

Workflow and tools for the SAPFLUXNET database



Compiling a global database of sapflow measurements with R

Víctor Granda, Víctor Flo, Mauricio Mencuccini, Jordi Martínez-Vilalta & Rafa Poyatos <http://sapfluxnet.creaf.cat/>

SAPFLUXNET Progress Report

SAPFLUXNET Project Wiki

Start Sites Biomes Methods Species Contributors

204 Sites 34 Countries

See the sites in a map. Feel free to zoom in (in some places you can see the plots) and zoom out. Clicking in the points gives you info about the sites and clicking in the table isolates the selected site in the map for easy inspection

Country code Site code

Country code	Site code
1 ARG	ARG_MAZ
2 ARG	ARG_TRE
3 AUS	AUS_BRI_BRI
4 AUS	AUS_CAN_ST1_EUC
5 AUS	AUS_CAN_ST2_MIX
6 AUS	AUS_CAN_ST3 ACA
7 AUS	AUS_CAR THI_00F
8 AUS	AUS_CAR THI_0P0
9 AUS	AUS_CAR THI_0PF
10 AUS	AUS_CAR THI_CON
11 AUS	AUS_CAR THI_T00

Showing 1 to 11 of 204 entries

Leaflet | Tiles © Esri — Source: Esri, i-cubed, USDA, USGS, AEX, GeoEye, Getmapping, Aerogrid, IGN, IGP, UPR-EGP, and the GIS User Community

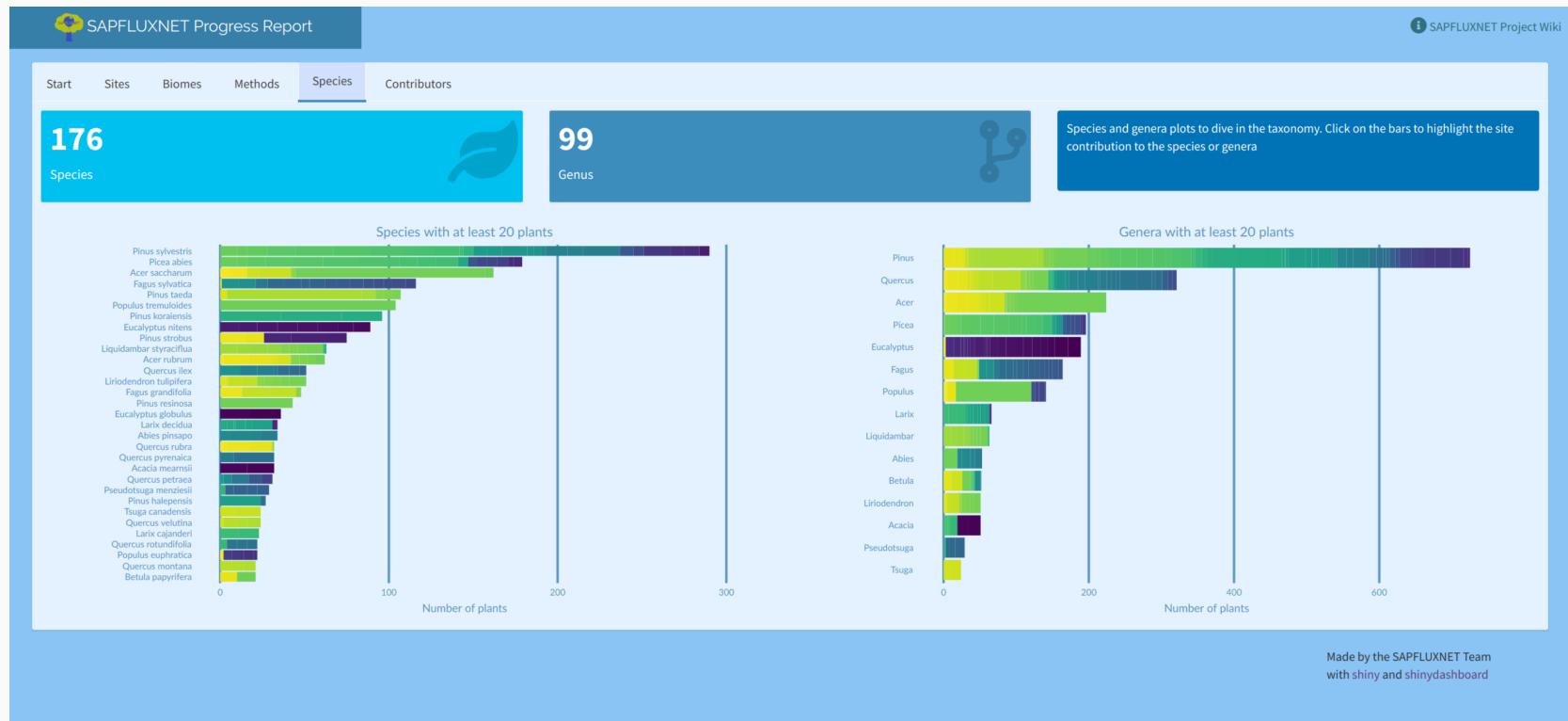
Made by the SAPFLUXNET Team
with shiny and shinydashboard

