

macroclimate

ibdj

2024-11-08

Table of contents

1	Macroclimate	2
2	Temperature data	3
2.1	Mean annual temperature	3
2.2	Trend in mean temperature of warmest months	3
3	Precipitation data	6
3.1	Yearly precipitation	6
3.2	Monthly precipitation	7
3.3	Precipitation type	7
4	PAR data	11
4.1	Monthly means	11
4.2	Anomolies	13
4.3	Highest monthly means	13
	References	15

Chapter 1

Macroclimate

Background macroclimate of Kangerluarsunnguaq ([Kobbefjord, Nuuk 64.13334, -51.34368](#)). Data produced by [Asiaq - Greenland Survey for Greenland Ecosystem Monitoring](#) (Asiaq 2023, 2020a, 2020b).

Chapter 2

Temperature data

The imported data has entries between 2007 and 2022.

Temperatures between -30.2°C (2008-02-11) and 23.2°C (2016-06-10) have been recorded.

2.1 Mean annual temperature

The mean temperature across all entries is -0.1003°C .

The warmest months are July (10.49°C), August (9.49°C) and June (7.25°C).

The coldest months are February (-8.97°C), March (-7.97°C), and January (-7.34°C).

2.2 Trend in mean temperature of warmest months

Call:

```
lm(formula = mean ~ year, data = data_temp_monthly_mean_summer)
```

Residuals:

Min	1Q	Median	3Q	Max
-3.6340	-0.7226	0.1279	1.2551	2.9202

Coefficients:

Estimate	Std. Error	t value	Pr(> t)
----------	------------	---------	----------

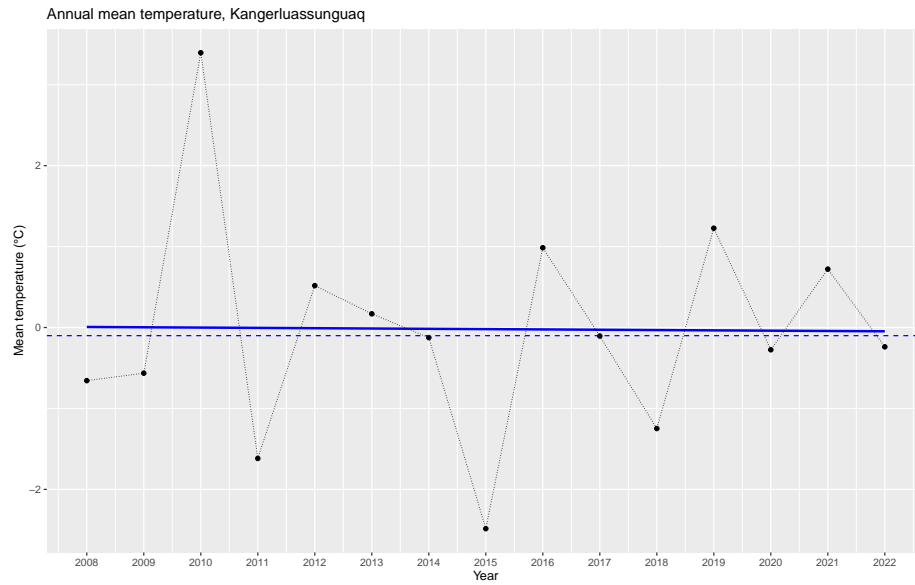


Figure 2.1: Mean air temperature pr year ($^{\circ}\text{C}$) from 2008 to 2022. Data from 2007 is excluded because data is only from October, November and December. Blue dashed line indicate over all mean of -0.1003°C . Solid blue is trend line.

