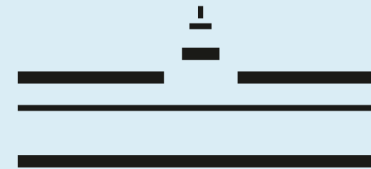


Variation of benthic algae communities on stone surfaces – A river study

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Theoretical Background – Analysis of Bio-fouling

- Influence of desiccation on bio-fouling of stone surfaces (-> lack of water, high temperatures and high light intensity)
- High biodiversity results from the influence of extreme environmental conditions
- Reaction to extreme conditions by resistance or resilience
- Recolonization of strongly disturbed areas occurs from undisturbed areas or from resilience stages

Hypotheses

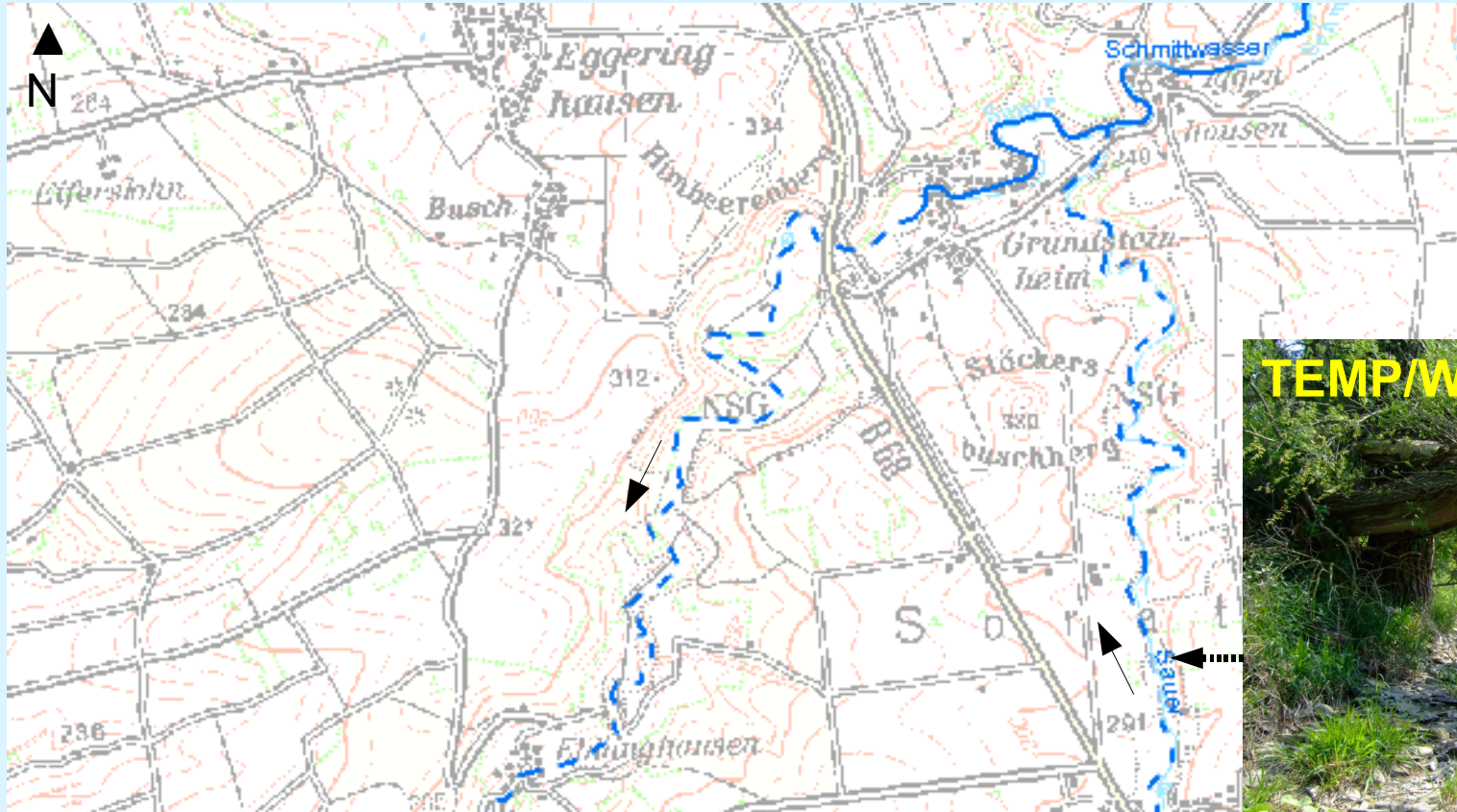
1. A difference in the development of bio-fouling and the biomass in dependence to the hydrological environment should be found
2. The growth of biomass and diversity are smaller in the temporary zone of the river than in the permanent zone, following the intermediate disturbance theory
3. At the beginning, the two sections of the river are quite similar to each other, later they will be more and more different from each other, because of the disturbance of the desiccation

