Supplementary material

START

Initialization of Constants
N = 4 (trees)
Period = 30 m
P_avg_1 = 3 s
time_lapse = 63 s
P_avg_2 = 41 s

t = 0
Clock=0
P_avg = P_avg_1

Measurement
of Temperatures

Storage Initial Temperature averaged on t
Average_Tp_ini [2N] = avg(Tp[2N]) $_{1..P\_avg}$

t = 0
Clock_2 = 0

Heater pulse
RELEASE

t = t +1

t = 3
No / Yes

Heater pulse
STOP

Clock =
time_lapse
No / Yes

t = 0
P_avg = P_avg_2

Second
Measurement
of Temperatures

Averages, Variances and Covariances

Average_ratios [N] = avg(Ratio[N]) $_{1..P\_avg}$
Average_times [N] = avg(Time_since_heat[N]) $_{1..P\_avg}$

Var_ratios [N] = variance(Ratio[N]) $_{1..P\_avg}$
Var_times [N] = variance(Time_since_heat[N]) $_{1..P\_avg}$

Cov_ratios_times [N] = covariance(Ratio[N]/Time_since_heat[N]) $_{1..P\_avg}$

Storage averages, Variances and Covariances

Average_ratios [N], Average_times[N]
Var_ratios [N], Var_times[N]
Cov_ratios_times [N]

Clock = Period
Yes / No

MEASUREMENT
OF
TEMPERATURES

Measurement
Td = Datalogger
temperature

Measurement
Tp [2N] =
Thermocouples
temperatures

Storage Measurements
Tp [2N]

t = t +1

t > P_avg
No / Yes

EXIT

SECOND
MEASUREMENT
OF
TEMPERATURES

Measurement
Td = Datalogger
temperature

Measurement
Tp [2N] =
Thermocouples
temperatures

ΔT [2N] = Tp[2N] - Average_Tp_ini [2N]

$Ratio_t [N] = \Delta T_{top} [N] / \Delta T_{bottom} [N]$

Storage Ratios
Ratio$_t$ [N]

Storage time lapse since heat
release
time_since_heat$_t$ [N]= Clock_2
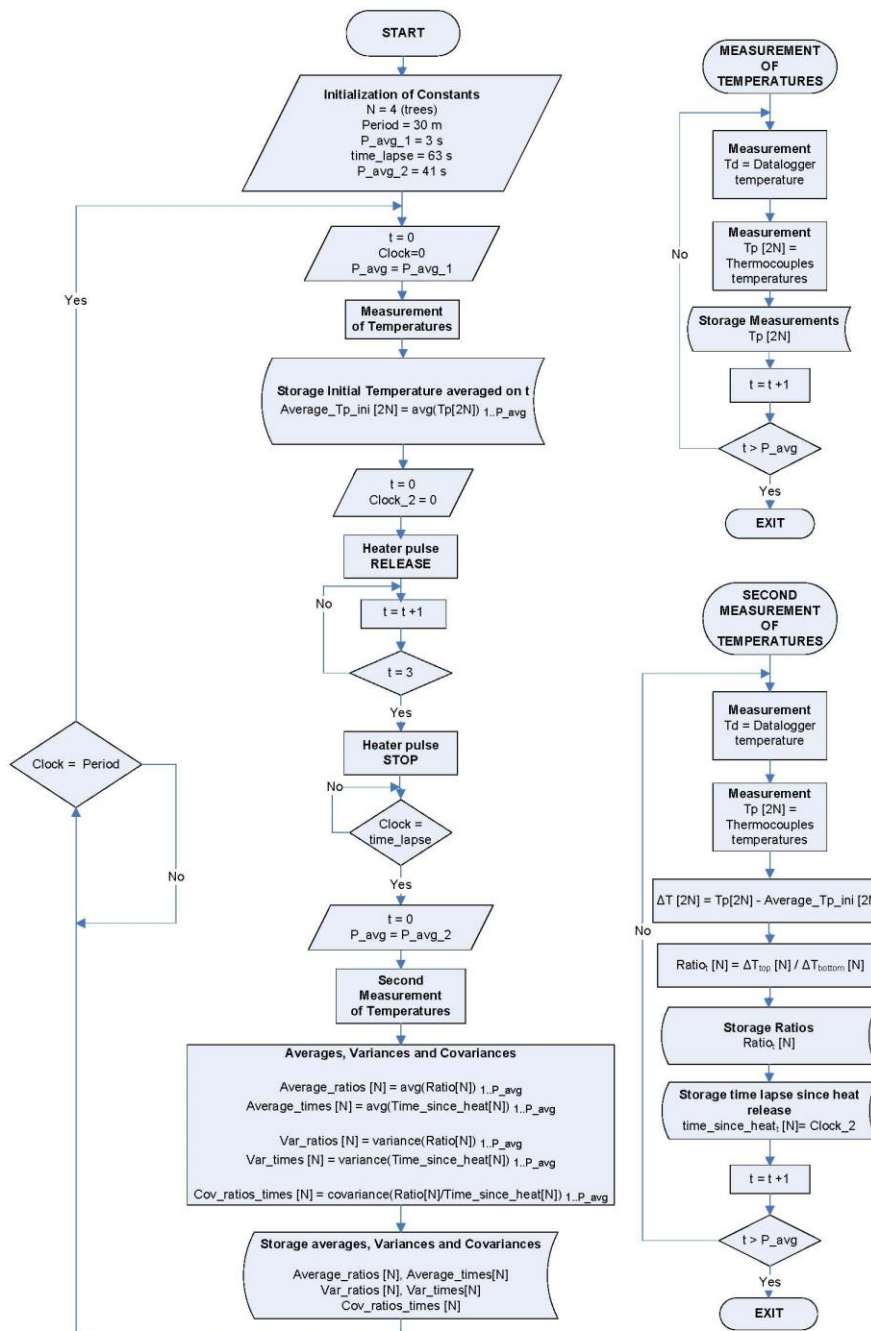
t = t +1

