

# Pros and cons of the SOOP-approach

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# What SOOP data represents: reality vs. our hopes

- Ferrybox-proposal:
  - "data sets provide a comprehensive source for assessment of long-term trends and aid in the development of models"
  - "data will enormously improve the **ability to resolve temporal and spatial variability**"
- Things to notice about the spatiotemporal coverage of SOOP-data

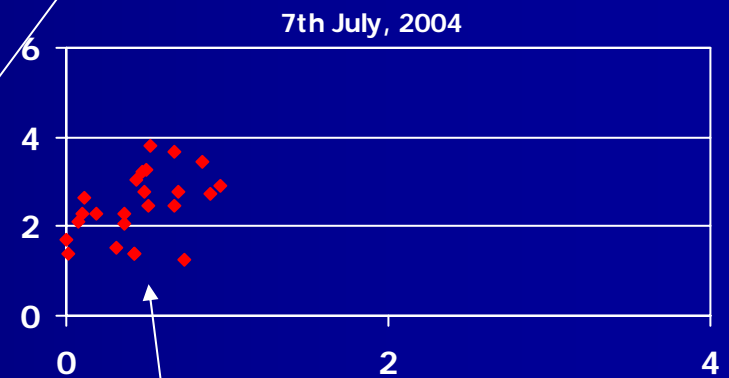
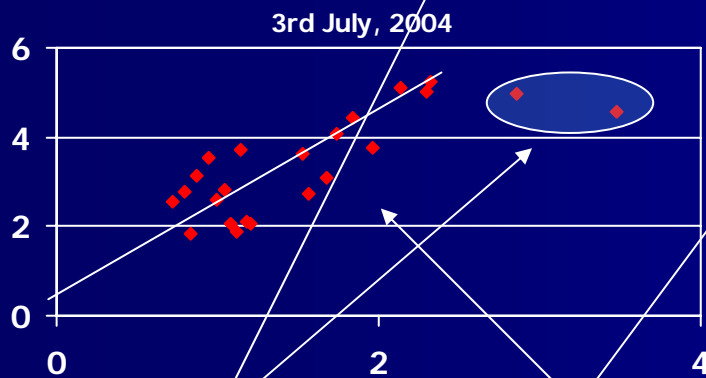
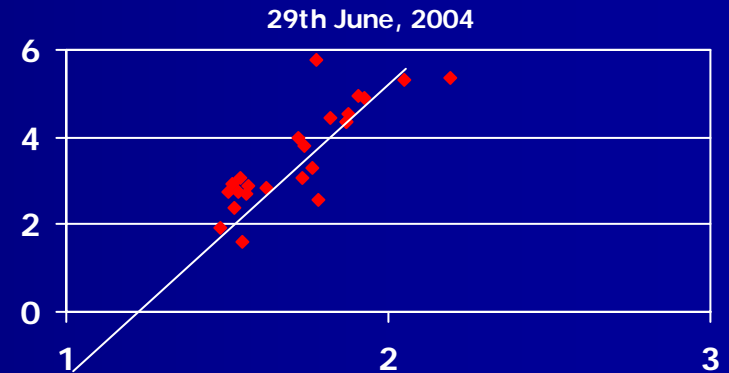
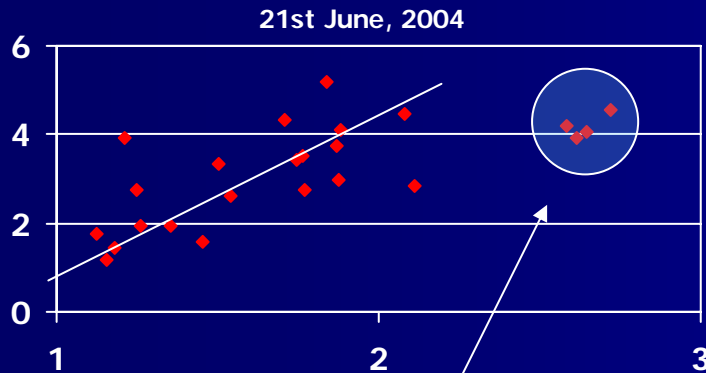
dimension	+	-
spatial	<p>dense sampling grid →uncomparable data coverage</p> <p>unchangeable sampling line → good basis for areal/temporal comparisons</p>	<p>line sampling in nature →how describes the status of the sea area around the SOOP line (1 nm, 10 nm) →does NOT represent the status of the basin (remote sensing)</p>
temporal	<p>dense sampling grid →uncomparable data coverage</p>	-
vertical	<p>unchangeable measuring depth →good basis for areal/temporal comparisons</p>	<p>always in the surface layer →does not represent the whole water column →does not always represent the whole surface water mass either (cyanobacterial surface scums, deep Chl maxima) the ship's hull displace the surface waters →the actual depth the waters originate is unknown</p>
bottle samples	<p>dense sampling grid →good basis for areal/temporal comparisons</p>	<p>point sampling in nature →represents only a limited part (&lt; 1 nm) of the line</p>

