



Enhancing the traceability of fluorometer measurements; report from project MINKE including Metrology Workshop on Monday 30.9.2024

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Metrology for Integrated Marine Management and Knowledge-Transfer Network - MINKE

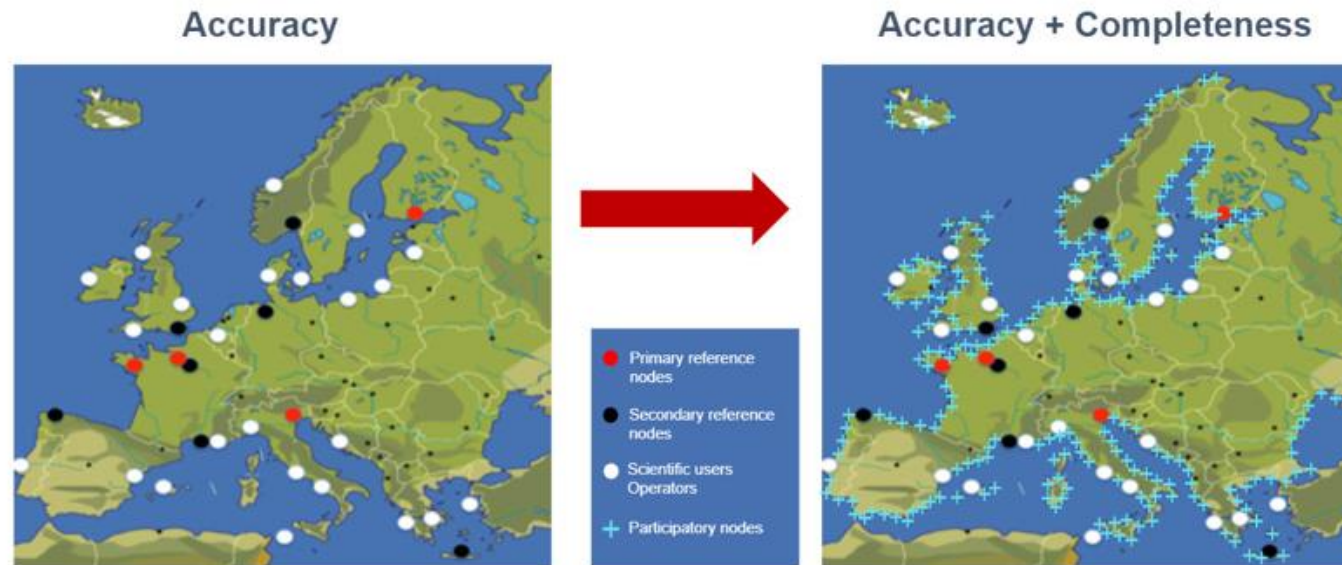
MINKE is an INFRAIA project (2021-2025) that brings together marine observing community and metrology institutes

- to coordinate the use and development of marine metrology infrastructures
- to propose a new vision in the design of marine monitoring networks, integrating two dimensions of data quality, namely accuracy and completeness, as the driving components of quality in data acquisition.
- one theme of joint research activities “Enhancing the traceability of fluorometer measurements”



MINKE Vision

1. The selection of few 'key' points for regular monitoring, prioritising the use of top-level instrumentation to maximise the measurements' accuracy.
2. The attempt to cover all the potential points of measurement, with the implicit use of low-cost observational systems, maximising the completeness of the dataset.