Theoretical Background – A Comparison of Methods

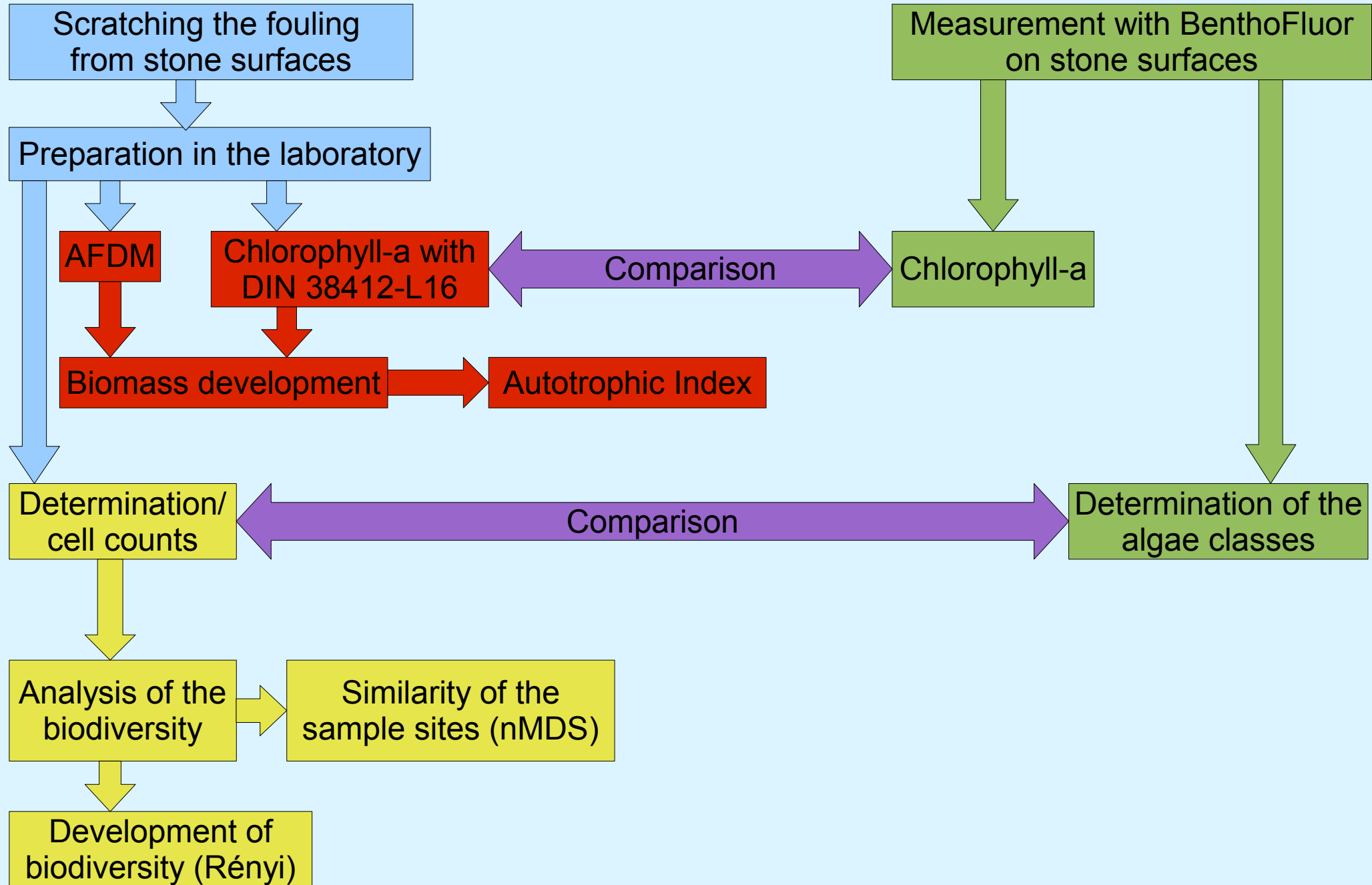
- *"in vivo"* determination of the chlorophyll-a content
- Differentiation of algae classes (Chlorophyta, Cyanobacteria and Diatoms)
- Comparison with the absorption determination of the chlorophyll-a content (DIN 38412-L16)
- Comparison of the measured algae classes with the results of the microscopical determination of the algae