parameter	-	+	what do do
all parameters	<p>have a temporal lag of minutes between sampling and measurement (hull pools, pipings, bubbling chambers)</p> <p>→usually neglected</p>	<p>usually the same</p> <p>usually neglected</p>	<p>the assessment of this lag is recommended (scientific purposes)</p> <p>→installation of flow meters into the system (if possible)</p>
temperature	<p>rises inside the ship's hull</p> <p>→depends on the water temperature</p>	<p>depends on the water temperature</p>	<p>placing an additional sensor as close to the inlet as possible</p> <p>isolation of pipings</p>
Chl <i>a</i>	<p><i>in vivo</i> fluorescence / Chl <i>a</i> ratio is very variable in nature</p>	<p>everyone knows this</p>	<p>needs careful calibration (more later)</p>
	<p>does not truthfully represent the biomass of cyanophytes, as compared to eukaryotic groups</p>		<p>installation of phycocyanin fluoroprobe into the system (630/660nm)</p>
Detection of cyanophytes	<p>narrow surface scums may be left undetected</p>	<p>only late-summer</p> <p>only after long (&gt;3-5 d) calm periods</p>	<p>How the ship's hull steer the water flow?</p> <p>Water intake near the bow of the ship(?)</p>

# Calibration of Chl *a*

- The relevance of all the SOOP-data correlates straightly with the success in calibration
- Especially *in vivo* fluorescence / Chl *a* ratio should be addressed as often as possible
  - every time the bottle samples are taken

# Reality in fluorescence vs. Chl *a* calibration



Outliers

Varying responses

Messed-up data

# FIMR's way

Advantage: finding out if any of the variability in the fluorescence / Chl relationship is due to technical matters  
→assessment of systematic errors!!

	Instrument calibration	Response calibration
Why	Check the consistency in the instrument's function	Check the fluorescence / Chl ratio of the algal community
How	Solid state standards	Bottle samples
When	During maintenance in port	In the lab
How often	Every two weeks	Every time the bottle samples are taken (1 to 2 weeks)
What we get	The fluorescence yield corresponding 1 or 2 pre-set Chl <i>a</i> values	Dependence between Chl <i>a</i> and <i>in vivo</i> fluorescence (Chl = a + b × fluor)

# FIMR's way

- FIMR's Alg@base-project kicked off in August
  - the requirement of comprehensive view over the response calibration from the past 12 yr
  - getting rid of possible discontinuities / sources of error in the Chl *a* data
    - exclude outliers
    - re-visit varying responses
    - exclude bad data
- For final Q/C purposes:
  - the time interval between the consecutive resulting linear regression models is 1 to 2 weeks
  - the interval will be changed to 1 day by interpolating linear regression models over time
  - result: a unique regression model for each day → annual Chl *a* data is recalculated
- Calibration process is a matter of opinion, and very subjective
  - for the sake of continuity of data, one person does the work

# Money needed....

- The initial investments for an institute having an own lab to get the system running: **50 k€**
  - The ship-level equipment
  - Lab supplies etc. consumables
  - Data processing (PC, software etc.)
- To complement the system: **50 k€ more**
  - Taxonomy (microscopes and software etc.)
  - Q/C-system (additional personnel)
  - Web-publishing tools etc.
- To finalise the system **50 k€ more**
  - GUI-based database



Product / investment ratio is good

Running the system relatively cheap

The system is unattended

Uncomparable data source by its sampling frequency

Easy to expand with additional sensors → extensive data flow



...still quite expensive to launch

...if you can carry out all the measurements by yourself (especially taxonomic services very expensive)

...but needs continuous attention (4 manmonths for maintenance and data management)

...but only the area in the very vicinity of the SOOP-line (remote sensing)

...as long as the calibration is kept in mind

## A SOOP-paradox

**SOOP-line provides you  
monitoring data, but  
requires a scientific approach**

Thank you!