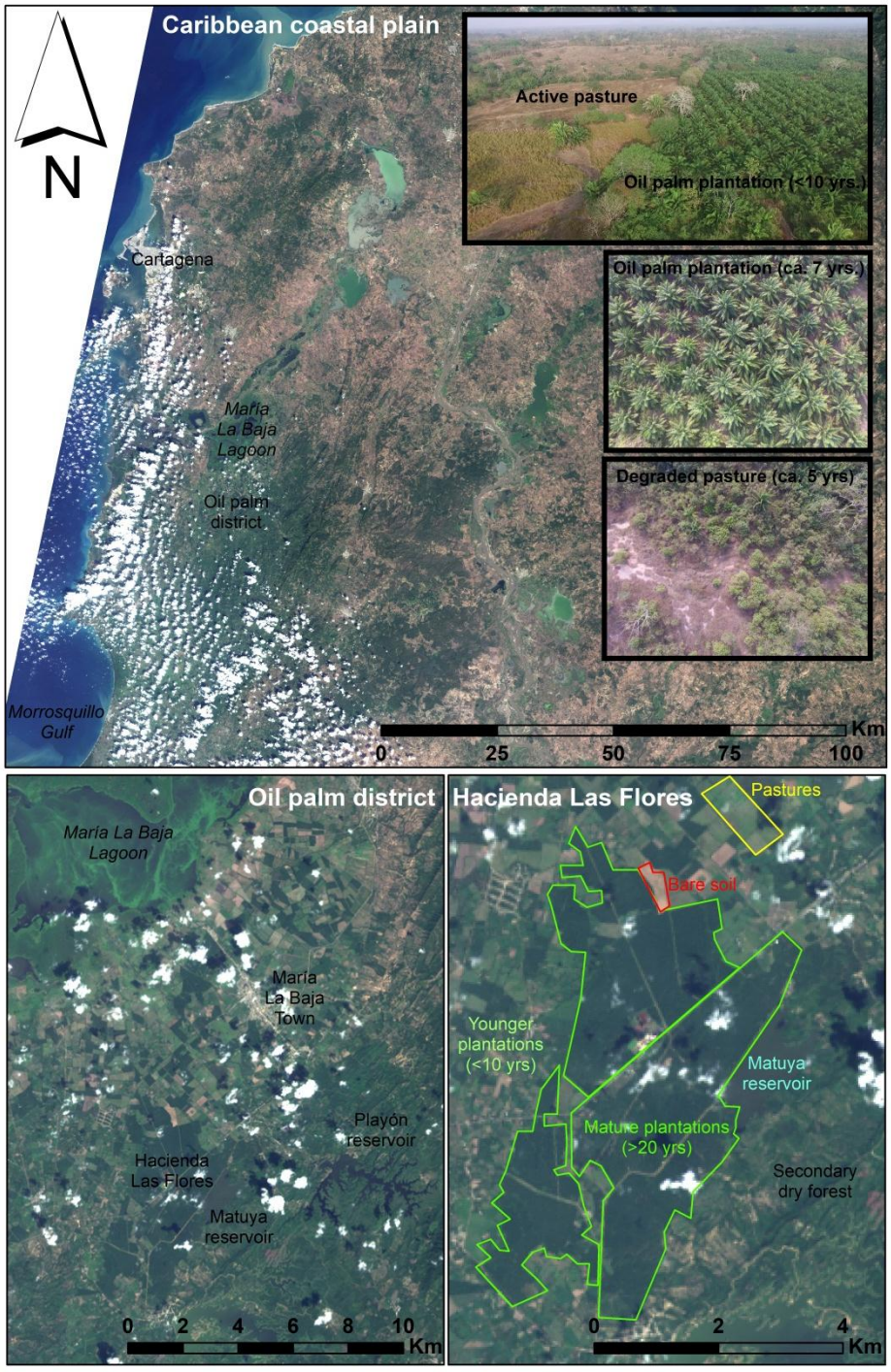

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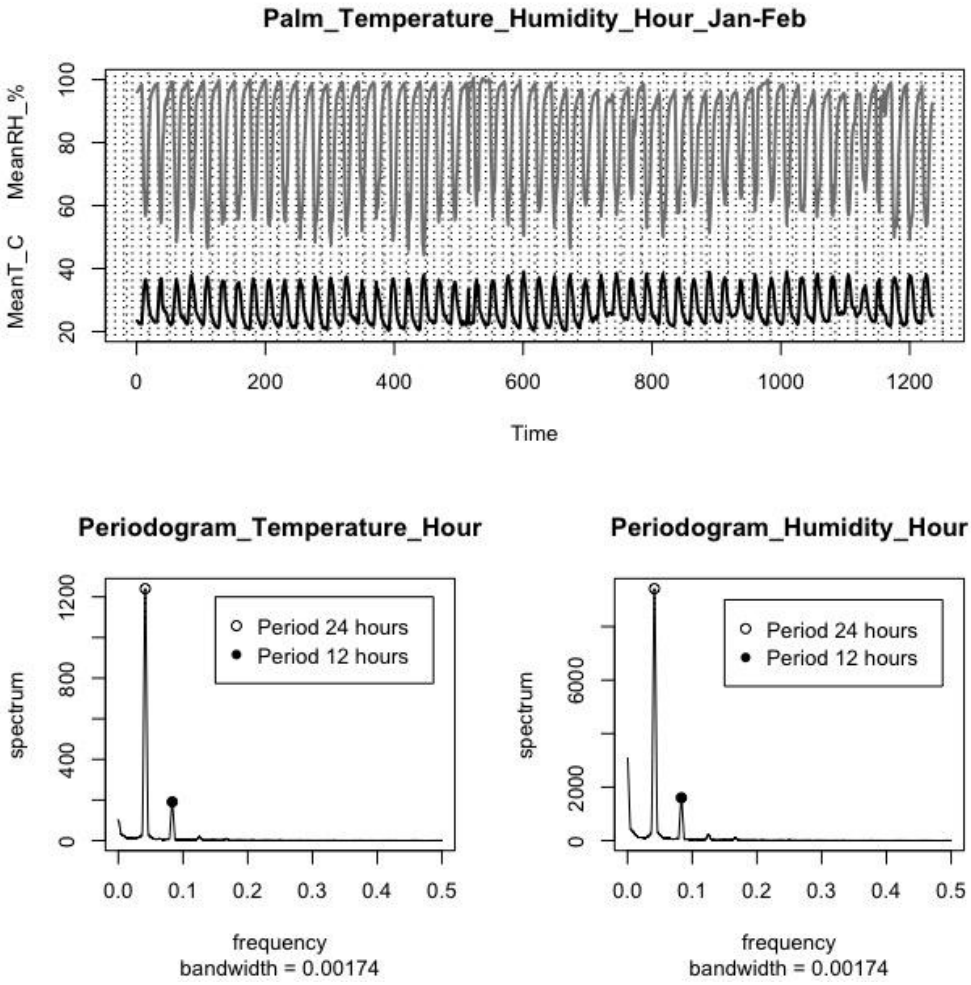


Figure 3. Upper panel: Sample time series (January-February 2016) of mean temperature and mean relative humidity in an oil palm plantation located in Finca Michigan. Lower panels: period-grams for temperature and relative humidity.