MINKE Stakeholder and user analyses

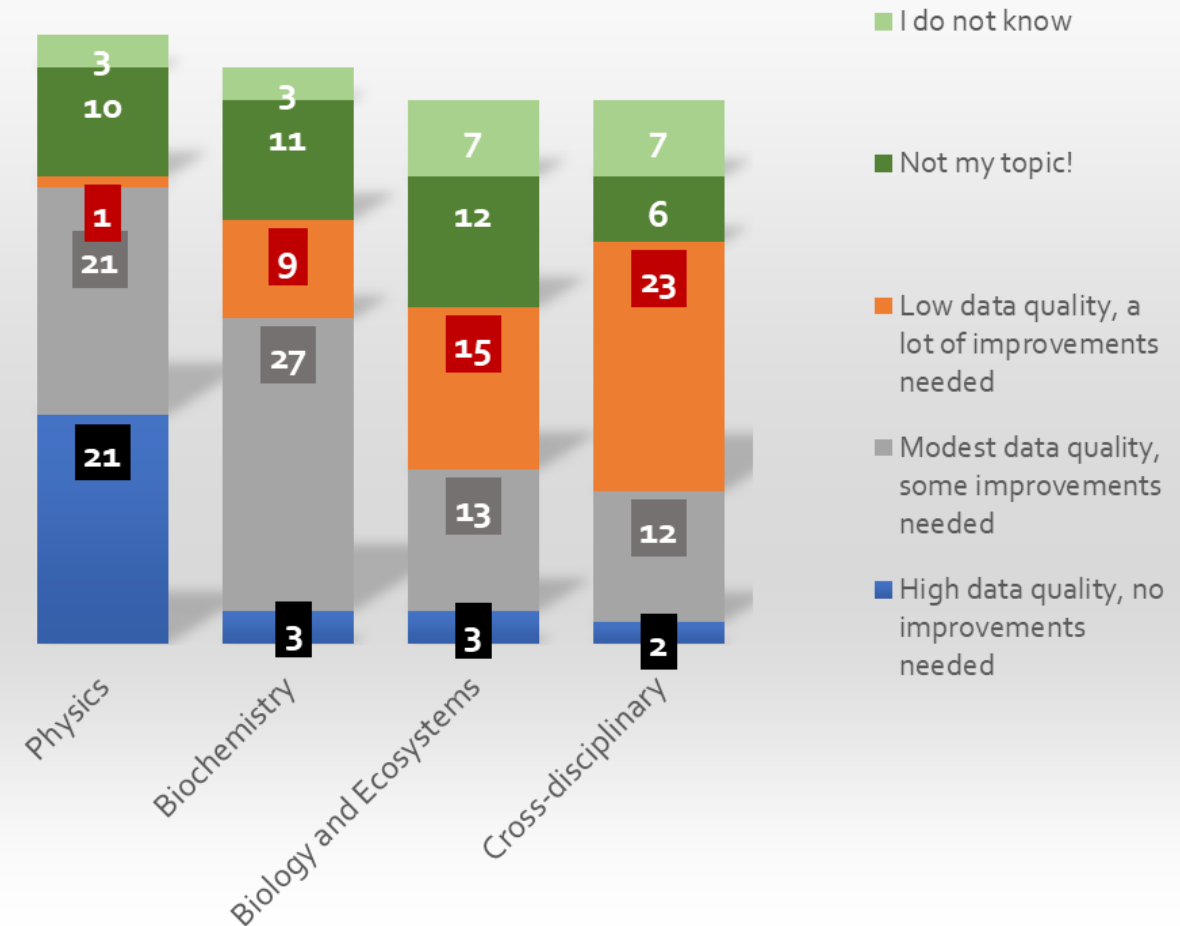
What are the needs and requirements of marine observing stakeholders for marine metrology network – online questionnaire, responded by 57 experts

Analysis of the availability and reliability of contemporary marine observations

The reliability and availability of Physics EOVs is much better than those of Biochemistry, Biology and Ecosystems and Cross-disciplinary EOVs, clearly calling for more attention for these latter groups.



For various EOVs, how would you scale the need of improving the reliability of contemporary marine observations for your needs.