Study Site

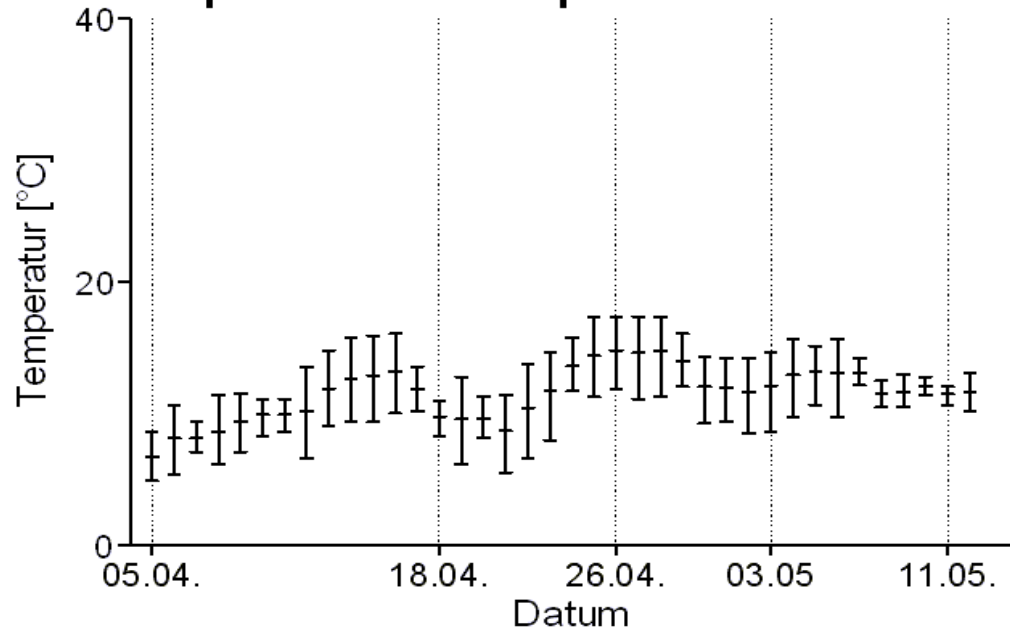


Methodology



Events of Desiccation

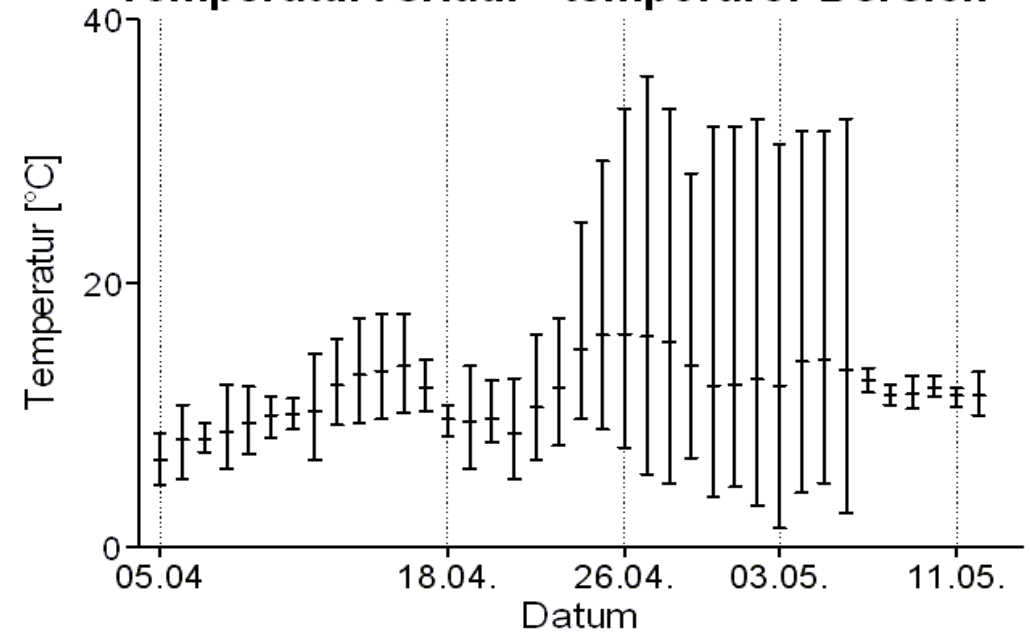
Temperaturverlauf - permanenter Bereich



Temperature profile of the permanent flow

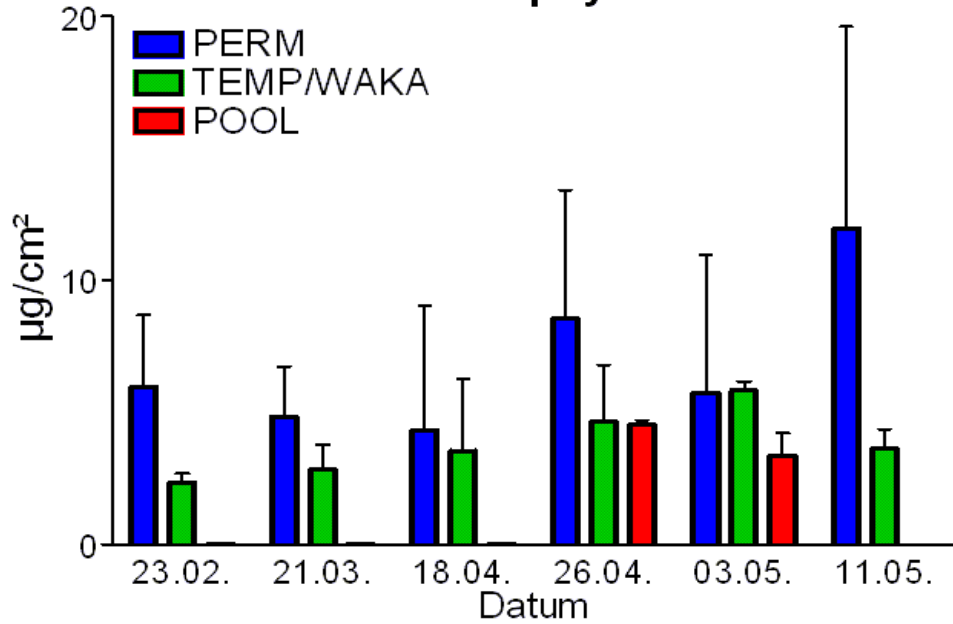
Temperature profile of the temporary section