t > P_avg
No / Yes

EXIT

Figure. S1. Detailed flow chart of the procedure for data sampling. Each step represents a command in the script for the datalogger.

List of variables referenced in the flow chart:

N: Number of trees sampled (in our case, 4 trees).

Period: Time between two consecutive measurements or heat pulse releases (in our case, 30 minutes).

P_avg_1: Period to average the initial temperatures (before the heat release) by the thermocouple probes (in our case, 3 seconds).

P_avg_2: Period to average the final temperatures (after the heat release) by the thermocouple probes (in our case, 41 seconds).

Time_lapse: Elapsed time from the beginning of initial temperatures to the beginning of final temperatures corresponding to the measurement of the cooling ramp at the thermocouples (in our case this lapse is 63 s).

t: time counter, or dummy variable, to count the elapsed time inside each of the different loops of the programme (in seconds).

Clock: Marks the temporal sequence of the whole process, from the beginning of the process of the measurements (instant zero) to the end of the periodic process for all measurements (the maximum number allowed is determined by the constant Period, which in our case is 30 minutes). The processing speed of the data logger must have the capacity to perform all the calculations in a time (measured by "Clock") lower than the pre-set measurement period (determined by "Period").

Clock_2: Monitor the time elapsed between the release of the heat pulse and the instant when thermocouples are measured.

Td: Temperature at the data logger (this temperature is necessary to be known to correctly measure temperature using thermocouples).

Tp [2N]: Array of the temperatures measured at the 2N thermocouple probes (there are two thermocouples per tree).

Average_Tp_ini [2N]: Array of the averaged initial temperatures at the 2N thermocouple probes. Average is calculated using the P_avg_1 period, previous measurements to the beginning of the heat release.

ΔT [2N]: Array of the variations of the temperatures in the 2N thermocouples due to the heat release (variations with respect to their initial temperatures).

Ratio$_t$ [N]: Ratio between the temperature variations in the thermocouple above the heater (ΔT_{top} [N]) and those below the heater (ΔT_{bottom} [N]). Sub index indicates the time corresponding to the ratio (in our case the ratios are measured at the 60s second after the beginning of the heat release and for the next 40 seconds).

Time_since_heat$_t$ [N]: Storage of the time elapsed between the start of the heat pulse release and the instant when thermocouples are measured. Sub index indicates the time corresponding to each measurement, this sub index matches this variable with Ratio $_t$ [N].

Average_ratios [N]: Array of the averaged ratios for each tree (N). Average is calculated for the period determined by P_avg_2; in our case for 41 seconds (from second 60 to second 100 after the heat release).

Average_times [N]: Array of the averaged time elapsed between the release of the heat pulse and the instant when thermocouples are measured. Average is calculated for the period determined by P_avg_2; in our case for 41 seconds, from second 60 to second 100 after the heat release). If everything works well, this value will be constant and, in our case, equal to 80 seconds (median measurement time, between 60 and 100 seconds).

Var_ratios [N]: Array of the variances calculated for the ratios measured for the period determined by P_avg_2; in our case for 41 seconds (from second 60 to second 100 after the heat release).

Var_times [N]: Array of the variances calculated for the times elapsed between the release of the heat pulse and the instant when thermocouples are measured. Variance is calculated for the period determined by P_avg_2; in our case for 41 seconds (from second 60 to second 100 after the heat release).

Cov_ratios_times [N]: Array of the covariances calculated with the ratios of temperature variations and the times elapsed between the releases of heat pulse and the instants when thermocouples are measured.