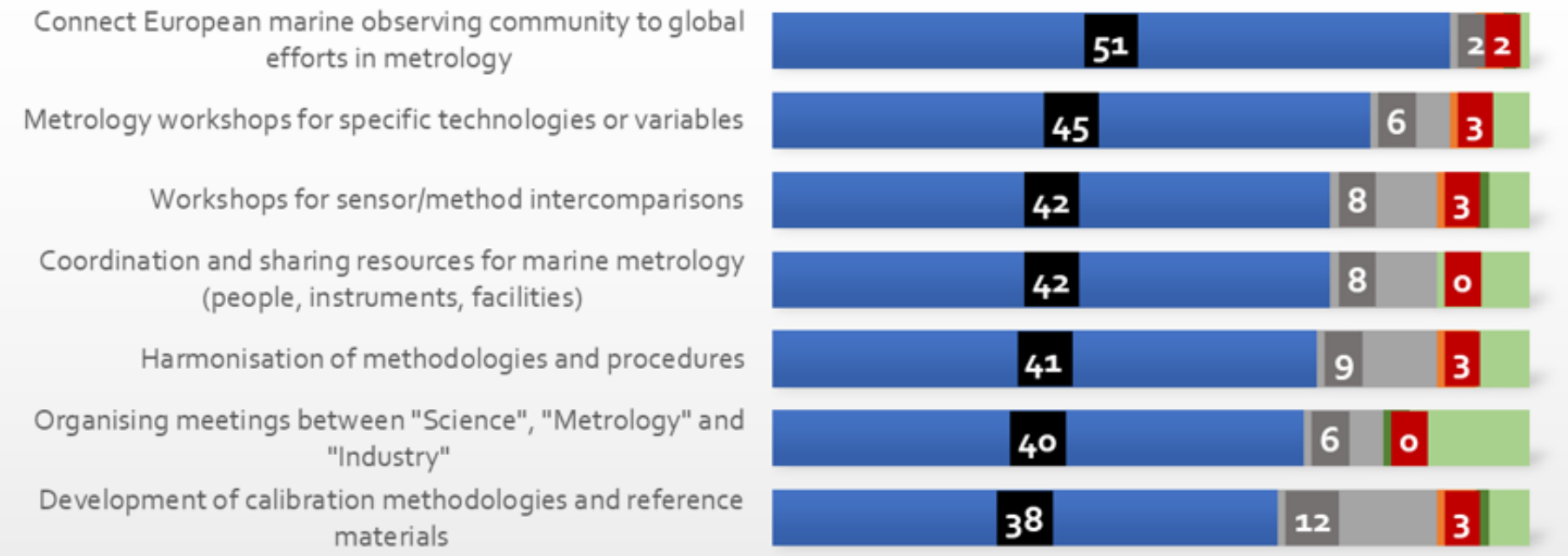


MINKE Stakeholder and user analyses

Services and products expected from MINKE

Needs for overall coordination of marine metrology was noted, as well connecting between science, metrology and industry. Works towards harmonization of methods and coordination of metrology resources was noted important as well.

What metrology-related services and products should MINKE deliver to the marine communities.



MINKE consortium D1.2 (2024)

Analysis of metrological requirements of stakeholders and users

Jukka Seppälä, Rajesh Nair, George Petihakis, Florence Salvetat, Andrew King, Paola Fisicaro, and Susan Hartman

MINKE work for Enhancement of traceability of fluorometer calibration

MINKE consortium D9.3 (2024)

Enhancement of traceability of fluorometer calibration

Jukka Seppälä, Sara Pensieri, Roberto Bozzano, Constantin Frangoulis, Ioannis Tsakalakis, Kai Sørensen, Louise Valestrand, Andrew King, Joëlle Salaün, Marine Laloux, Petri Maunula, Noora Haavisto, Elsa Lescroart, Pasi Ylöstalo, Michail Pipinis Troupakis

Main findings and recommendations

- It is evident that on a concept level the value of primary calibration of fluorometric sensors is not fully acknowledged in the marine observing communities.
- It is expected that initiatives like MINKE could act as a driving force in bringing together the marine research and metrology communities and manufacturers to find a common solution for traceable fluorometer calibration.
- More extensive research on the benefits, problems and fine details of different calibration methods is needed.
- Institutes and researchers should openly be ready to change their measurement methods if it turns out that there are better solutions available to replace the methods used.
- In addition to commitment, training is needed to ensure information transfer.



MINKE Workshops for early career scientists and technicians

“An introduction to metrology for young and early career marine scientists”.