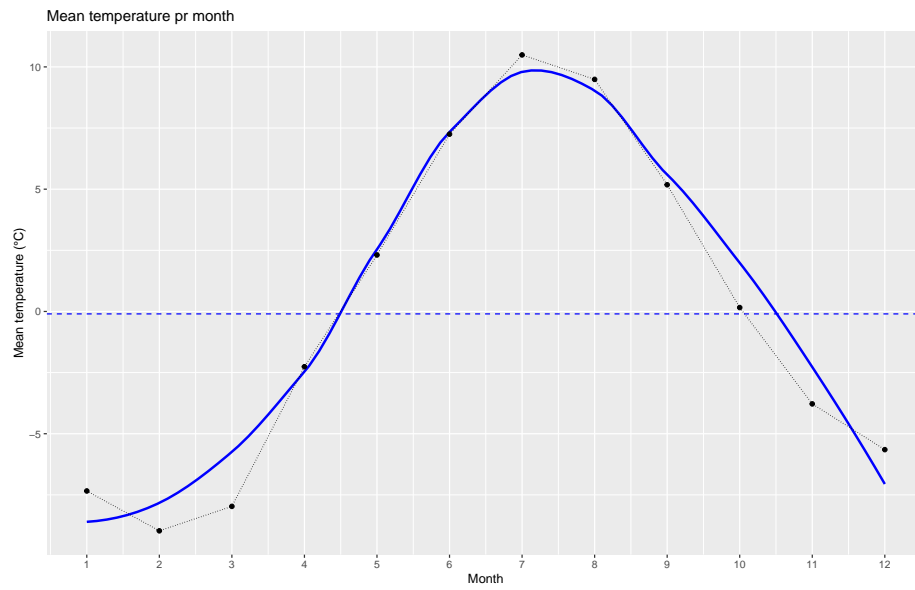


Figure 2.2: Mean air temperature ($^{\circ}\text{C}$) pr month, based on data from 2007 to 2022. The dashed line represent yearly mean of -0.1°C .

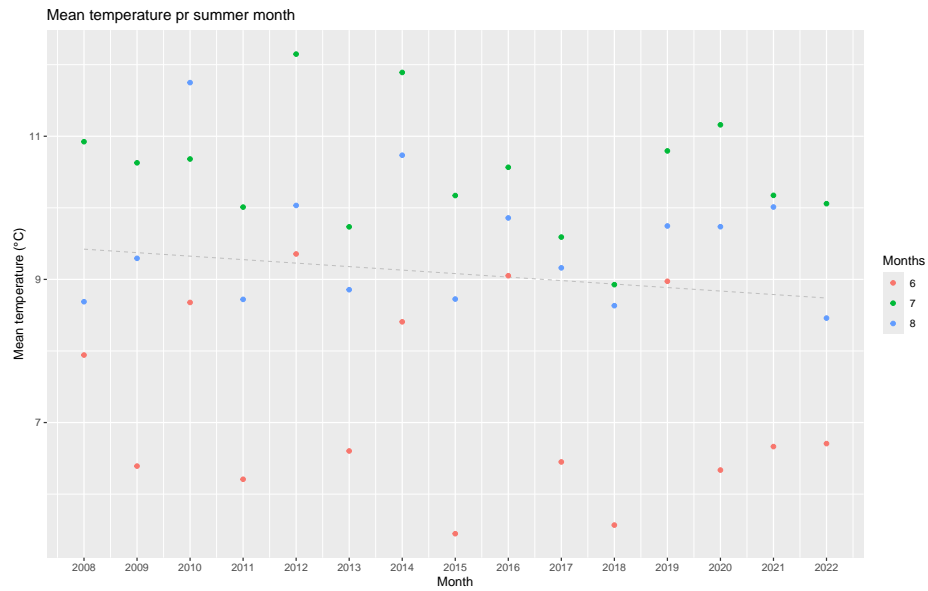


Figure 2.3: Mean air temperature (°C) pr for July, August, and June based on data from 2007 to 2022. P-value for the regression is 0.416. The mean of the warmest months across all years are 9.081°C.

(Intercept)	107.34623	119.65318	0.897	0.375
year	-0.04877	0.05938	-0.821	0.416

Residual standard error: 1.721 on 43 degrees of freedom
Multiple R-squared: 0.01544, Adjusted R-squared: -0.007454
F-statistic: 0.6745 on 1 and 43 DF, p-value: 0.416

Chapter 3

Precipitation data

3.1 Yearly precipitation

The mean annual precipitation is 887.36 mm.

