



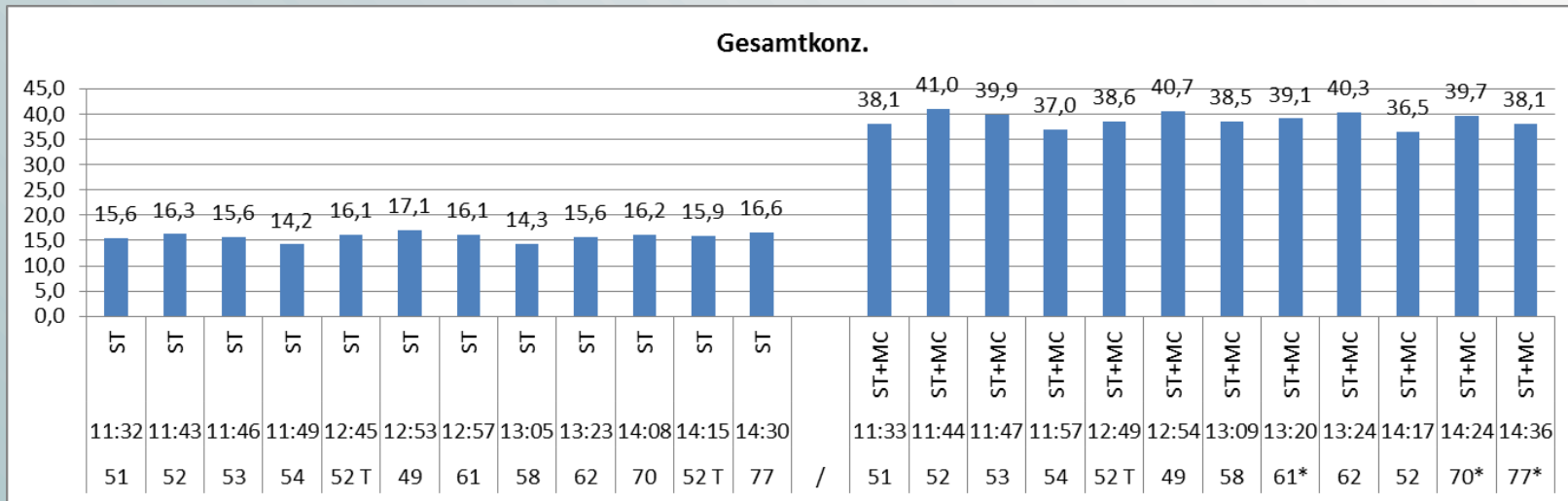
28 FluoroProbes Measuring in Parallel

To what extent can we expect the same results with each probe?