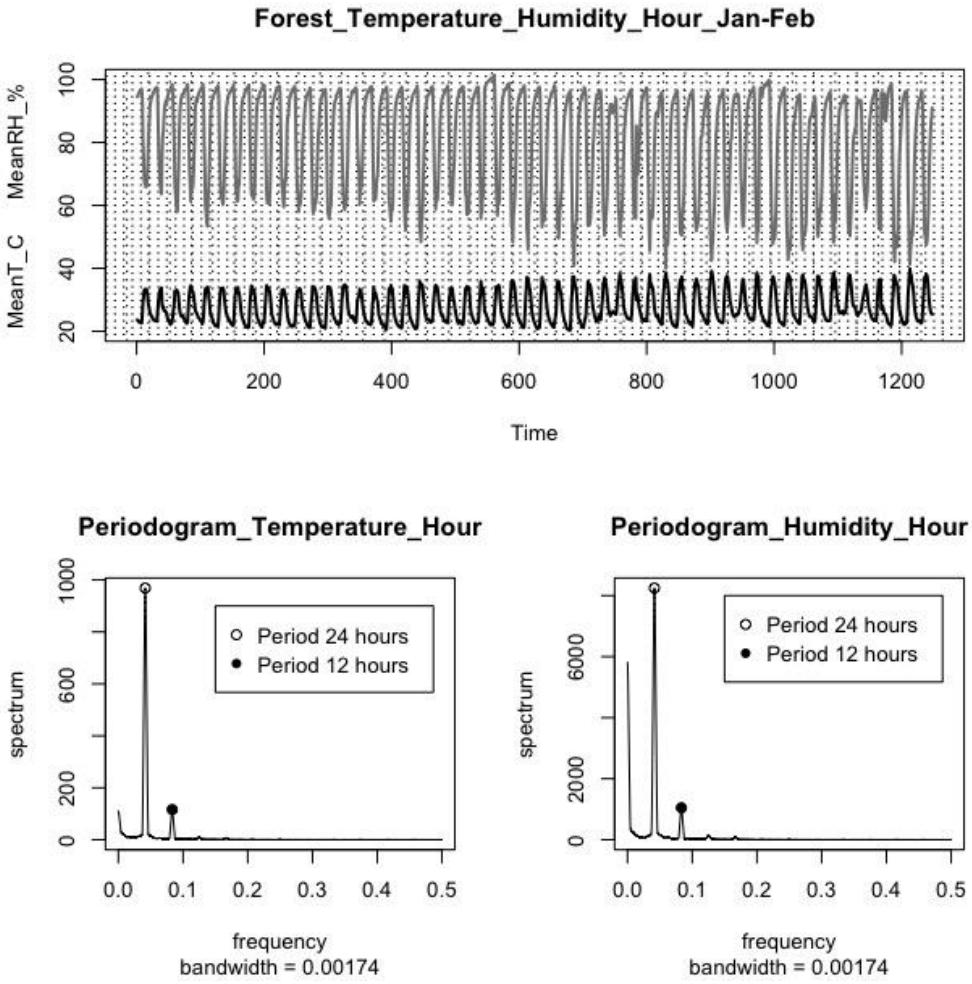


Figure 4. Upper panel: Sample time series (January-February 2016) of mean temperature and mean relative humidity in a secondary riparian forest located in Finca Michigan. Lower panels: periodograms for temperature and relative humidity.