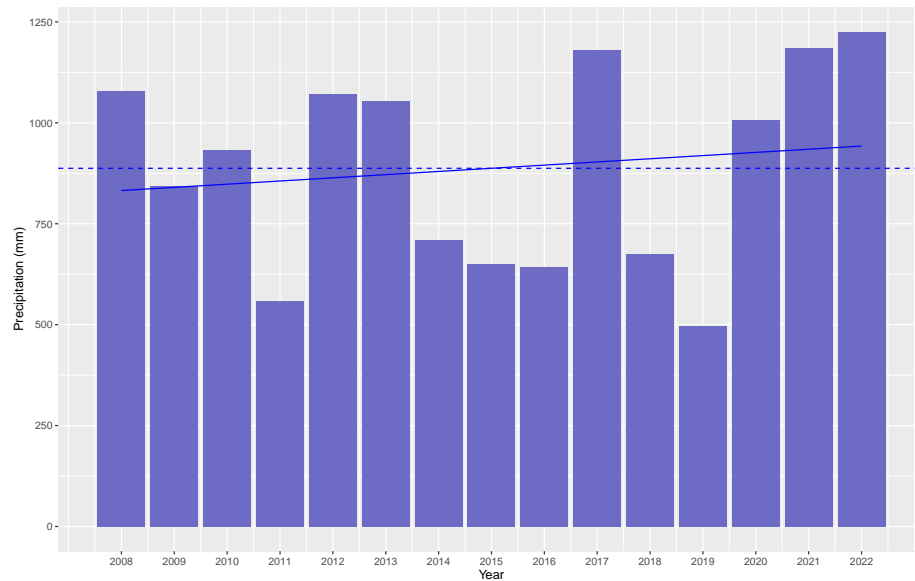


Figure 3.1: Mean yearly precipitation (mm) from 2008 to 2022. Data from 2007 is excluded because it was only from May - December. Blue dashed line indicate over all mean of 887.36 mm.

3.2 Monthly precipitation

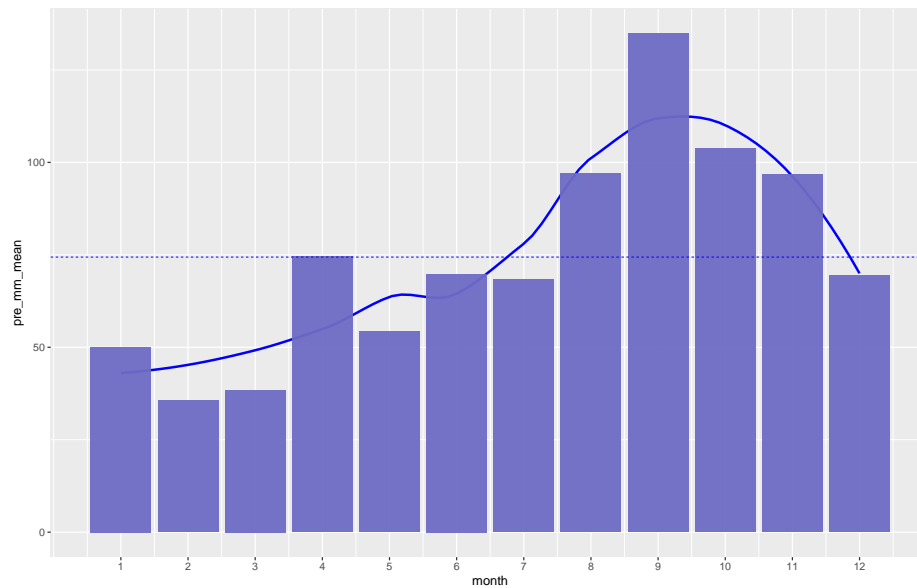


Figure 3.2: Mean monthly precipitation (mm) including data from 2007 to 2022. Blue dashed line represent monthly mean of 74.4 mm. ADD SF BARS!

The wettest months are September (134.8 mm), October (103.84 mm), August (96.93 mm).

The driest months are January (50.03 mm), March (38.42 mm), February (35.57 mm).