Chr. Moldaenke, bbe
Marén Lentz, IGB, Berlin



Results not equal enough

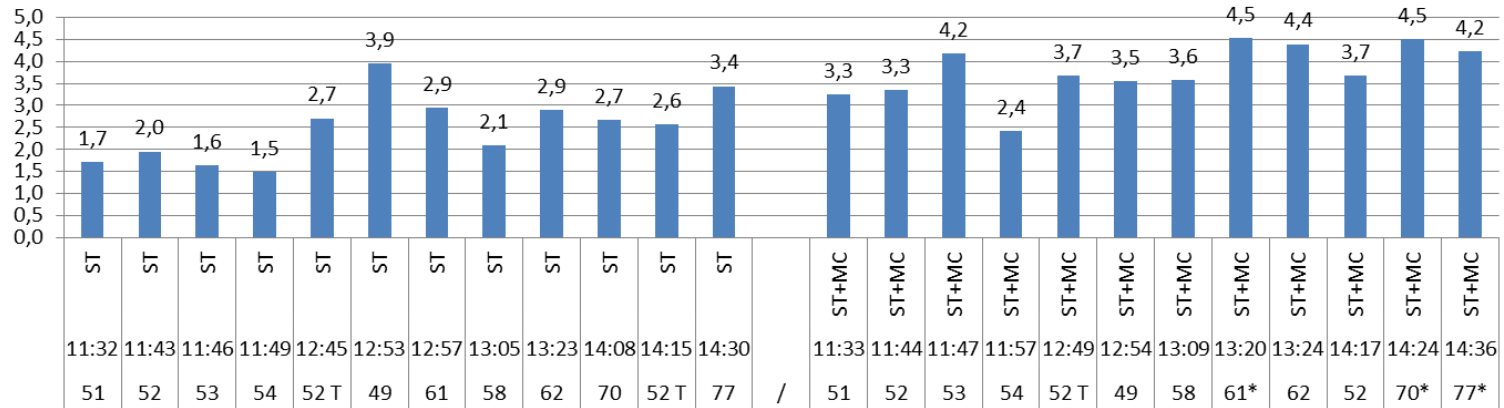


ST= Lake Stechlin ; MC = Microcystis; measurement on 14.03.2012

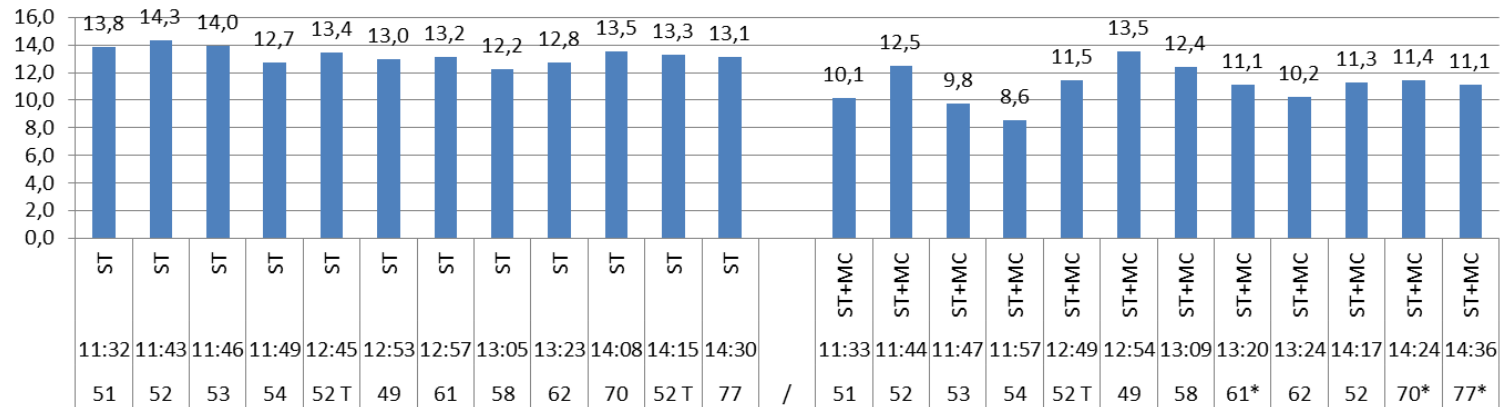
-> Scattering in all parameters not accepted