The figure is a screenshot of the SAPFLUXNET Progress Report website. It features a top navigation bar with links for Start, Sites (which is the active tab), Biomes, Methods, Species, and Contributors. Below this is a summary section with two large numbers: 204 Sites and 34 Countries. To the right of these numbers are icons for a magnifying glass and a globe. A callout box provides instructions for using the map and the table. The main content area contains a world map with yellow dots representing the site locations. A legend in the bottom-left corner of the map area shows plus and minus signs for zooming. To the right of the map is a table titled 'Country code' and 'Site code' with 11 rows of data. At the bottom of the page, there is a note about the tile sources and credits for the map, followed by a footer stating 'Made by the SAPFLUXNET Team with shiny and shinydashboard'.



Workflow and tools for the SAPFLUXNET database

Data and tools for scientists and modellers to help them unravel the **global** patterns and drivers of plant transpiration.



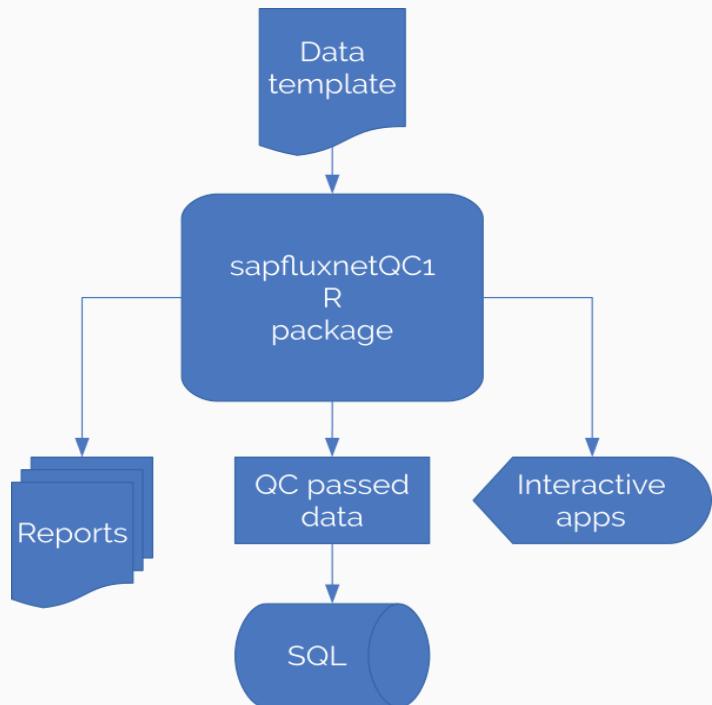


Openness

- Open science
 - a collaborative effort
- Open source
 - mostly R, but other open source tools are also used
- Open data
 - all the data is available on Zenodo (<https://zenodo.org/record/2530798>)



Sapfluxnet infrastructure



All data flow and data quality checks are performed by the internal-use intended R package *sapfluxnetQC1* (<https://github.com/sapfluxnet/sapfluxnetQC1>):