3.3 Precipitation type

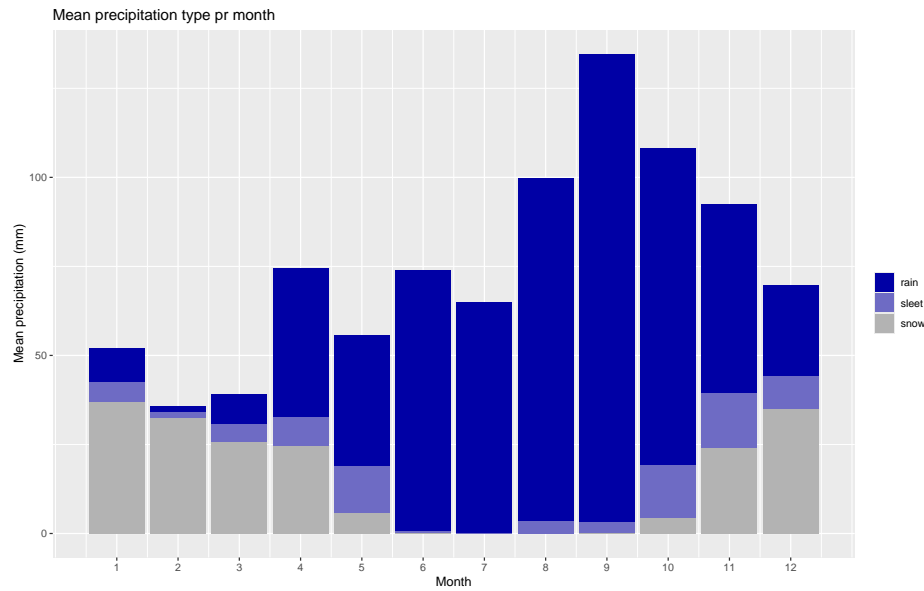


Figure 3.3: Mean monthly distribution of types of precipitation (mm). Based on data from 2007 to 2022. Sleet is defined as precipitation that fell when temperatures were between -1°C and 1°C .

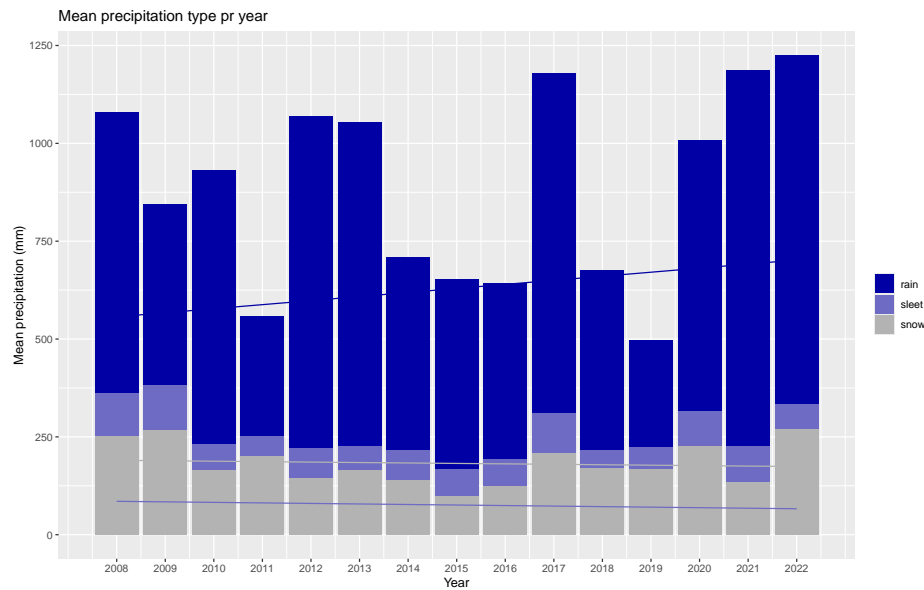


Figure 3.4: Mean percipitation pr. month over the monitoring period (2008 - 2022). Sleet is defined as precipitation that fell when temperatures were between -1°C and 1°C .

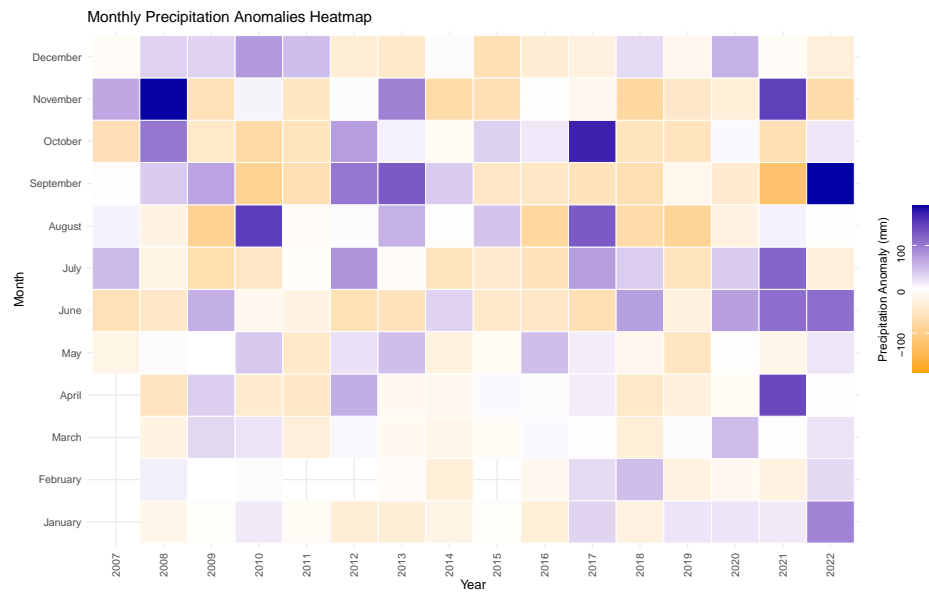


Figure 3.5: Monthly precipitation anomaly ($^{\circ}\text{C}$). Stronger colors indicate large deviation from the month mean.