Green Algae

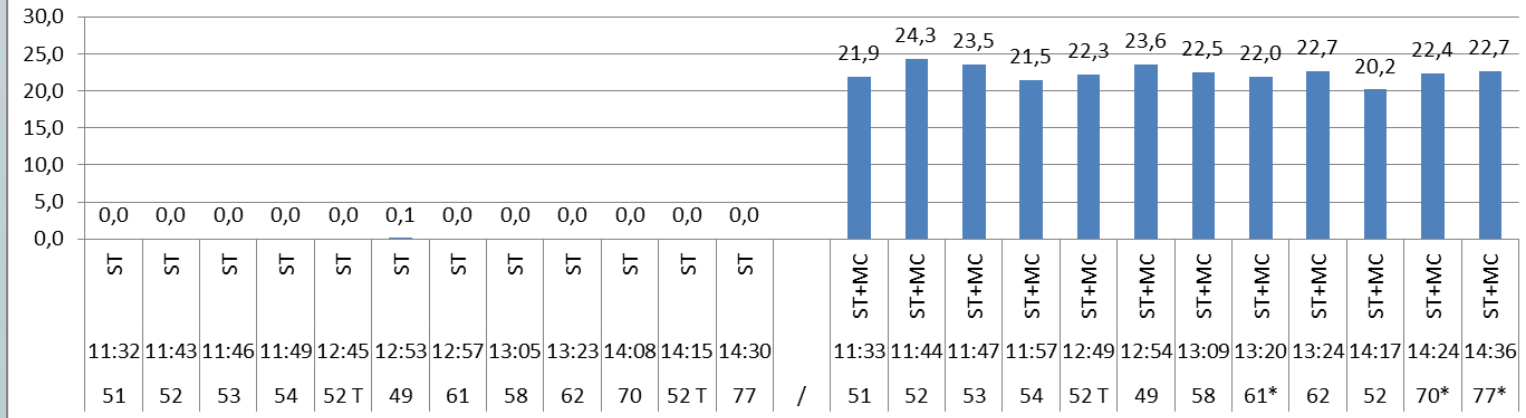


Diatoms

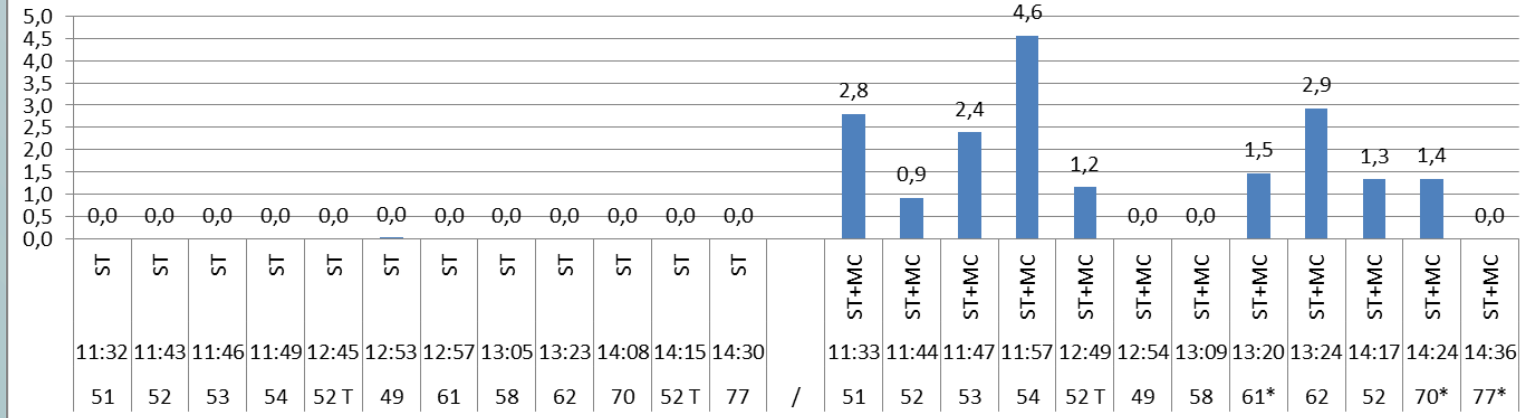




Bluegreen



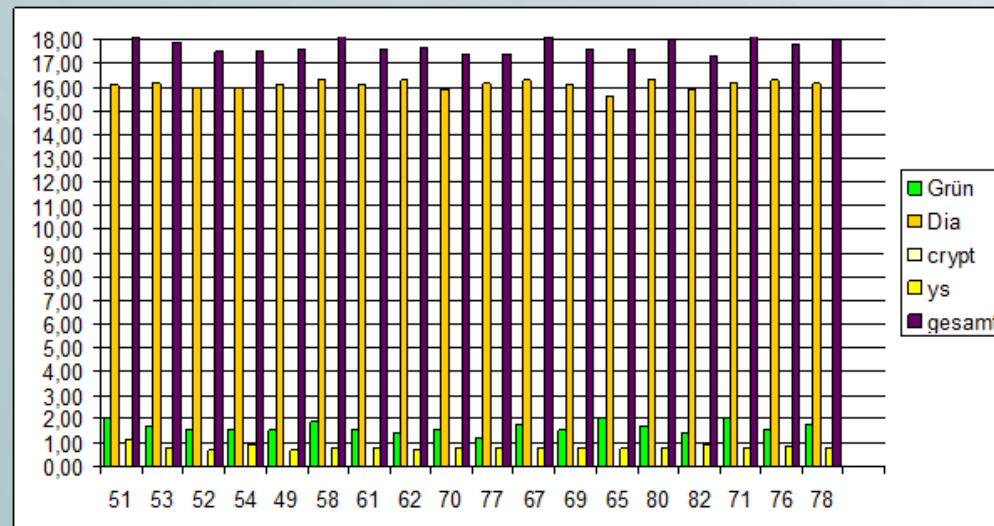
Cryptophyta





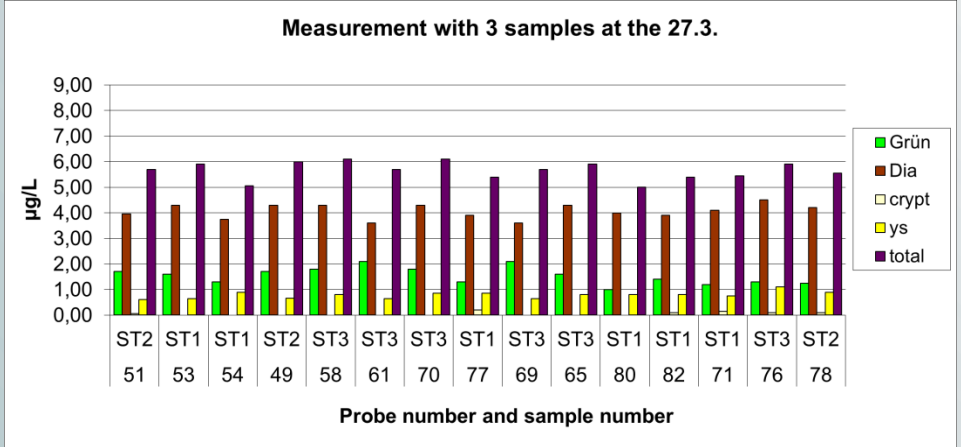
First steps for better evaluation:

- Determine the offset with bi-distilled water