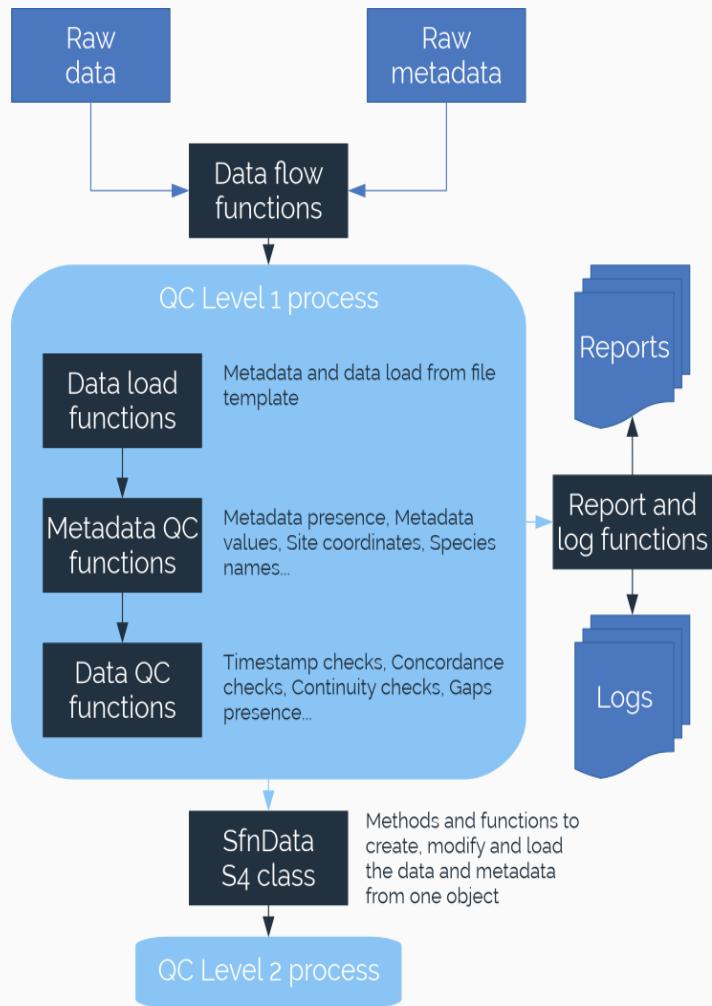
- All steps implemented as functions
- Complete reproducibility
- Logs implemented

Manual data quality steps are performed in shiny apps that logs and store all action, again allowing for complete reproducibility.

Workflow and tools for the SAPFLUXNET database



Sapfluxnet infrastructure



All data flow and data quality checks are performed by the internal-use intended r package *sapfluxnetQC1* (<https://github.com/sapfluxnet/sapfluxnetQC1>):

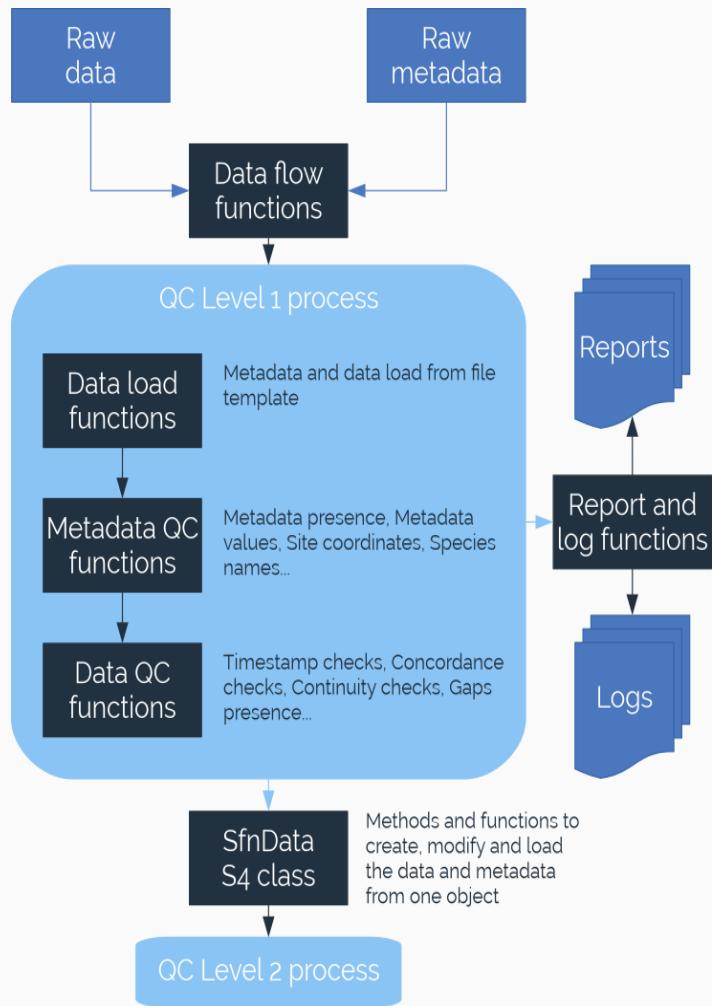
- All steps implemented as functions
- Complete reproducibility
- Logs implemented

Manual data quality steps are performed in shiny apps that logs and store all action, again allowing for complete reproducibility.