15 to 17 November 2022 in Helsinki, Finland

“An introduction to measurement uncertainty for young and early career marine scientists”.

25 to 27 September 2023 in Torino, Italy

“Improvements in fluorometer measurements”

“Improving the quality of plankton imaging”

30 September and 3 October, in Helsinki, Finland



MINKE Workshops for early career scientists and technicians

“Improvements in fluorometer measurements”

“Improving the quality of plankton imaging”

30 September and 3 October, in Helsinki, Finland

Both Workshops have approx. 35 participants, roughly 10 have their travel/accommodation covered by MINKE

Aims

- to facilitate improvements in quality of biological measurements specifically for FerryBox applications
- Raise the metrology-awareness of the new generation of FerryBox scientists
- Improve the dialogue between marine science, metrology and sensor manufacturers



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MINKE Workshop “Improvements in fluorometer measurements”

Presentations:

Rajesh Nair, Linking marine measurements with mainstream Metrology in Europe: the MINKE initiative

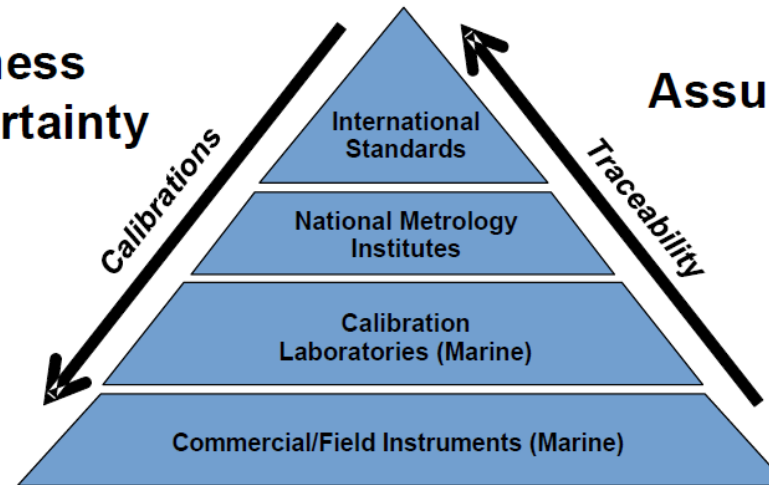
Rajesh Nair, The challenge of integrating metrologically significant information in Ocean Data acquisition, reporting and exchange

“Fitness for purpose” and Ocean Data:

Fundamental dimension #1: Accuracy

The degree to which data are error-free and reliable, from the standpoint of the established mission needs.