Temperaturverlauf - temporärer Bereich

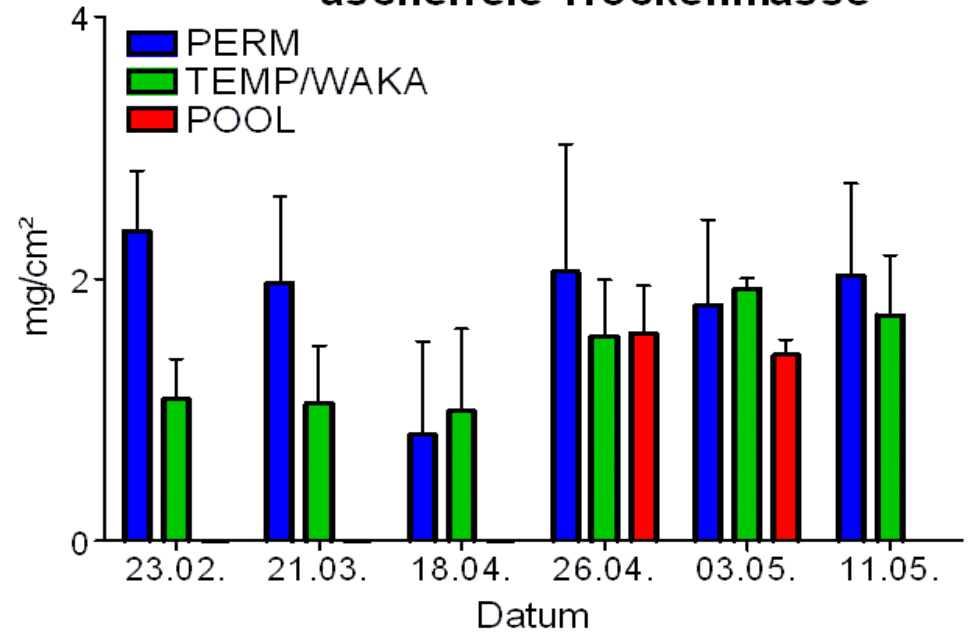


Development of the Biomass of Algae

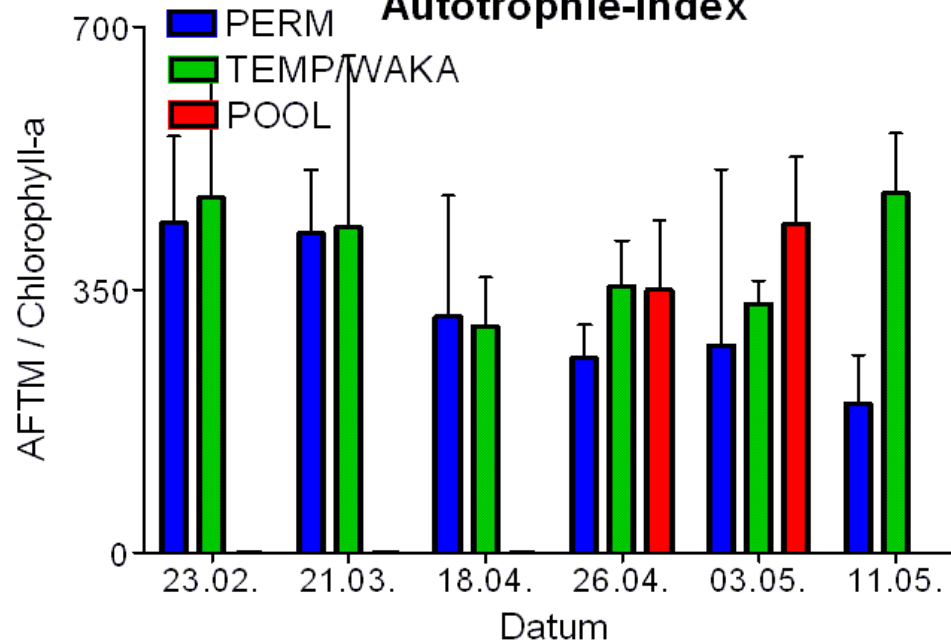
Chlorophyll-a



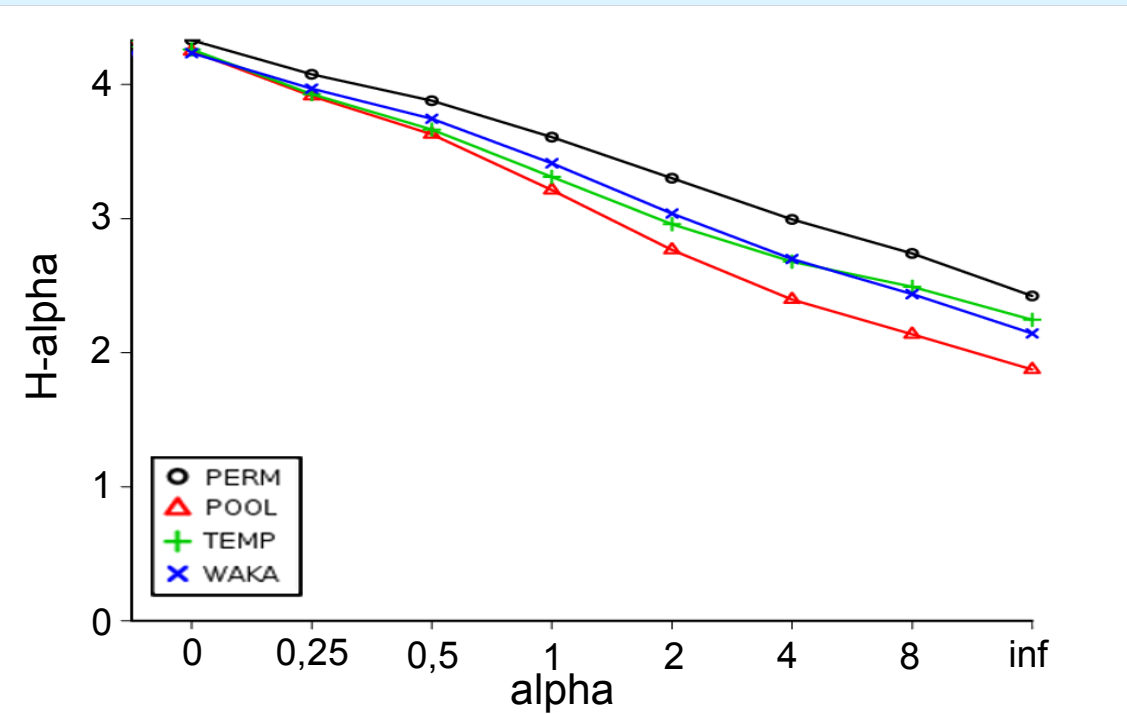
aschefreie Trockenmasse



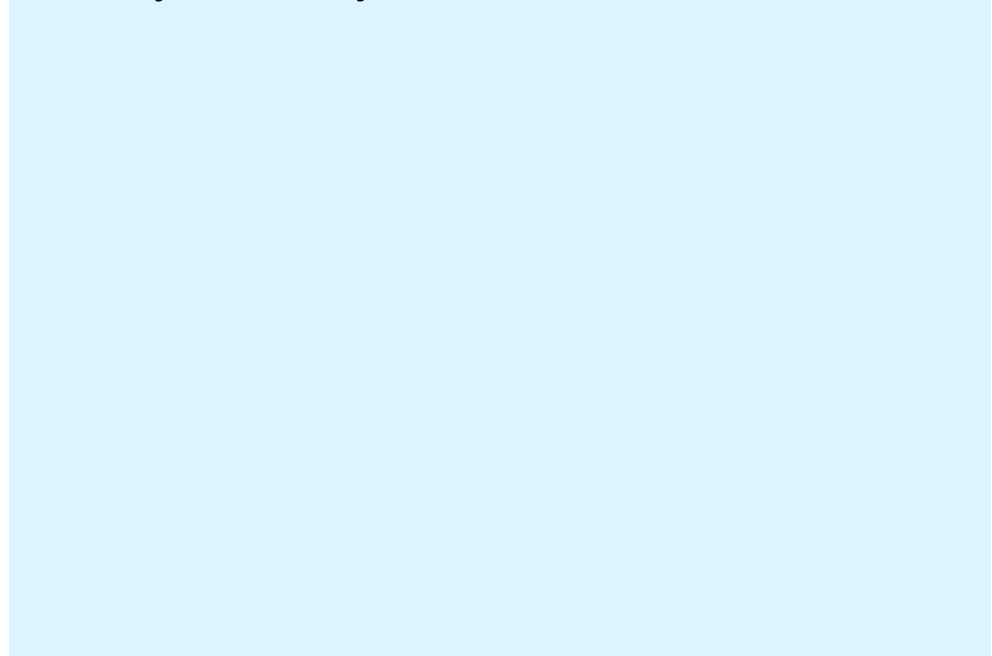
Autotrophie-Index



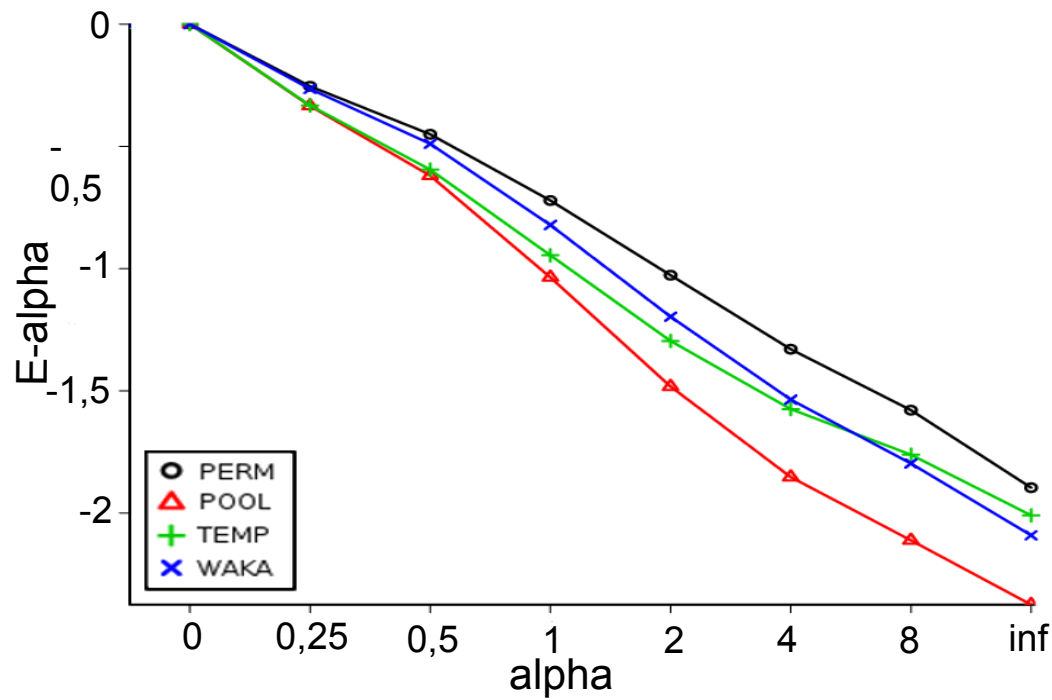
