

Water quality experiment

Group B

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Introduction

Water quality is linked to geology, land use, pollution and sediment transport. By doing water quality measurements, the relations between these and water quality can be analysed.

The measurements were done at four locations. The first measurement was done at the Attert. The second measurement was done at a lake that's connected with a small stream (Helmeschbaak) to the Attert. The third measurement was done at a small stream upstream of that lake. The fourth measurement was done at a small lake / drinking pool close to the Helmeschbaak, but it was not connected to any visible streams.



Figure 1. Lake (location 2)



Figure 2. Small stream (location 3)



Figure 3. Small lake (location 4)

Method

- Collect water with a bucket. Clean the bucket before use.
- Walk back to the car to do the measurements.
- Measure dissolved oxygen (DO), pH, electrical conductivity (EC) and temperature by putting the sensors in the bucket of water. Wait until the values on the sensors have stabilized and write them down. For DO and pH, two instruments have been used: a Greisinger sensor for each and a WTW multimeter. EC and temperature are measured with the EC sensor.
- Measure alkalinity using the Lovibond spectrophotometer.
- Take some water from the bucket, filter it and put it in vials for further lab analysis.

Results

The sampling points can be seen in Figure 4. The measuring results can be seen in Table 1.



Figure 4. Map of the sampling points (modified from Google, n.d.)

Table 1. All the water quality measurements

Sampling point	Coordinates	Time
1. Colmar Berg	49.811658, 6.092321	9:34
2. Lake	49.807413, 6.051634	10:40
3. Stream to lake	49.807918, 6.050406	10:40
4. Small lake / drinking pool	49.8050689, 6.0498307	11:20

Alkalinity [mmol/L]	DO WTW [mg/L]	DO Greisinger [mg/L]	pH	EC [μ S/cm]	Temperature [°C]
3.39 mmol/L	10.1 mg/L	5.5 mg/L	8.0-8.1	519	12.9
3.82 mmol/L	7.8 mg/L	4.9 mg/L	7.7-7.9	411	11.4
4.54 mmol/L	10.2 mg/L	8.0 mg/L	Gr: 8.0, WTW: 8.4	482	10.1
0.1 mmol/L	3.1 mg/L	2.0 mg/L	Gr: 7.5, WTW: 5.9	56.1	11.1

Discussion

For DO, it is noticeable that the values from the WTW multimeter are significantly different compared to the values from the Greisinger sensor. This can be caused by one sensor being more accurate than the other.

For pH, we think (we don't remember exactly anymore) that for the first two locations we measured the range of the values for one pH sensor. For the last two locations we measured

the pH using both the Greisinger sensor and WTW multimeter. It is noticeable that for the last location the WTW multimeter gives a more reasonable value.

For location 3 we only took some samples from the stream using vials. When the temperature was measured from the vials, it seemed too high. We walked back to the stream to measure it again, but this time directly from the stream and we measured a lower temperature. For location 2 we took a bucket of water and measured the temperature. Just in case we also measured the temperature directly from the lake but this value was similar to the value measured from the bucket. Measuring temperature is thus best done either directly from the stream/lake or from a big bucket where temperature doesn't change that quickly.

It is also noticeable that all the measured values (except for temperature) for location 4 are significantly lower than the other locations.

Due to lack of time we didn't manage to measure chloride, nitrate and ortho-phosphate.

References

Google. (n.d.). Google Maps. Retrieved 22-05-2023 from
<https://www.google.nl/maps/@49.8083787,6.0683234,14z>