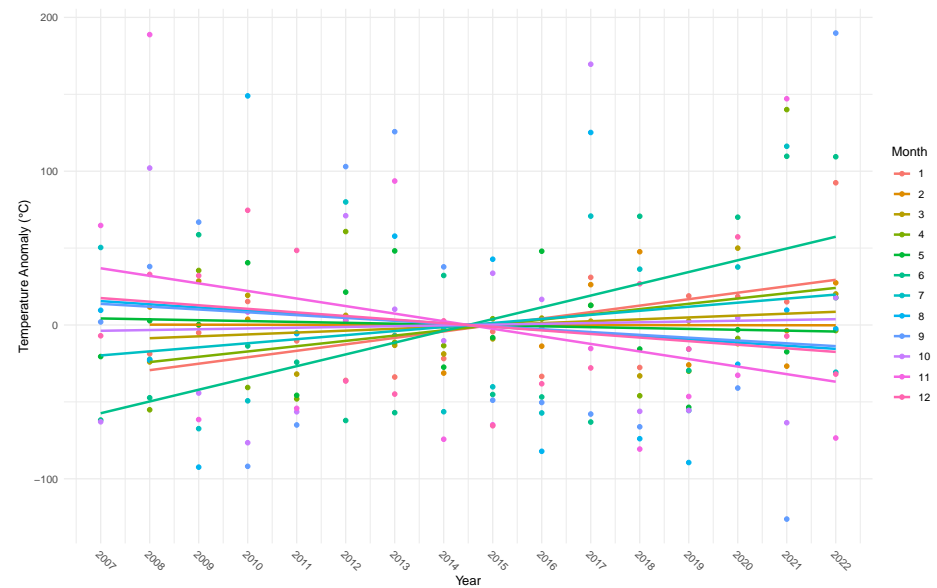


Figure 3.6: MAKE IN TO SUM OF ANOMOLIES INSTEAS!

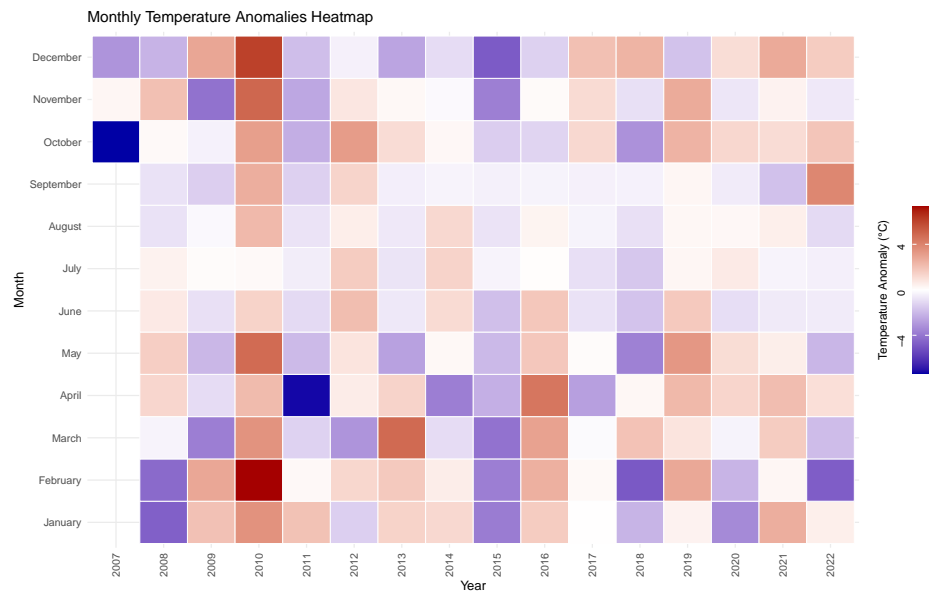


Figure 3.7: Monthly Temperature Anomalies Heatmap. The stronger the color the bigger the difference from mean temperature of the respective month across all monitored years ($^{\circ}\text{C}$).