Biodiversity



Rényi-diversity



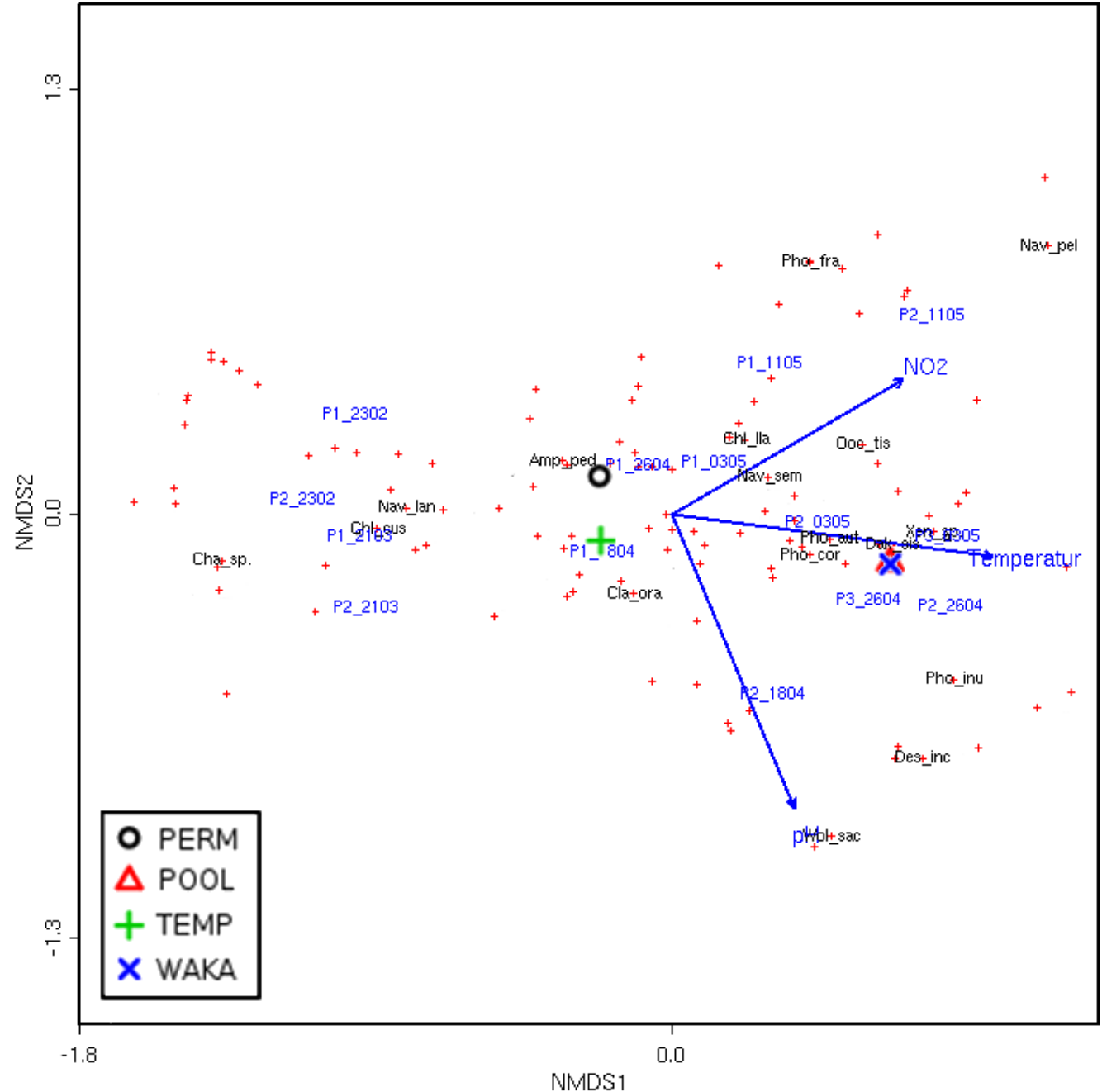
Rényi-evenness



Similarity of the Study Sites

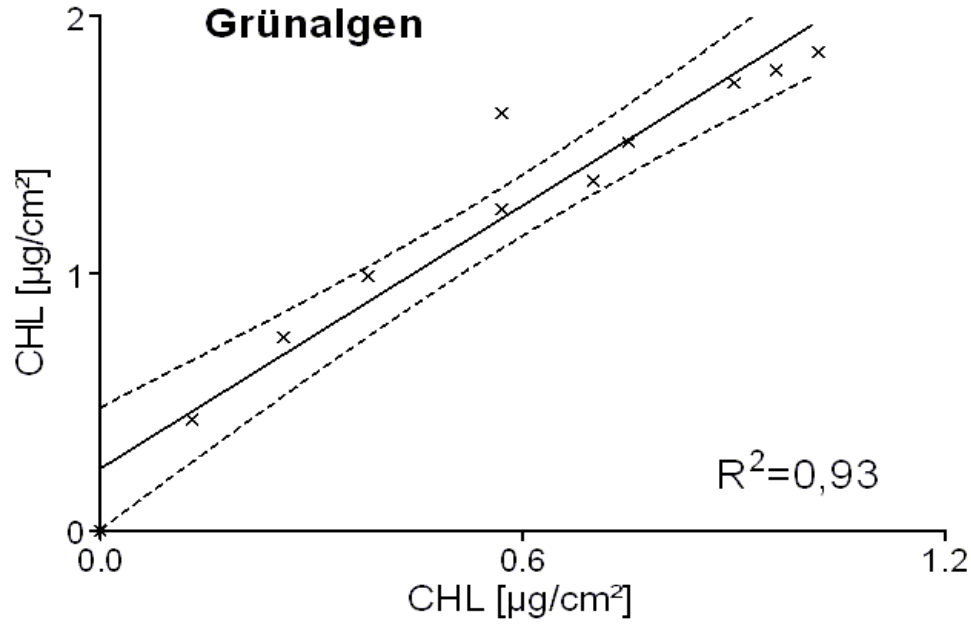
Excerpt from 167 Taxa

Taxon	Abk.	hydro. Reg.
Cladophora	Cla_ora	TEMP/WAKA
Oocystis	Ooc_tis	ALLE
Chlorococcus	Chl_cus	ALLE
Chlorella	Chl_lla	ALLE
Phormidium fragile	Pho_fra	PERM
Xenococcus sp.	Xen_sp.	TEMP
Phormidium inundatum	Pho_inu	POOL
Chamaesiphon sp.	Cha_sp.	TEMP/WAKA
Desmosiphon incrustans	Des_inc	PERM/TEMP
Phormidium autumnale	Pho_aut	ALLE
Phormidium corium	Pho_cor	ALLE
Daktylococcopsis	Dak_sis	PERM/TEMP
Navicula peliculosa	Nav_pel	PERM/TEMP
Navicula lanceolata	Nav_lan	ALLE
Navicula seminulum	Nav_sem	ALLE