- Filtrate (0.2-0.45 μm) sample water and re-calibrate the offset for yellow substances
- Re-scale the fingerprints

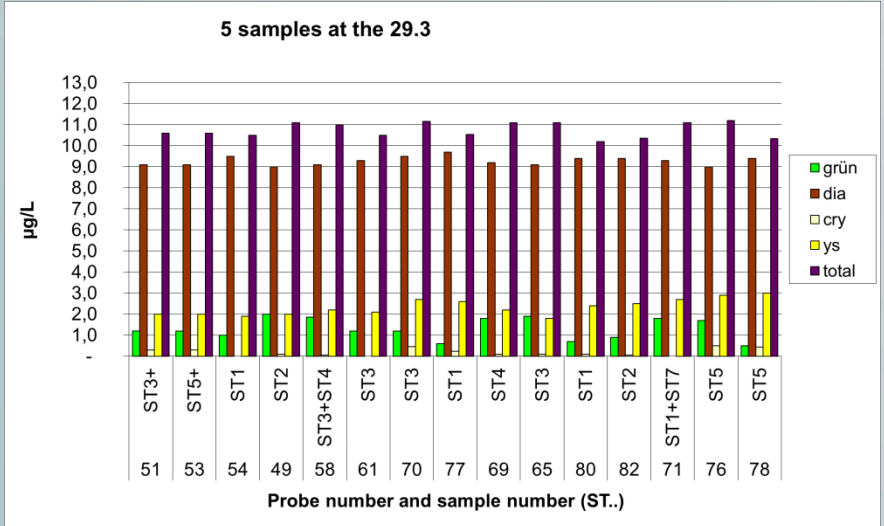


Looks good...
But is it the truth?

..only if the
settings/fingerprints
are valid for other
concentrations and
distributions as well