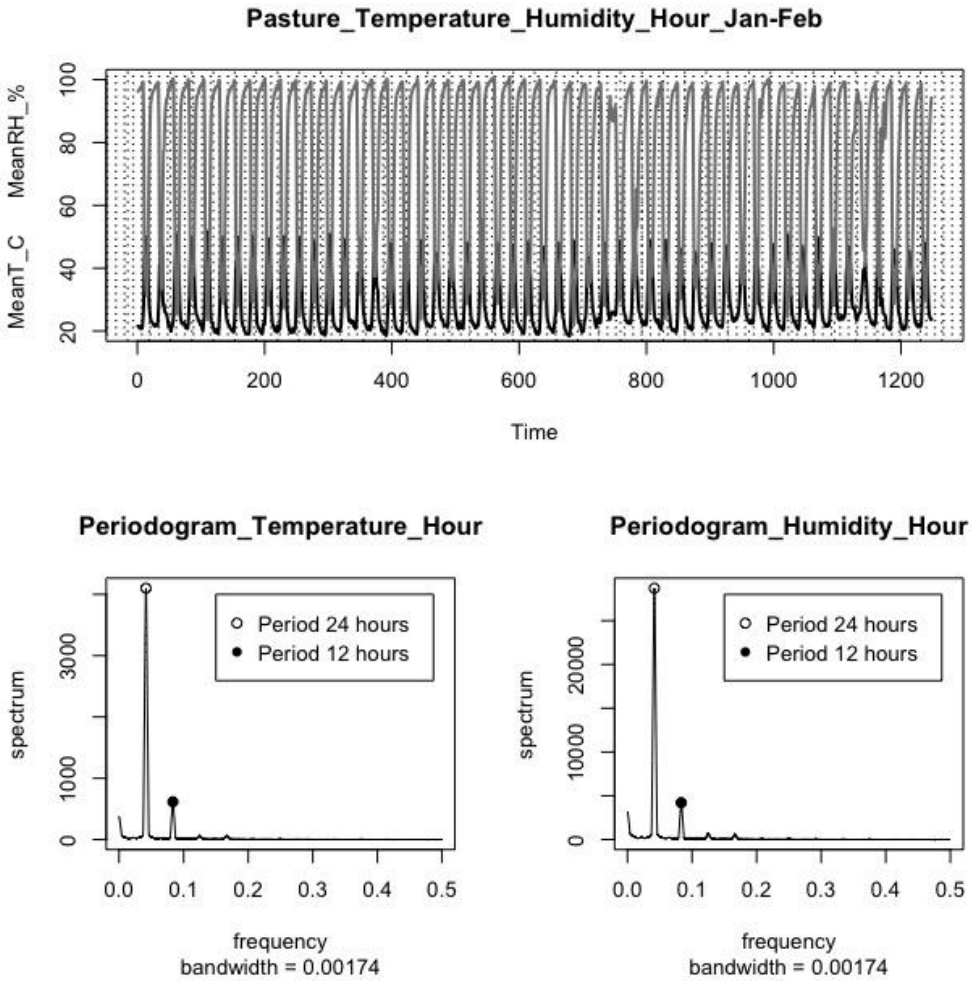
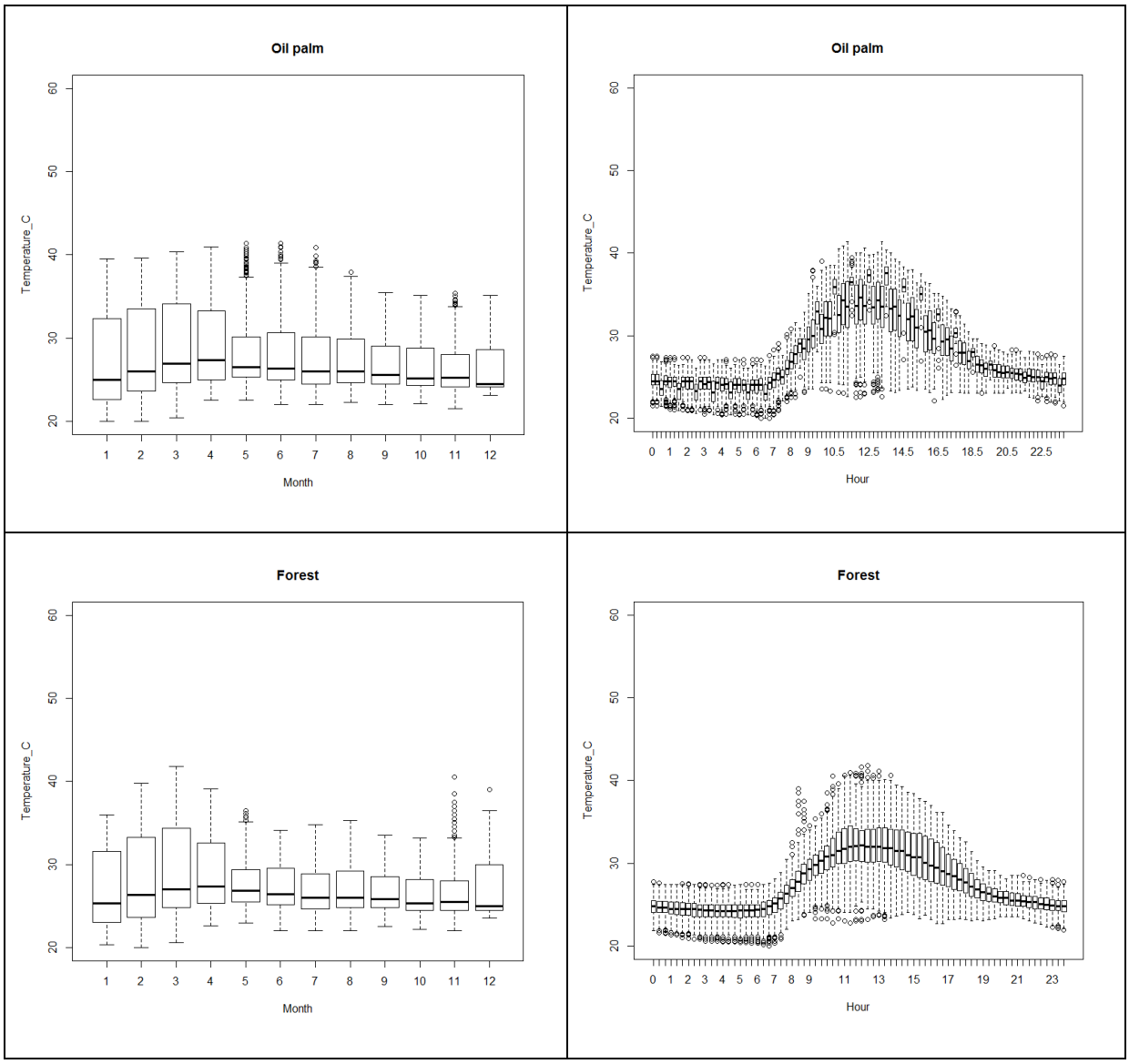
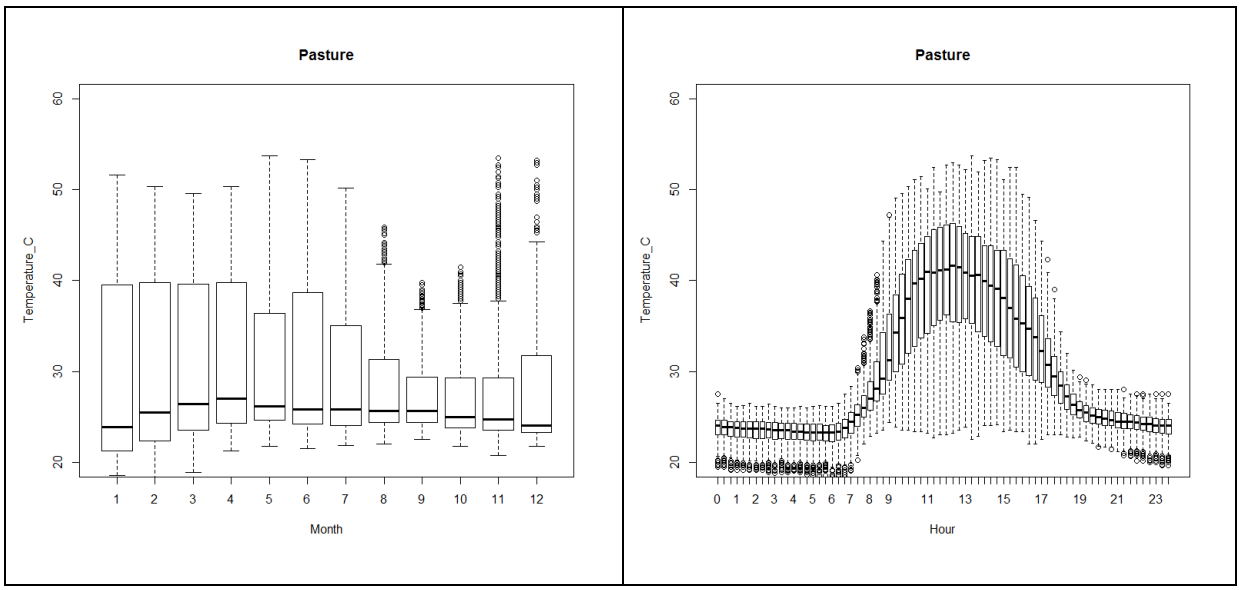


Figure 5. Upper panel: Sample time series (January-February 2016) of mean temperature and mean relative humidity in a degraded pasture located in Finca Michigan. Lower panels: period-grams for temperature and relative humidity.


Oil palm
Temperature_C
Month
Oil palm
Temperature_C
Hour
Forest
Temperature_C
Month
Forest
Temperature_C
Hour



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