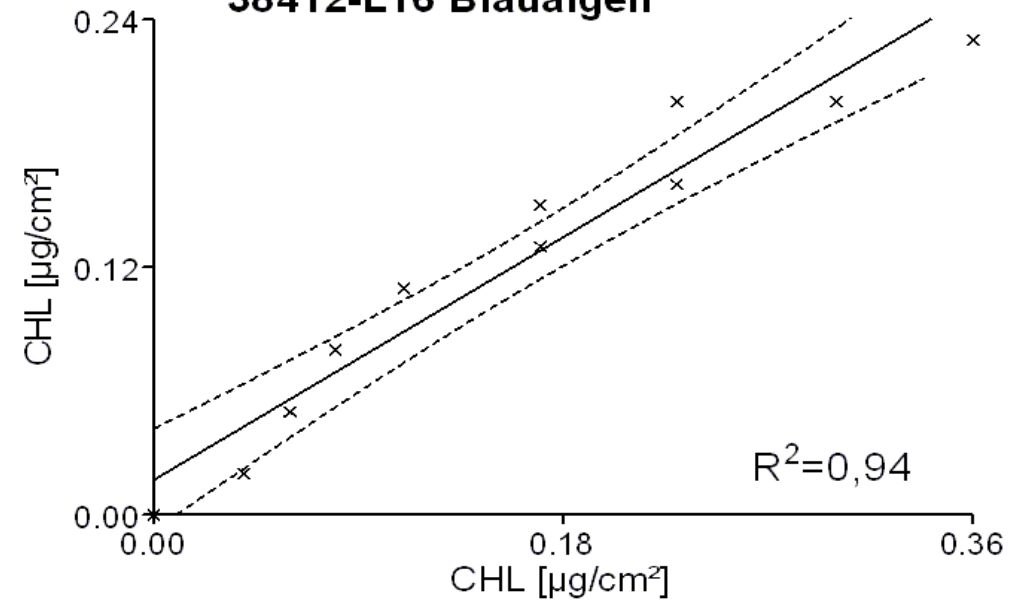


Comparison of the Methods - Laboratory

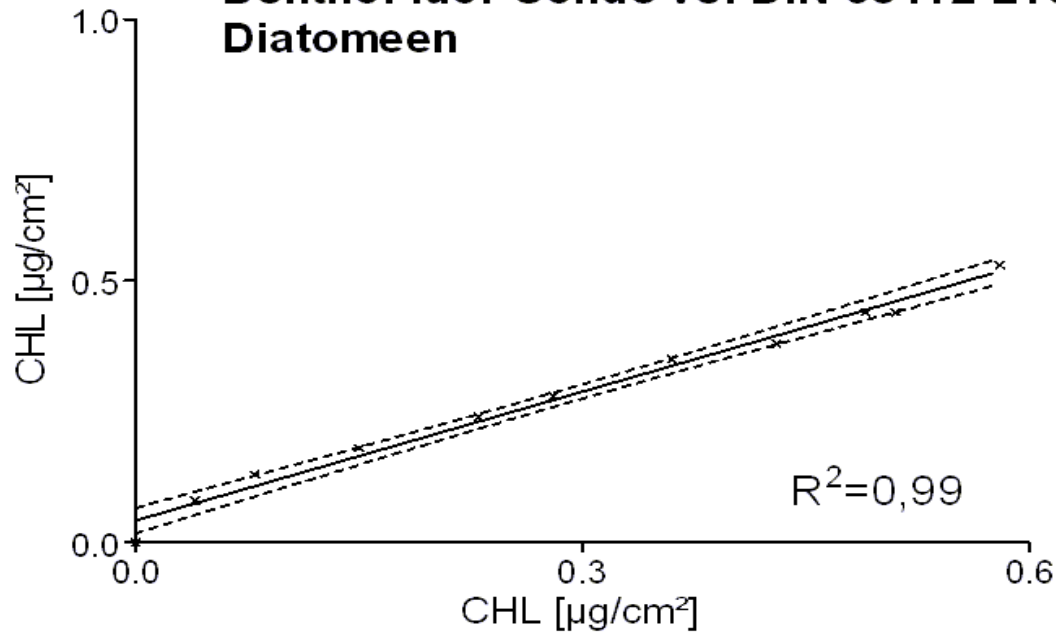
**BenthoFluor-Sonde vs. DIN 38412-L16
Grünalgen**