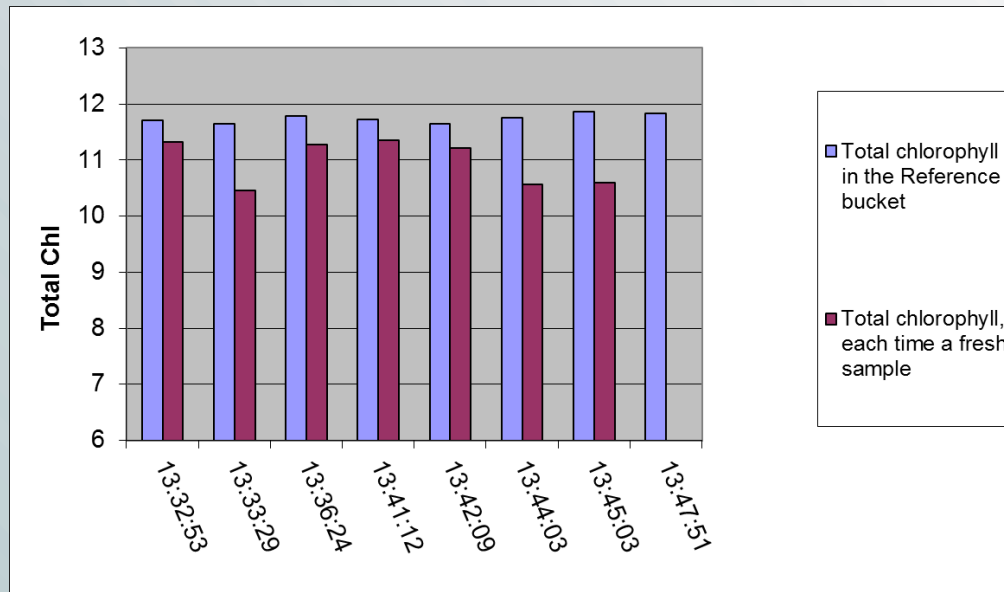


Different concentrations on March 27 and March 29:



- Still some scattering:**
- ‘Induction Kinetics’ considered, keep the probe moving
 - Also, a warm probe in cold water can produce air bubbles: move the probe

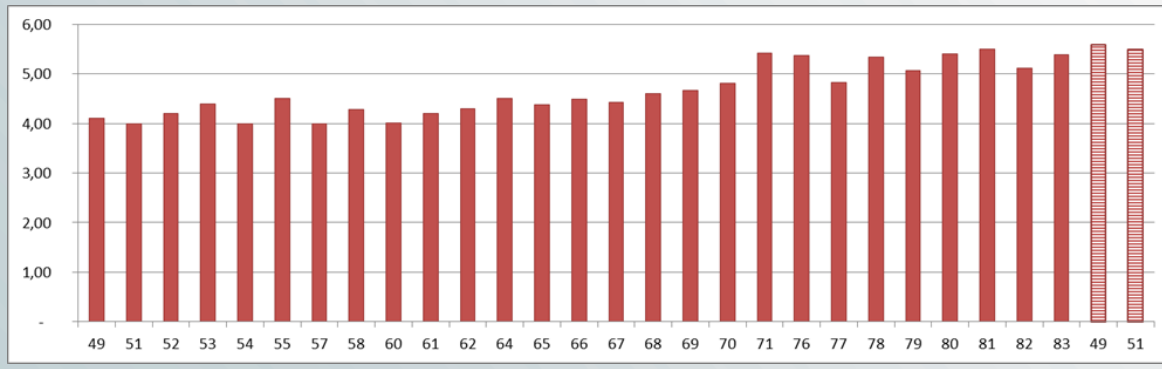
Does the sampling influence the results?



Probes were alternately submersed in a reference bucket, always containing the same sample, and a bucket with samples which were exchanged before each measurement.

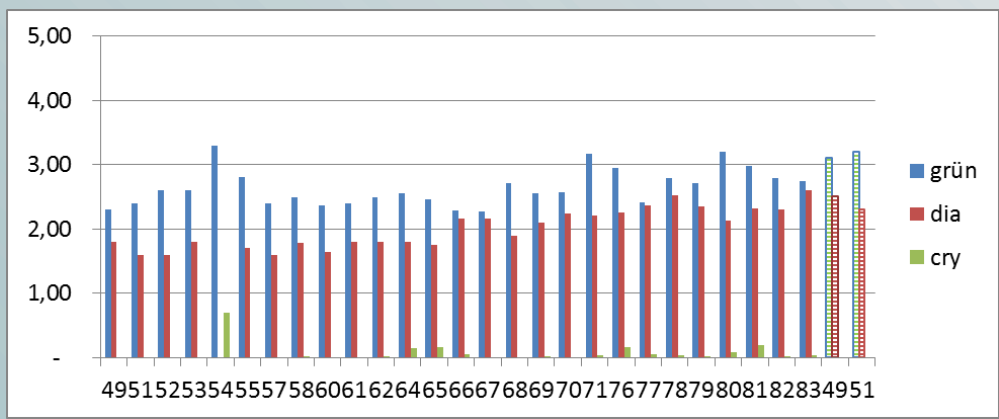
-> sampling is a strong issue

All measurements in one large bucket !?