Workflow and tools for the SAPFLUXNET database



Sapfluxnet infrastructure



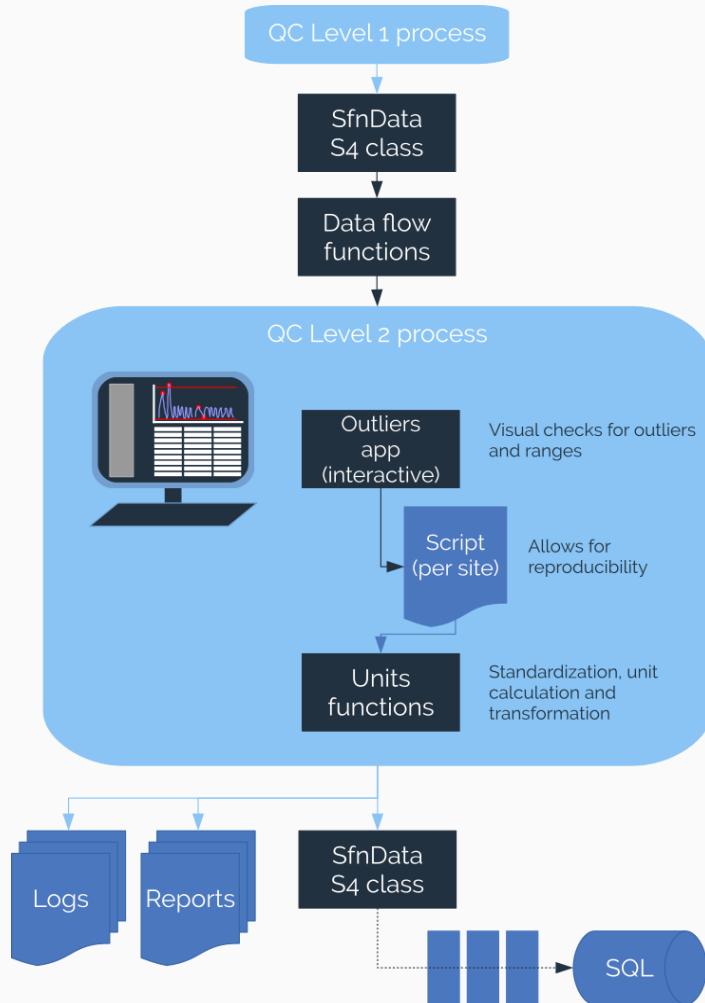
All data flow and data quality checks are performed by the internal-use intended r package *sapfluxnetQC1* (<https://github.com/sapfluxnet/sapfluxnetQC1>):

- All steps implemented as functions
- Complete reproducibility
- Logs implemented

Manual data quality steps are performed in shiny apps that logs and store all action, again allowing for complete reproducibility.

Workflow and tools for the SAPFLUXNET database

Sapfluxnet infrastructure



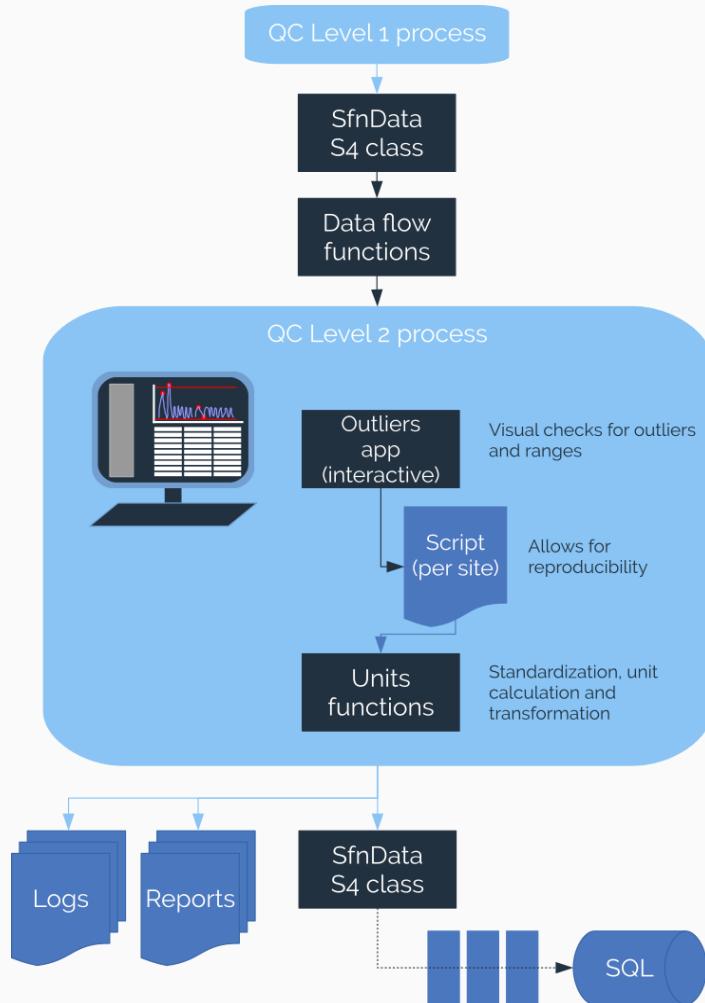
All data flow and data quality checks are performed by the internal-use intended r package *sapfluxnetQC1* (<https://github.com/sapfluxnet/sapfluxnetQC1>):