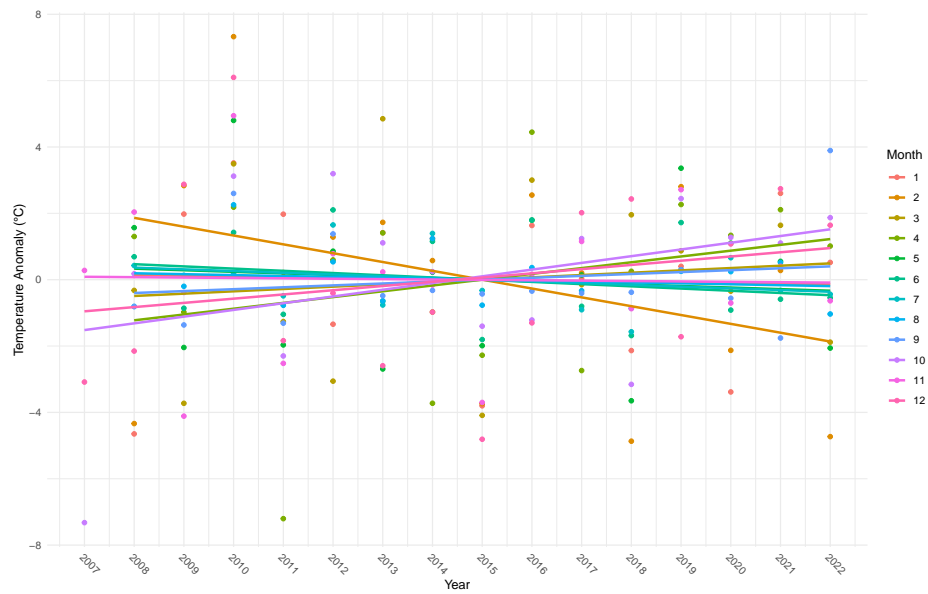


Figure 3.8

Chapter 4

PAR data

4.1 Monthly means

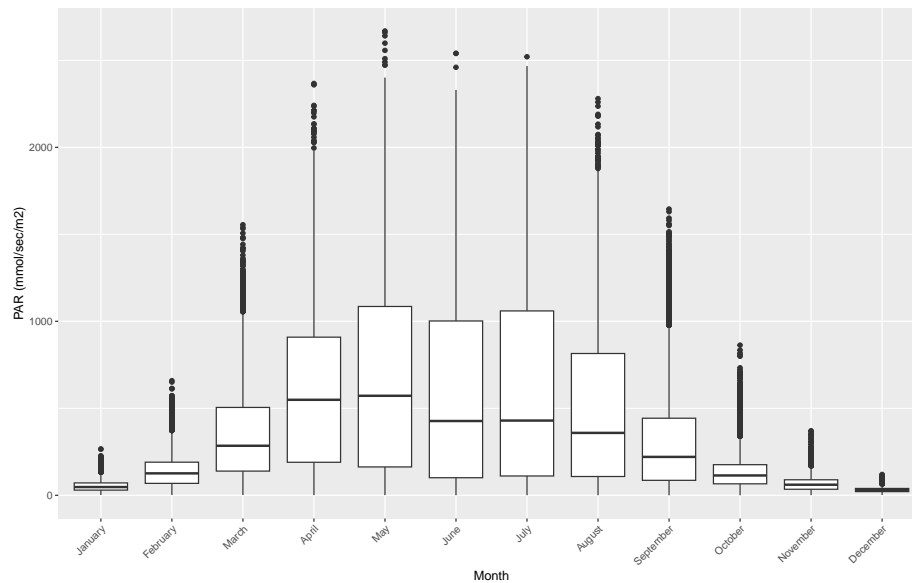


Figure 4.1: Monthly mean PAR from 2008 to 2022. Calculations based on PAR values only when the sun is up (solar elevation > 0).

