Experience from calibration of standard bio-optical sensors

Kai Sørensen^{1,3}, Anna W. Wranne², Louise Valestrand³, Lena Viktorsson⁴ and Bengt Karlson⁴.

¹⁾OceanObs AS, Norway, ²⁾Voice of the Ocean - VoTo, Sweden, ³⁾Norwegian Institute for Water Research -NIVA and ⁴⁾Swedish Meteorological and Hydrological Institute – SMHI.



Sensor data from different platforms should be comparable



Chlorophyll-a, Chlorophyll-a_Fluoresence and phytoplankton from Inner Oslofjord 2015



Kai Sørensen

SMHI

OceanObs AS Norway > TO N/V

Field samples for yealy delayed mode calibration used for coastal ships in the national monitoring programs

Six years of data studying the seasonal and diurnal variation of the Chl-a_fl relative to Chl-a in Skagerrak waters



Measurements of fDOM as proxy for cDOM are important in coastal darkening studies



Extreme flooding event i autumn 2023 in Norway. More coastal darkening and change of light quality and quantity for plankton and macroalgae.



The calibration should optimal have been in absorption unit (a440, 1/m), but the fDOM/a440 varies along the coast due to the origin of the organic material. Thi has to be some kind of delayed mode calculation

Classical calibration of standard bio-optical sensors



Work in progress for the Phycocyanin.



Secondary standards and temperature effects



Decrease in secondary standard value in order of 10-15 % over approx. 10 Deg.C





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Use control card for the Secondary Standards and control/measure the temperature carefully



Calibration of Wetlabs Chl-a_Fl and PC_Fl sensors

Algae	Strain ID in NORRCA	Origin	Pigments
Skeletonema pseudocostatum	NIVA-BAC 1	Oslo fjord, 1962	Chl-a, Chl-c
Dunaliella tertiolecta	NIVA-CHL 26	EPA, Corvallis, USA, 1977	Chl-a, Chl-b
Rhodomonas baltica	NIVA-5/91	Unknown	Chl-a, Phycoerytrin
Aphanizomenon flos-aquae	NIVA-CYA 704	Stechlinsee, Germany 2008	Chl-a, Phycocyanin
Nodularia spumigena	K-1353	Øresund /Helsingør, Denmark	Chl-a, Phycocyanin, Phycoerythrin
Synechococcus sp	UIO 012	Oslo fjord, 1989	Chl-a, Phycocyanin, Phycoerythrin

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Chlorophyll-a fluorescence - Wetlabs FLNTUR SN 2587 vs Chlorophyll-a



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Phycocyanin fluorescence Wetlab FLPCS SN 2570



in the order of a few micrograms/liter ⁹



Work in progress to solve the issues of turbidity effects

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Take home message

- Calibration using todays most common SOP are challenging to perform for remote platform (Ferryboxes).
- Use of field samples gives the best data for monitoring for Water Framework Directive and should be used with a delayed mode QC.
- Real time data with lower QC level can be acceptable for modellers and forcasting.
- For Chl-a fl/Chl-a ratio one can expect diurnal variation of a factor 2 and a factor 3 on seasonal basis. Except during events or areas with cyanobacteria which teoretically the ratio can vary up to a approximatly a factor 10.
- Still severe issues to solve for some optical sensor of the standard parameteres.
- Use of secondary standards can support sensors controls in the field, but care should be taken on temperaure effects, aligments due to geometri and stability of the standards.
- Its very important for the FB community that we «solve» the issues with calibration and come up with SOP to get good enough data for monitoring programs. Important to secure future funding.