- All steps implemented as functions
- Complete reproducibility
- Logs implemented

Manual data quality steps are performed in shiny apps that logs and store all action, again allowing for complete reproducibility.

Workflow and tools for the SAPFLUXNET database

Sapfluxnet infrastructure



All data flow and data quality checks are performed by the internal-use intended r package *sapfluxnetQC1* (<https://github.com/sapfluxnet/sapfluxnetQC1>):

- All steps implemented as functions
- Complete reproducibility
- Logs implemented

Manual data quality steps are performed in shiny apps that logs and store all action, again allowing for complete reproducibility.



Inspection, analysis and visualization of the data

```
install.packages('sapfluxnetr')
library(sapfluxnetr)

folder ← 'sapfluxnet_db/0.1.3/plant'
sfn_metadata ← read_sfn_metadata(folder)

raw_data ← sfn_sites_in_folder(folder) %>%
  filter_sites_by_md(
    si_biome %in% c('Mediterranean', 'Temperate forest'),
    pl_sens_meth = 'HR',
    metadata = sfn_metadata
  ) %>%
  read_sfn_data()

raw_data %>%
  daily_metrics(tidy = TRUE)
```

sapfluxnetr package:

- Data objects -> *snf_data* S4 class
- Metadata inspection (sites information, individual plant characteristics...)
- Subdaily measures aggregation (to daily, monthly, midday, predawn, custom aggregates)
- Data modification tidyverse-style (filtering, mutating...)
- Data visualization (ggplot2)

<https://github.com/sapfluxnet/sapfluxnetr>



Inspection, analysis and visualization of the data

```
install.packages('sapfluxnetr')
library(sapfluxnetr)

folder ← 'sapfluxnet_db/0.1.3/plant'
sfn_metadata ← read_sfn_metadata(folder)

raw_data ← sfn_sites_in_folder(folder) %>%
  filter_sites_by_md(
    si_biome %in% c('Mediterranean', 'Temperate forest'),
    pl_sens_meth = 'HR',
    metadata = sfn_metadata
  ) %>%
  read_sfn_data()

raw_data %>%
  predawn_metrics(tidy = TRUE)
```

sapfluxnetr package:

- Data objects -> *snf_data* S4 class
- Metadata inspection (sites information, individual plant characteristics...)
- Subdaily measures aggregation (to daily, monthly, midday, predawn, custom aggregates)
- Data modification tidyverse-style (filtering, mutating...)
- Data visualization (ggplot2)

<https://github.com/sapfluxnet/sapfluxnetr>



Inspection, analysis and visualization of the data

```
custom_funcs ← list(mean = ~ mean(., na.rm = TRUE), std_dev  
# metrics  
raw_data %>%  
  sfn_metrics(  
    period = '7 days',  
    .funs = custom_funcs,  
    solar = TRUE,  
    interval = 'daylight'  
)
```

sapfluxnetr package:

- Data objects -> *snf_data* S4 class
- Metadata inspection (sites information, individual plant characteristics...)
- Subdaily measures aggregation (to daily, monthly, midday, predawn, custom aggregates)
- Data modification tidyverse-style (filtering, mutating...)
- Data visualization (ggplot2)

