**Workflow for data analysis**

**Use Master Script to source all the other scripts in correct order!**

**Logger**

* Read in data and create list
  + Separate scripts for separate datasets
* Set all loggers to same start time (same interval)
  + Interpolate data to 1 min intervals and
  + Reduce again to 10 min values
* Use calculated offset (reference thermometer) to correct data
  + Use offset from test in the lab and subtract the offset from temperature data
  + Offset for logger 33 is missing -> check that
* Decompose the time series (plot seasonality, trend and noise)
* Tidy up data regarding spikes
  + Set a threshold for a rise in temperature that are regarded as spikes and therefore set to NA
    - For water: threshold of 2.5°C/10min, remove 2h of data
    - For air: threshold of 5°C/10min, remove 30mins of data
* Plots
  + plot the tidy data in pairs (water, settlement, vegetation)
  + plot overviews for all water logger/ vegetation logger/ sealed area logger
* Split data into day and night datasets (creates separate lists)
  + Two hours per day for dawn are removed
  + Works for every dataset
* Plot the day and night datasets and save to file
  + Add the sunrise and sunset as vertical lines to the plots
  + Add description and type of location to plots
* Statistics:
  + Test for normality and, subsequently do ttest or Wilcoxon significance test for green vs grey infrastructure
  + Get mean, median and standard deviation for daily, nightly and 24h data
  + Plot statistics
* Map
  + Isarithmic map with interpolation of points through inverse path distance weighing

**Supplementary weather data**

* Windspeed, -direction
* Temperature

**Netatmo data**

* Merge both the temperature data and the metadata
* Perform QAQC in xxx steps
  + Inconsistent metadata

**To Do – Data analysis:**

* Create (working heatmap) -> check out other possibilities
* Check where NAs have gone
* Try and puzzle matching time frames together?
* Use 3 sd as QAQC (check QAQC for CSD)
* Tidy up split script with new dawn/dusk values
* Plot stats (add legend to grid plot)
* Download cloudiness data
* Get atmospheric stability data?
* For map: get landuse data of MS as spatial polygons dataframe
* Check occourences of water temp > air temp (during night prob) -> save in dataframe (key: logger ID)

**To Do – Fieldwork**

* Find out exact distance in meters between logger pairs
* Check Logger IDs and coordinates (some missing)

**To Do – Literature**

* Split weather effects
* Read paper about wind effects (again)

**Questions**

* Wind: use data from GEO1 (higher then usual) or FMO (further away)? -> how to get meteodata?
* 5 SD?
* Include only stations within Münster (city border)?
* Use which reference station?

**Ideas/considerations Aasee**

* Effect of shallowness
* Effect surface area
* Trees around Aasee #check how many NAs were added to data
* Large space (Aaseekugeln) 🡪 distinguish effect green space/cooling due to water
* Warming at nighttime (when water temp > air temp)
* Fountains for fish -> suppl evaporation
* How to distribute logger so that cold air stream can be mapped?