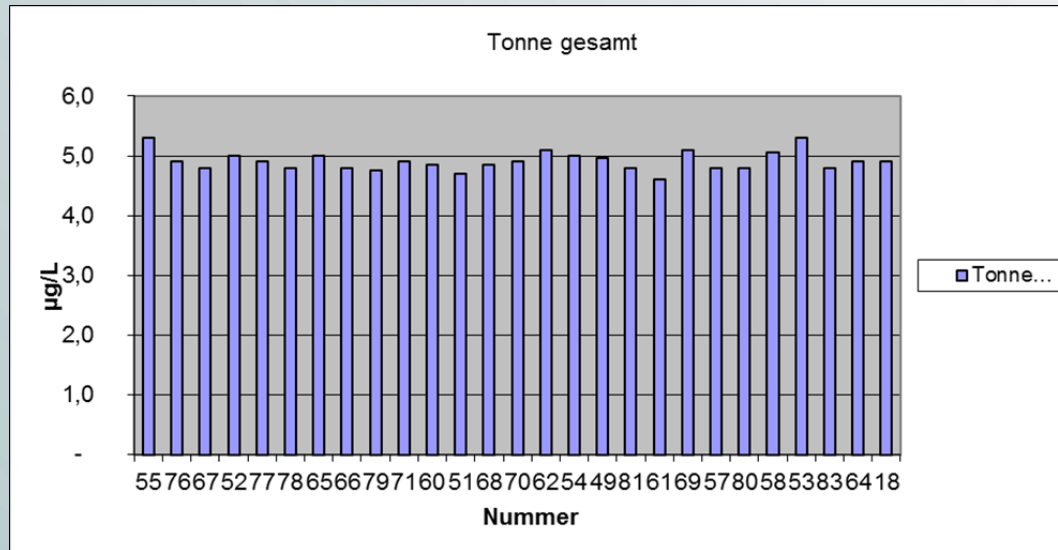


Total chlorophyll of a measurement on May 2.
The measurements with the probes 49 and 51 were repeated at the end

-> 28 measurements tend to consume too much time, the algae physiology changes and the results differ

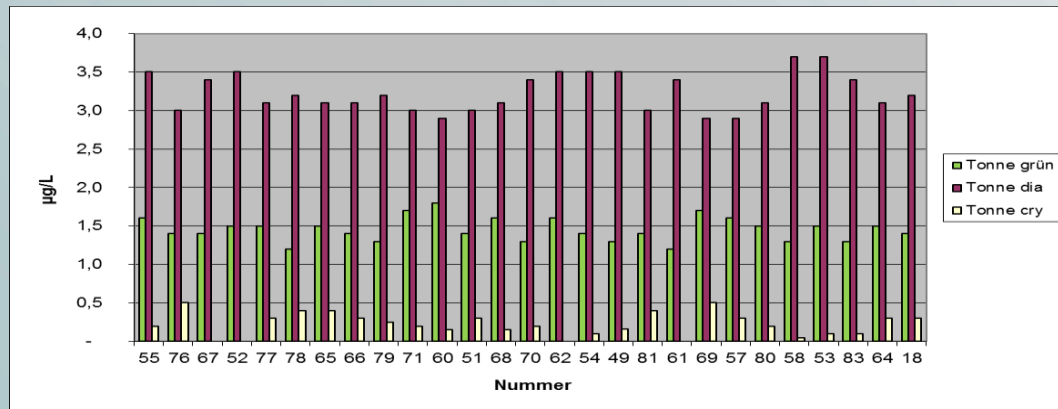


Interesting aspect:
diatoms seem to be most affected.
Possible reasons:
light changes, temperature changes