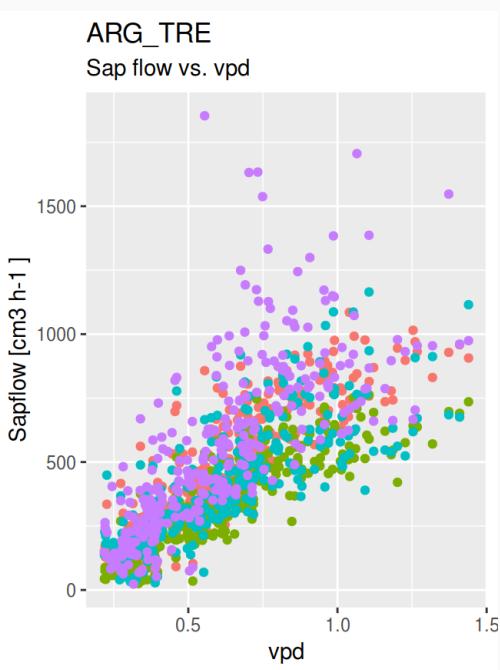
<https://github.com/sapfluxnet/sapfluxnetr>

Workflow and tools for the SAPFLUXNET database



Inspection, analysis and visualization of the data

```
all_plots ← raw_data %>%  
  sfn_filter(month(TIMESTAMP) %in% 4:9) %>%  
  sfn_mutate(ws = ws * 3600/1000) %>%  
  sfn_plot(formula = ~ vpd)  
  
all_plots[[1]]
```



sapfluxnetr package:

- Data objects -> *snf_data* S4 class
- Metadata inspection (sites information, individual plant characteristics...)
- Subdaily measures aggregation (to daily, monthly, midday, predawn, custom aggregates)
- Data modification tidyverse-style (filtering, mutating...)
- Data visualization (ggplot2)

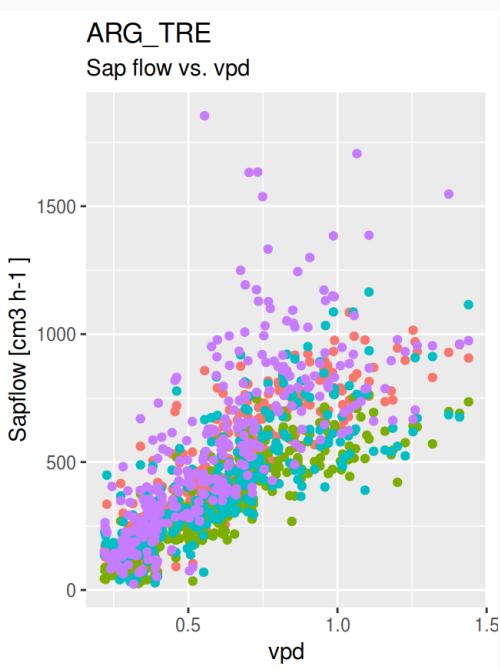
<https://github.com/sapfluxnet/sapfluxnetr>

Workflow and tools for the SAPFLUXNET database



Inspection, analysis and visualization of the data

```
all_plots ← raw_data %>%  
  sfn_filter(month(TIMESTAMP) %in% 4:9) %>%  
  sfn_mutate(ws = ws * 3600/1000) %>%  
  sfn_plot(formula = ~ vpd)  
  
all_plots[[1]]
```



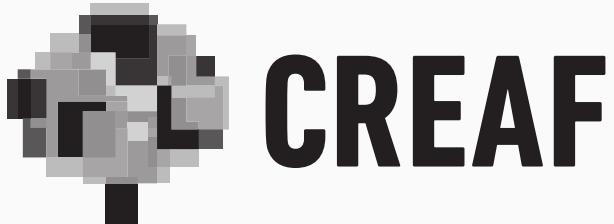
sapfluxnetr package:

- Data objects -> *snf_data* S4 class
- Metadata inspection (sites information, individual plant characteristics...)
- Subdaily measures aggregation (to daily, monthly, midday, predawn, custom aggregates)
- Data modification tidyverse-style (filtering, mutating...)
- Data visualization (ggplot2)

<https://github.com/sapfluxnet/sapfluxnetr>



Acknowledgements

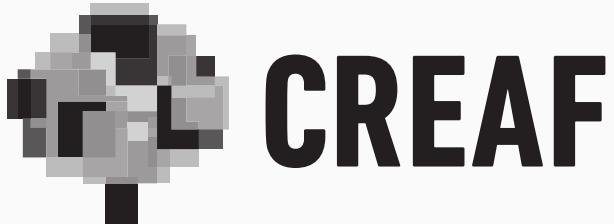


Contact

- <http://sapfluxnet.creaf.cat/>
- <https://twitter.com/sapfluxnet>



Acknowledgements



Contact

- <http://sapfluxnet.creaf.cat/>
- <https://twitter.com/sapfluxnet>