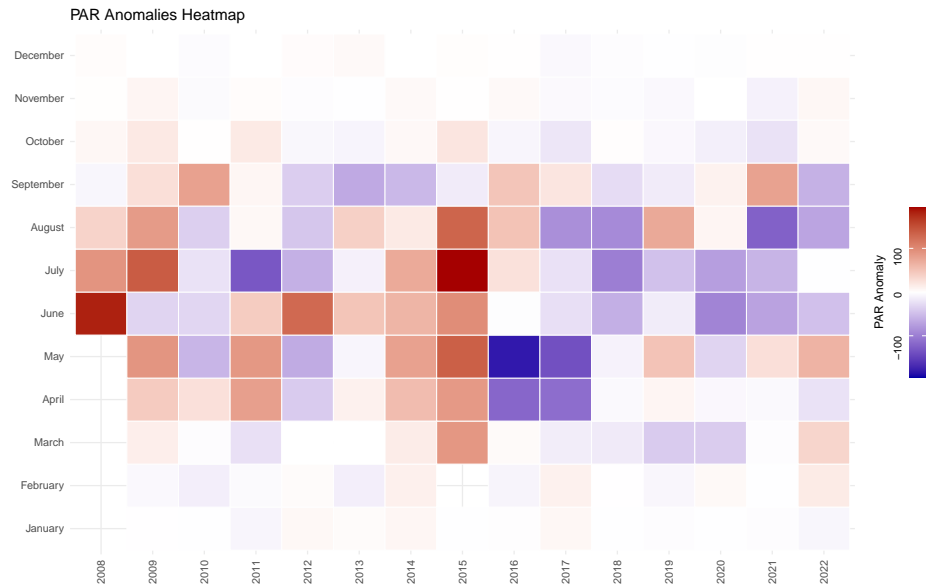


Figure 4.2: Anomalies (difference from mean) of respective month. Stronger color indication bigger difference from monthly mean across entire period.

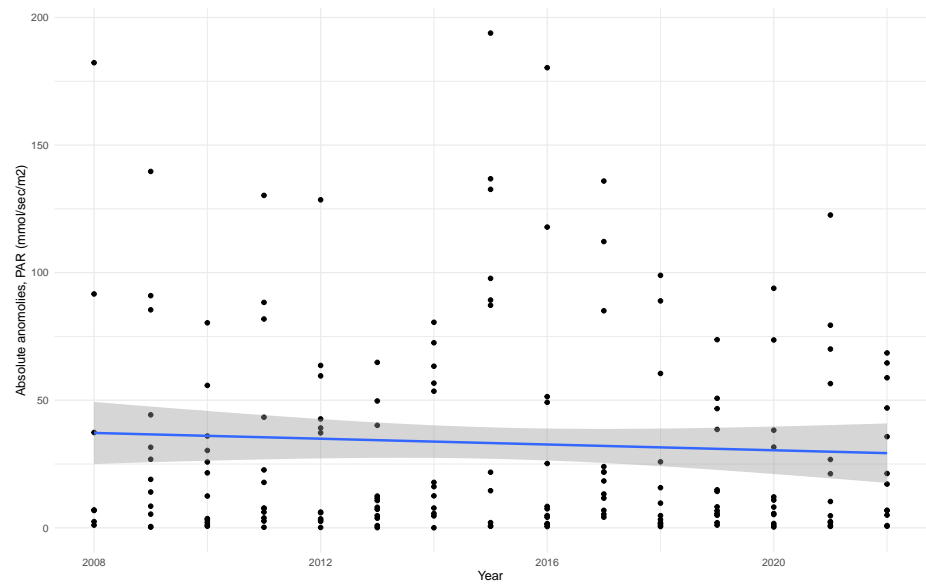
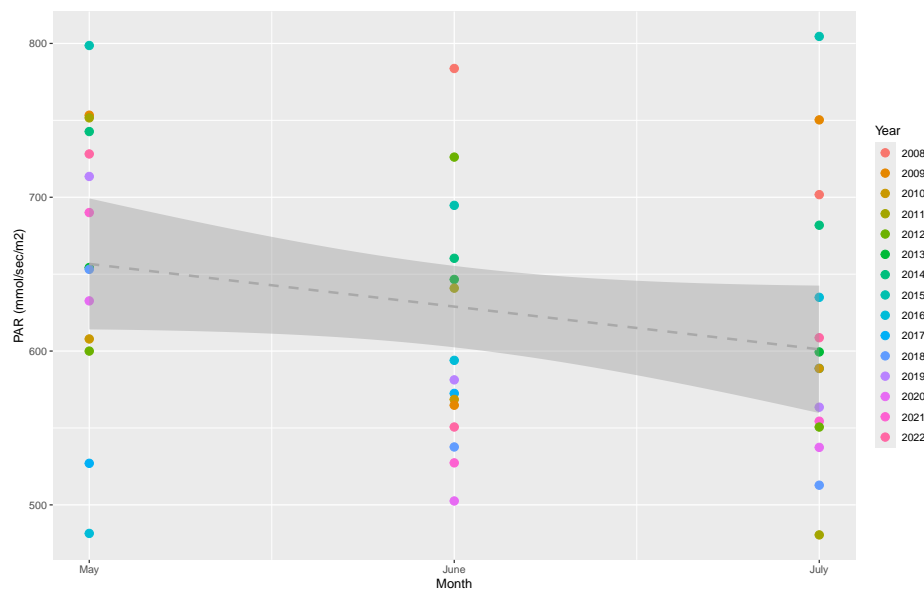