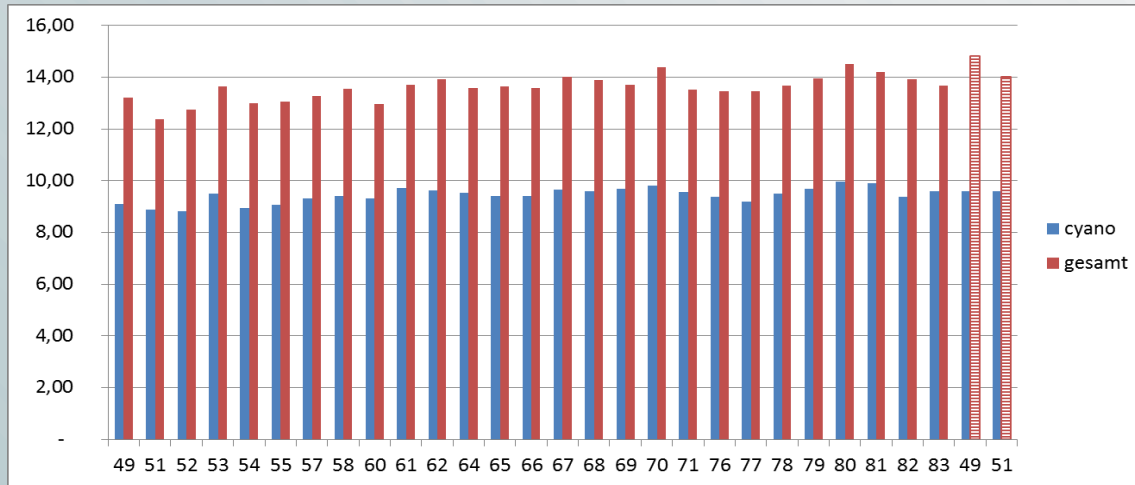


Measurement in a large bucket on April 24

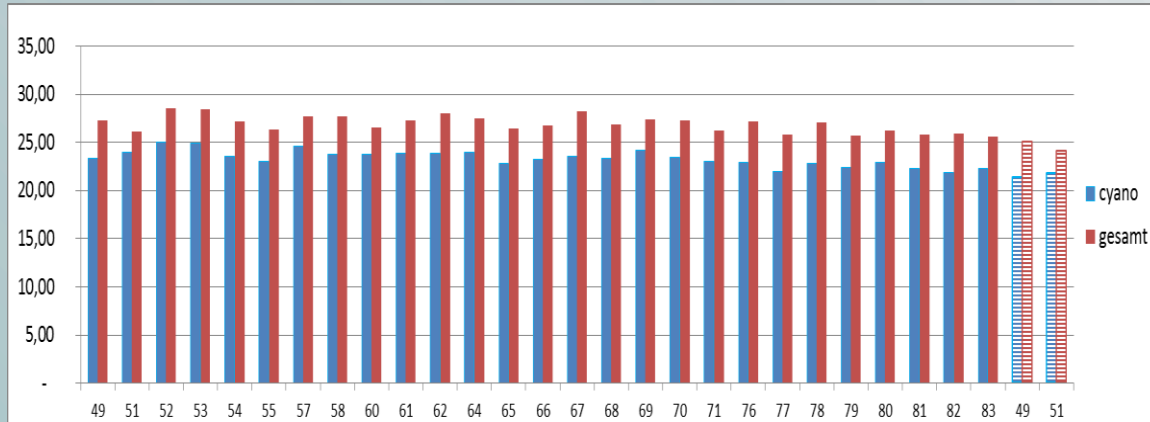
...so far , so good...



Is the variance in the algae class distribution an incorrect calibration or physiology?



Spike test of the sample on May 2, additional 9µg/L cyanobacteria



Spike test of the sample on May 2, additional 21µg/L cyanobacteria

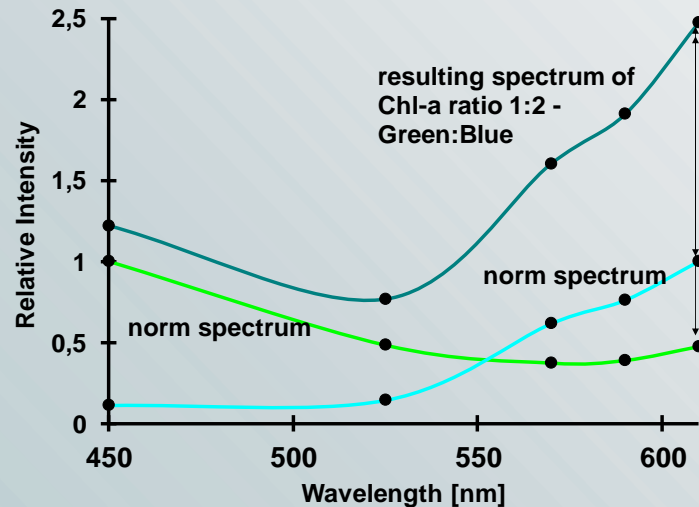
....physiology....