**BenthoFluor-Sonde vs. DIN
38412-L16 Blaualgen**

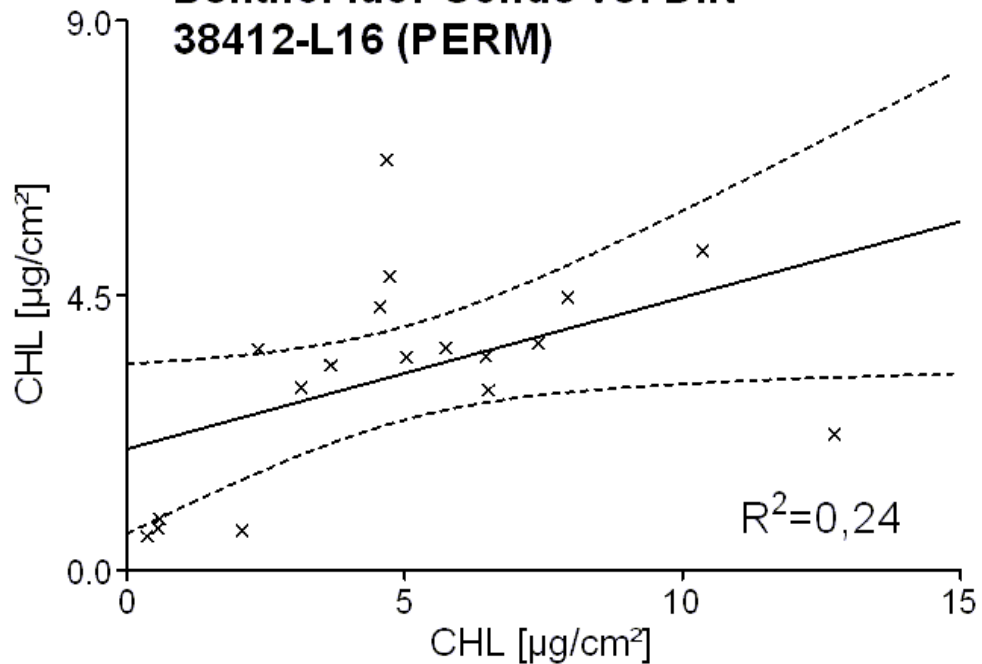


**BenthoFluor-Sonde vs. DIN 38412-L16
Diatomeen**

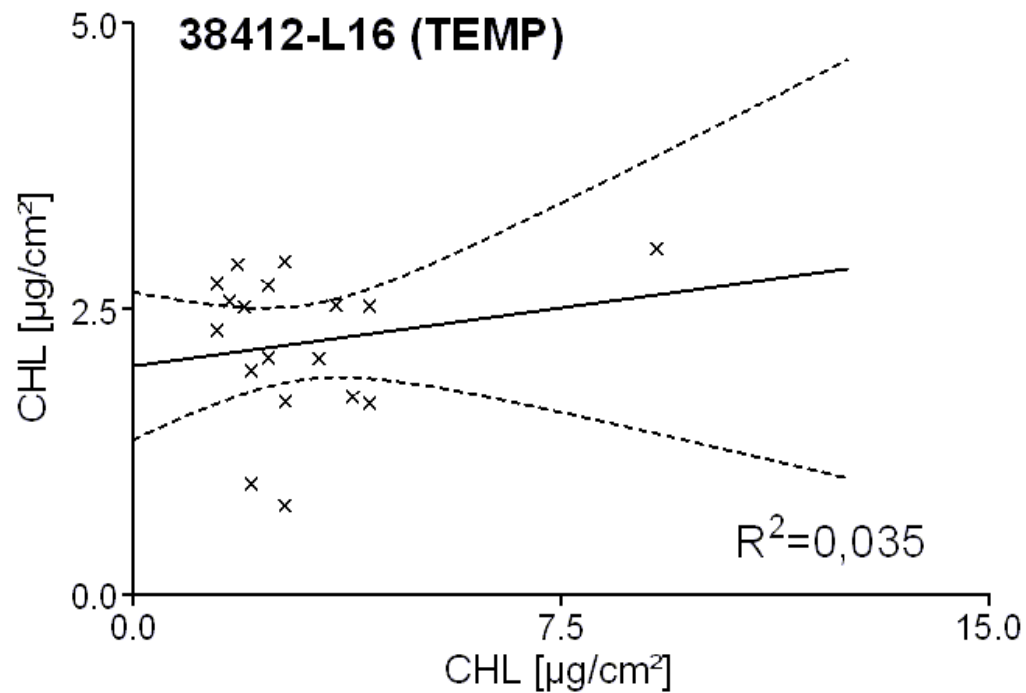


Comparison of Methods - Outdoor

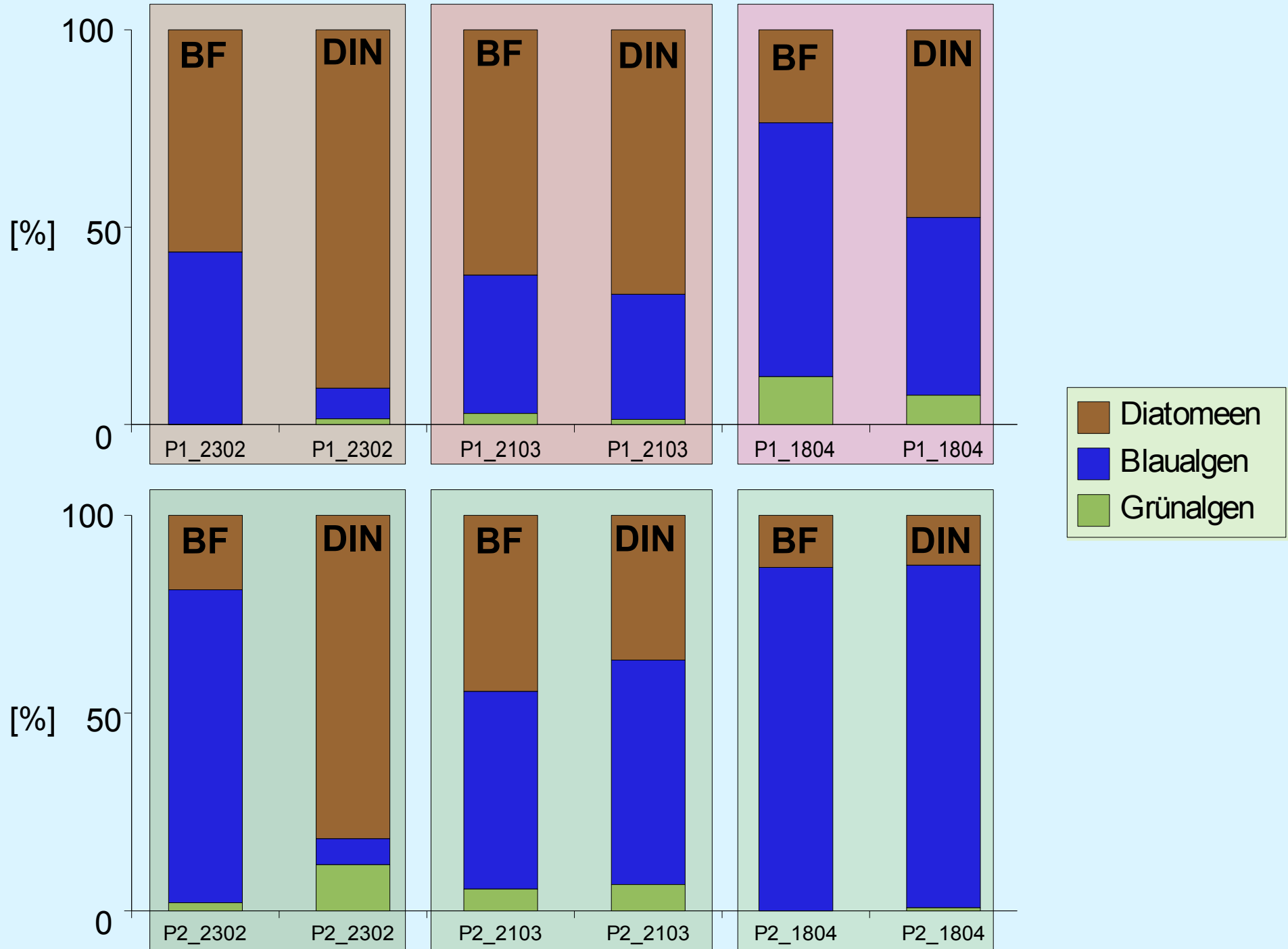
BenthoFluor-Sonde vs. DIN
38412-L16 (PERM)



BenthoFluor-Sonde vs. DIN
38412-L16 (TEMP)



Comparison of the Algae Classes



Conclusions

- The hypotheses have been approved
 - a difference in development of the biomass in comparison of both study sites was observed
 - due to the great impact of desiccation there was a difference in the diversity of both study sites observable
 - the similarity of both study sites at the beginning decreases with time. It is dependent of a change in the algae communities.

Comparison of the Methods

- Total different methods of chlorophyll determination
- The absorbance measurement (extraction method) gives higher concentrations of chlorophyll (even in comparison to the HPLC)
- Differences between the methods (sampling, etc.)
- Thickness of the biofilm (algae are not only distributed in the upper layers -> high production)
- Algae classes do fit well (differences occur because of the determined surfaces)

Thank you for watching