Figure 4.3: Absolut values of anomolies (difference from mean) of respective month.

4.2 Anomolies

4.3 Highest monthly means

The months with the highest mean levels of PAR (when the sun is up, solar elevation > 0) are May (663.1) July (610.3) June (597).



Call:

```
lm(formula = par_mean ~ month_num, data = par_highest_mean)
```

Residuals:

	Min	1Q	Median	3Q	Max
	-175.217	-57.594	-7.975	67.236	203.410

Coefficients:

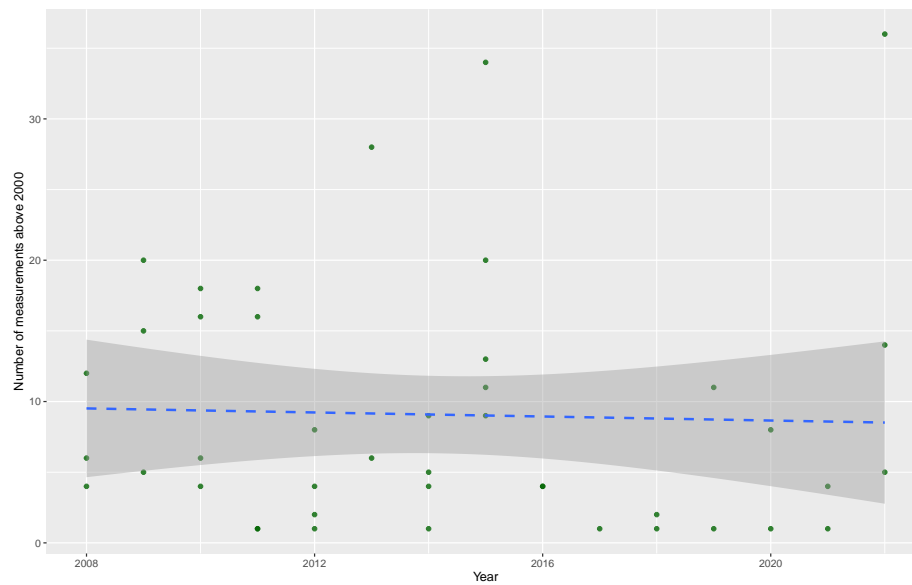
	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	795.51	98.20	8.101	4.05e-10 ***
month_num	-27.77	16.16	-1.718	0.0931 .

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 86.98 on 42 degrees of freedom

Multiple R-squared: 0.06569, Adjusted R-squared: 0.04345

F-statistic: 2.953 on 1 and 42 DF, p-value: 0.09308



Call:
lm(formula = above_2000 ~ year, data = above_2000)

Residuals:

Min	1Q	Median	3Q	Max
-8.299	-6.156	-3.513	4.737	27.486

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	152.8806	646.6144	0.236	0.814
year	-0.0714	0.3210	-0.222	0.825

Residual standard error: 8.88 on 41 degrees of freedom
Multiple R-squared: 0.001205, Adjusted R-squared: -0.02316
F-statistic: 0.04946 on 1 and 41 DF, p-value: 0.8251

References

- Asiaq. 2020a. “ClimateBasis Nuuk - Precipitation - Precipitation Accumulated (Mm).” <https://doi.org/10.17897/SXJ8-WA79>.
- . 2020b. “ClimateBasis Nuuk - Radiation - Photosyntetic Active Radiation @ 200 Cm - 5min Average (Mmol/M2/Sec).” <https://doi.org/10.17897/8Z2W-D993>.
- . 2023. “Air Temperature @ 200 Cm - 30 Min Average (°c).” <https://doi.org/10.17897/PGN3-7597>.