**Evaluate trueness
Estimate uncertainty**



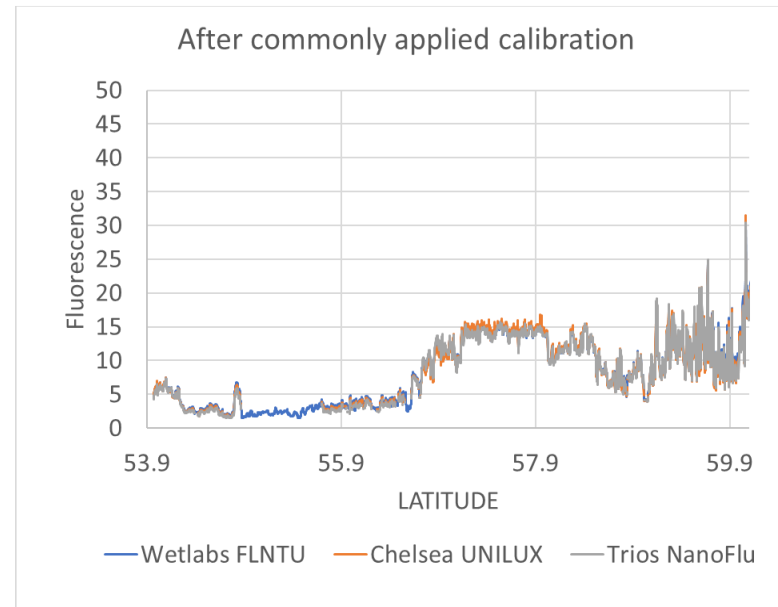
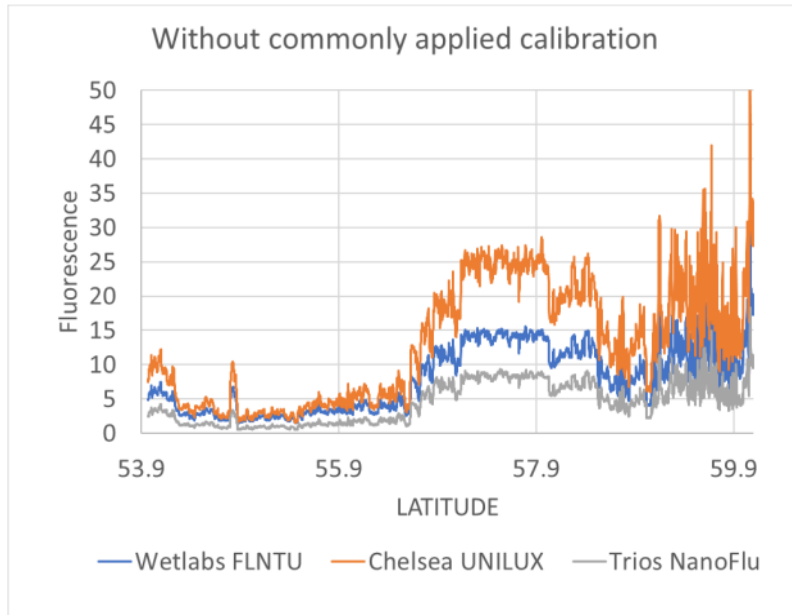
Assure traceability

*The MINKE vision
(<https://minke.eu/>)*

MINKE Workshop “Improvements in fluorometer measurements”

Presentations:

Jukka Seppälä, Chlorophyll fluorescence of living phytoplankton: why chlorophyll fluorescence intensity does not correspond to concentration and why should we care



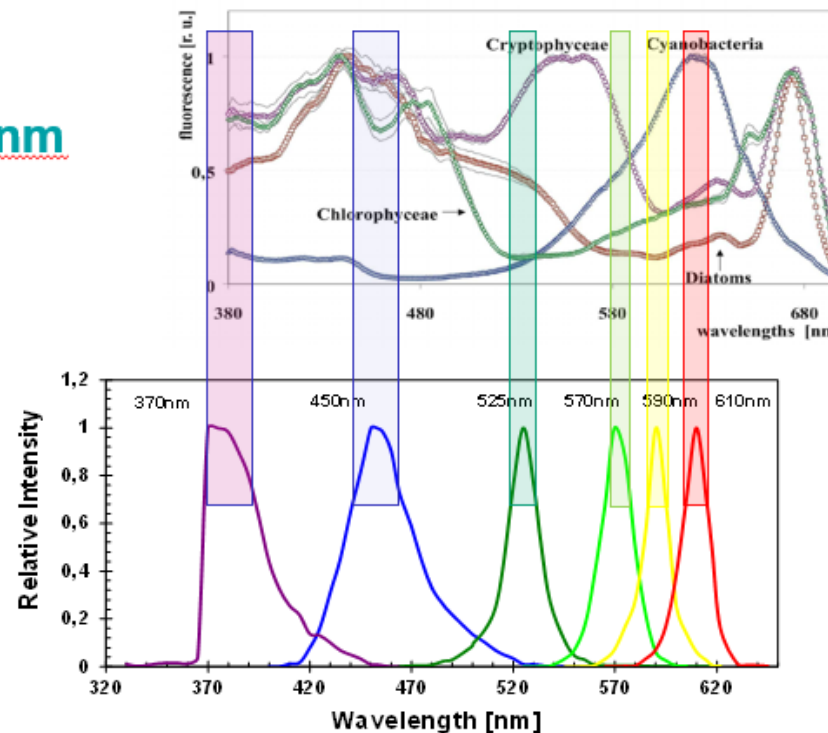
MINKE Workshop “Improvements in fluorometer measurements”

