Calibration Report for AWF PAR Sensors

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Figure 1: Custom made PAR Sensor

Background

For the next phase of the Biodiversity-Exploratories research project all climate stations on the experimental plots will be equipped with Photosynthetic Active Radiation (PAR) sensors. As the commercially available sensors (e.g. LiCOR LI-190) are quite expensive, we are looking for an alternative. Therefore, we build PAR sensors @ AWF based on a prototype developed and tested by MPI Jena. The calibration of the PAR sensors as presented here had two objectives i) to test the variation between copies of the custom made PAR sensor (PAR-AWF), and ii) to compare the measurement to a calibrated reference.

Method

The caluculation of the calibration factors is based on the aggregated 5 Minutes intervalls. We removed the first and last 30 minutes of the time series to avoid disturbances during the set-up of the devices. The calibration coefficients are calculated as the slope of the linear regression model with no intercept. For the analysis and fitting of the linear models all values ≤ 0.1 mV were removed as we assume that this is below the sensitivity of the data logger.

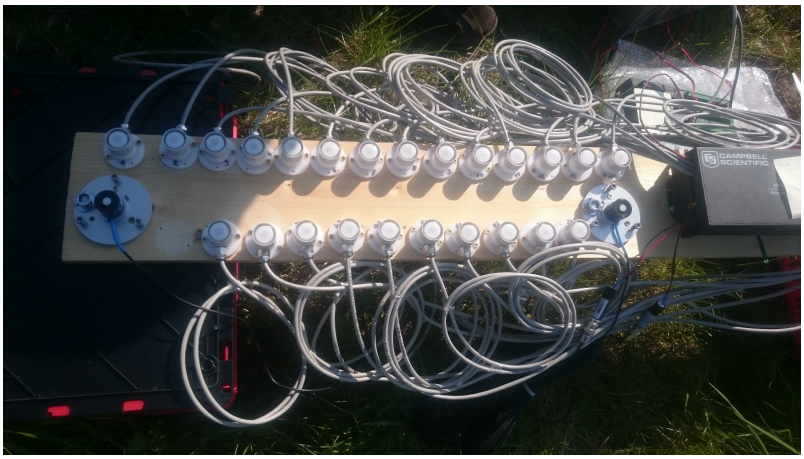


Figure 2: Calibration setup of Sensors

SENSOR:001

CALIBRATION DATASET:

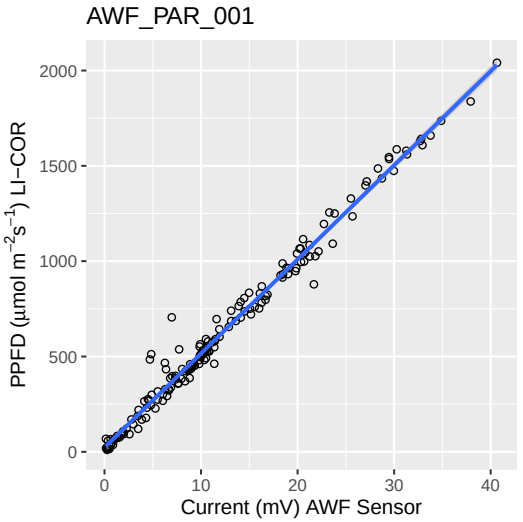
Location:	Aboretum Goettingen
Start:	Apr 27 09:39:30 2017
End:	Apr 28 08:51:30 2017
Duration:	23 h
Measurement frequency:	0.3hz
Averaging:	5 min
Number of records:	169
References:	LiCOR Q52953, Li-COR Q 52953

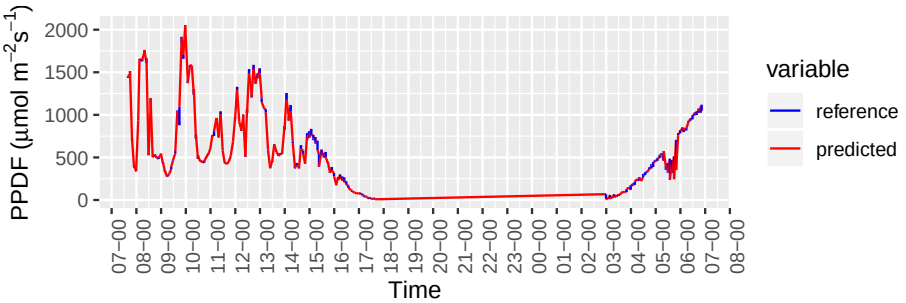
CALIBRATION RESULTS:

Calibration Factor: 50.522

	Estimate	Std. Error	t value	Pr(>|t|)
AWF_PAR_001	50.5217	0.2976	169.75	0.0000

QUALITY REPORT:
Residual standard error: 59.19 PPFD
Adjusted R-squared: 0.994





SENSOR:002

CALIBRATION DATASET:

Location:	Aboretum Goettingen
Start:	Apr 27 09:39:30 2017
End:	Apr 28 08:51:30 2017
Duration:	23 h
Measurement frequency:	0.3hz
Averaging:	5 min
Number of records:	169
References:	LiCOR Q52953, Li-COR Q 52953

CALIBRATION RESULTS:

Calibration Factor: 51.15

	Estimate	Std. Error	t value	Pr(>|t|)
AWF_PAR_002	51.1499	0.2689	190.22	0.0000

QUALITY REPORT:
Residual standard error: 52.85 PPFD
Adjusted R-squared: 0.995