

Exploratory analysis of AmeriFlux data

Advancements in tropical vegetation modelling and model-experiment integration

D. Dutra¹ L. Sato¹ G. Mataveli¹ A. Sánchez¹

¹National Institute for Space Research

Freising, Germany
2025-10-09



Introduction

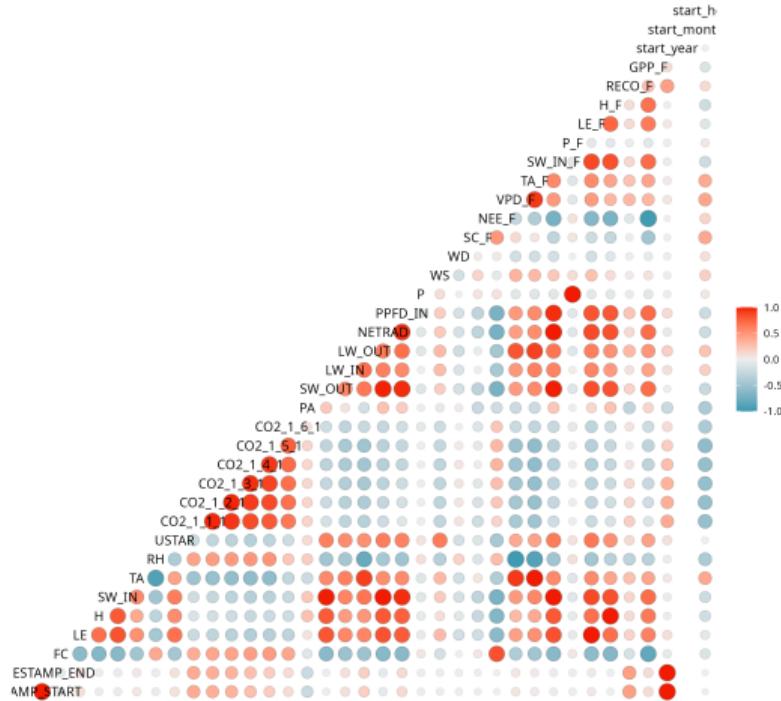
- AmeriFlux and European flux databases.
- Only one file analyzed: *BR-Ma2_HH_199901010000_201701010000_LBAv2.csv*

Method

- Read data.
- Replace invalid data with NAs.
- Constrain analysis to only complete observations occurring during August's daytime (08:00 - 18:00). August is the fire peak season [1] and daylight, which doesn't change much through the seasons near the equator, is needed for photosynthesis.
- Produce a correlation matrix (see Figure 1).
- Choose the most correlated variables.
- Plot observations and fit a quadratic model to the data (see Figure 2).

Correlation matrix

This correlation matrix shows interesting variables for further analysis, such as *FC*, *LW_OUT*, *RH*, and *TA*. The actual correlation values were omitted to ease reading.

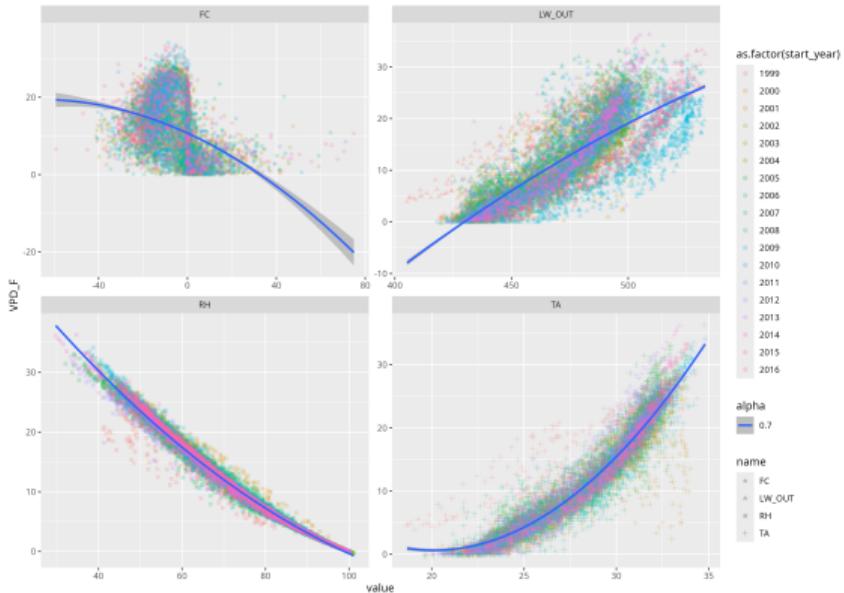


Most relevant variables

- VPD_F : Vapor Pressure Deficit (hPa).
- FC : Carbon Dioxide (CO_2) turbulence flux, no storage correction ($\mu \text{ mol } CO_2 \text{ m}^{-2} \text{ s}^{-1}$).
- LW_OUT : Longwave radiation, outgoing ($W \text{ m}^{-2}$).
- RH : Relative Humidity, range 0-100 (%).
- TA : Air temperature (deg C).

Observations' plot

This figure shows VPD_F as a function of the interesting variables selected before. Note the strong correlation of RH and TA .



Future work

- Check the correlation details (e.g. R^2).
- Include relations to vegetation through indices, such as NDVI, EVI, and GPP.

References I

- [1] Nathália S. Carvalho et al. *Spatio-Temporal Variation in Dry Season Determines the Amazonian Fire Calendar*. Nov. 2021. DOI: [10.5281/ZENODO.5706455](https://doi.org/10.5281/ZENODO.5706455). (Visited on 11/10/2024).