Presentations:

Tobias Boehme, Fluorescence of Algae and Cyanobacteria

Excitation wave length and fluorescence response at 700 nm

Spectra of the LEDs, used in the bbe instruments

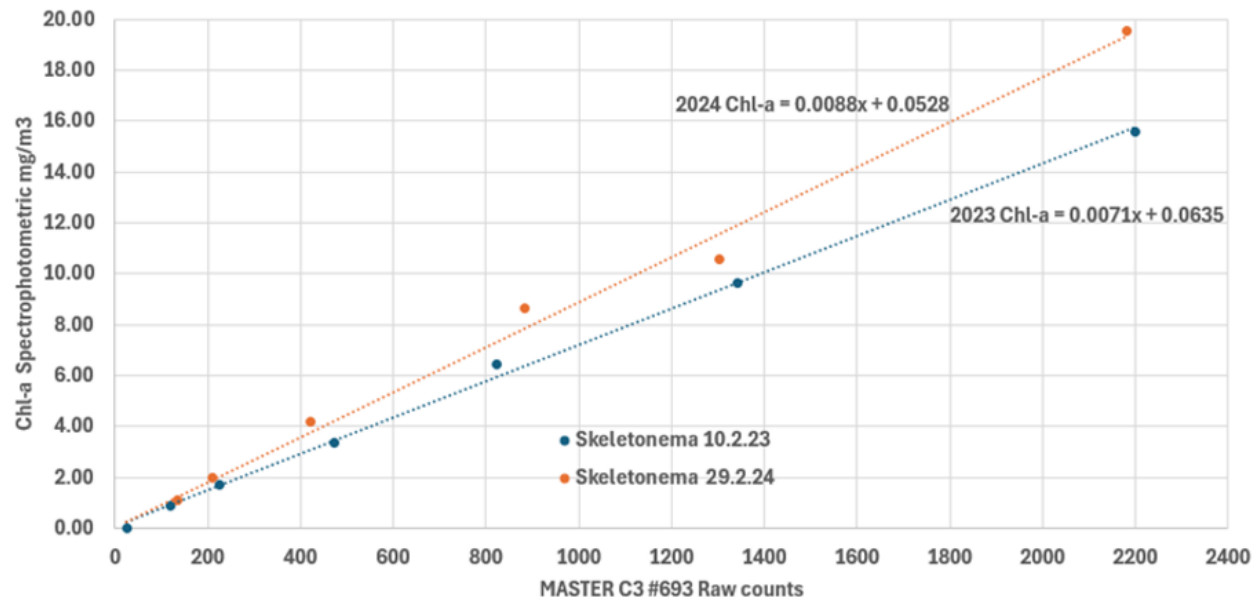


MINKE Workshop “Improvements in fluorometer measurements”

Presentations:

Kai Sørensen, Fluorometer calibration experiments in MINKE

Chl-a F calibration of MASTER with *Skeletonema pseudocostatum*



3 Oct MINKE Workshop “Plankton Imaging”

At hotel Arthur

- 9:00 *Welcome and introduction to the workshop*
Jukka Seppälä, Finnish Environment Institute
- 9:10 *Quality assurance for phytoplankton microscopy in the Finnish Baltic Sea monitoring*
Sirpa Lehtinen, Finnish Environment Institute
- 9:25 *Improving the quality of plankton imaging – Introduction*
Kaisa Kraft, Finnish Environment Institute
- 9:45 Discussion and coffee
- 10:15 *Improving the quality of plankton imaging - Quality Control (with discussions)*
Kaisa Kraft and Lumi Haraguchi, Finnish Environment Institute
- 11:15 *Development of a Data Pipeline for Imaging FlowCytobot Data Integration into the European Digital Twin Ocean*
Anders Torstensson Swedish Meteorological and Hydrological Institute
- 11:30 *Q&A session, Overall discussion, concluding remarks*

KIITOS!



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