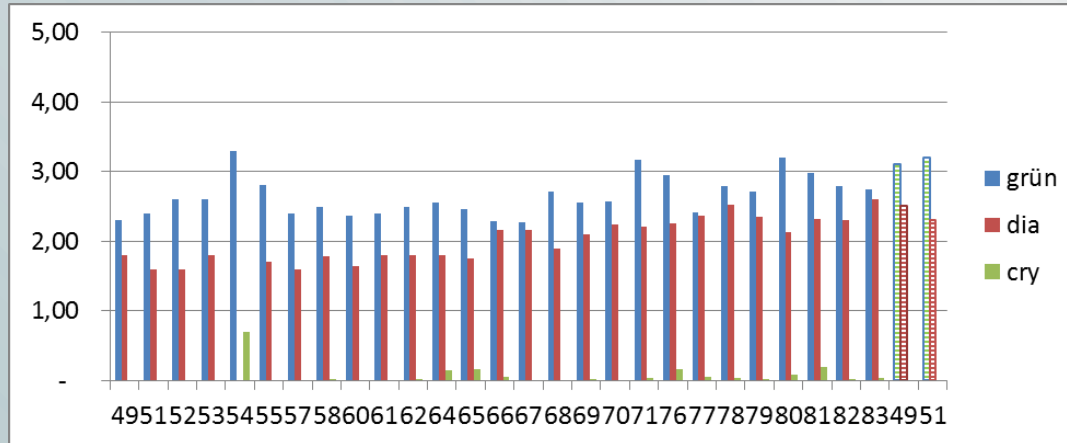


**Spike tests have their own difficulties:
cultured algae will be shocked by sample water due to
changes in temperature, osmotic pressure etc.**

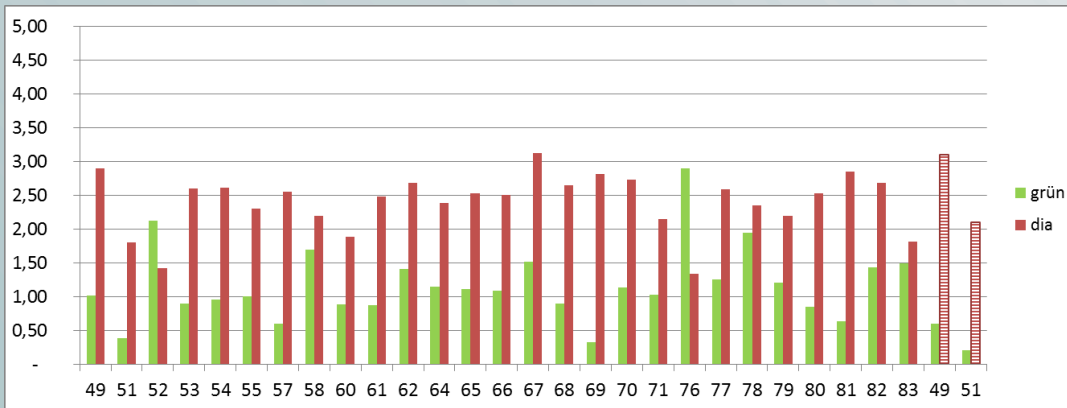
**This can induce drifts, oscillations and changes in
fingerprints**

**Example using bbe++:
Cyanobacteria fingerprint
changes**





Spike test of the sample of May 2, additional 9 µg/L cyanobacteria, residual algae classes



Spike test of the sample of May 2, additional 21 µg/L cyanobacteria, residual algae classes

There are natural limits for the resolution depending on the maximum concentration



It appears that the lowest class scatters the most. This can be up to 5% of the total concentration, resulting in a broad scattering of the class of minimum concentration.

In the case discussed below, the total concentration is about 27µg/L, the lowest class - the green algae - scatter up to 1µg/L, which is about 4%.



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moldaenke

Many Thanks for your Attention