JOINT EUROPEAN RESEARCH INFRASTRUCTURE NETWORK FOR COASTAL OBSERVATORIES

Operation and Calibration of Nutrient Sensors

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COMMERCIALLY AVAILABLE NUTRIENT ANALYSER SYSTEA

µMAC-1000

Micromac C

WIZ probe

COMMERCIALLY AVAILABLE CHEM. NUTRIENT ANALYSER ENVIROTECH INSTRUMENTS LLC

AutoLAB

EcoLAB

MicroLAB

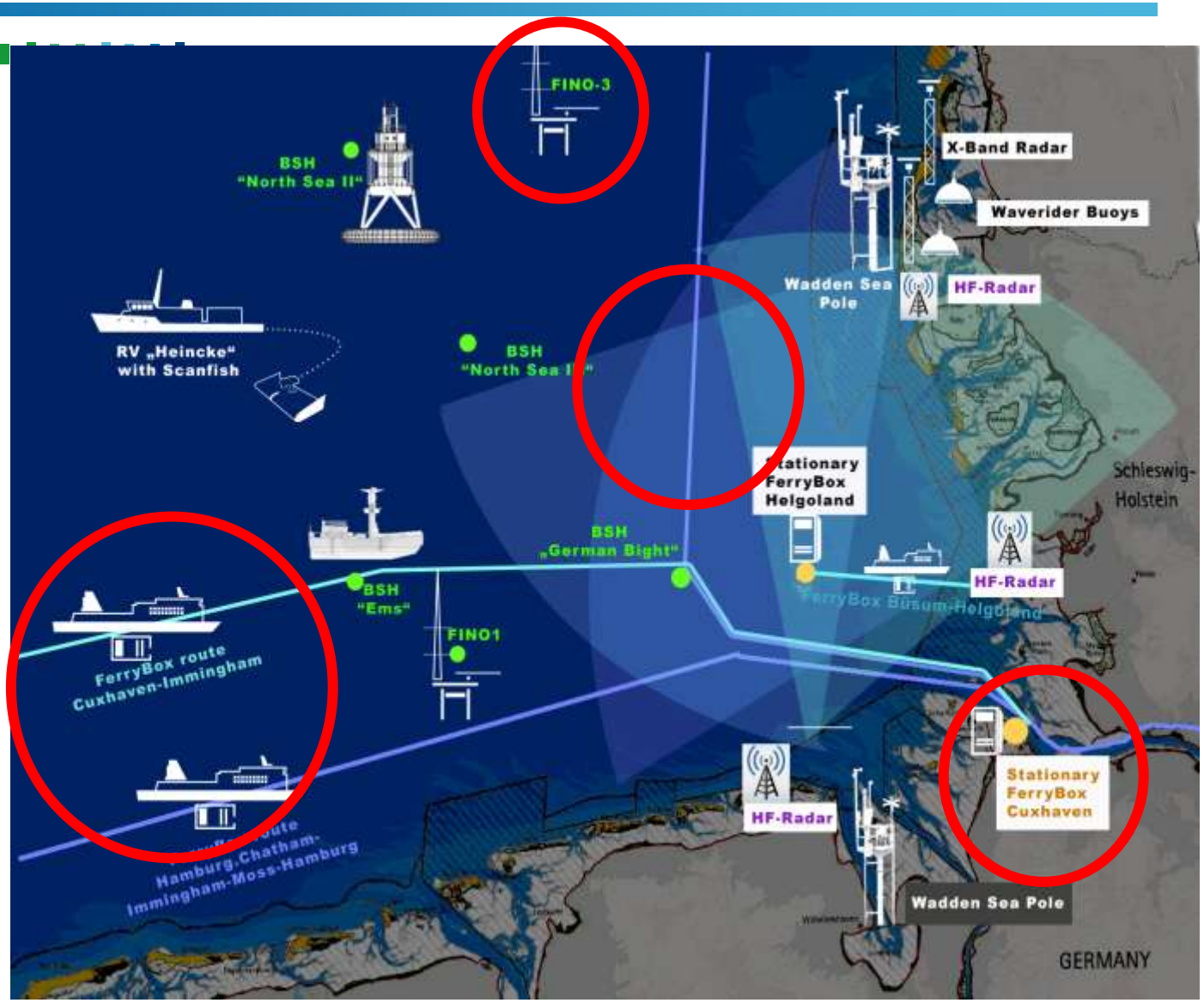
COMMERCIALLY AVAILABLE NUTRIENT ANALYSER WETLABS CYCLE-PO4

Test of Nutrient Analyser by Allliance for Coastal Technologies (www.act-us.info)

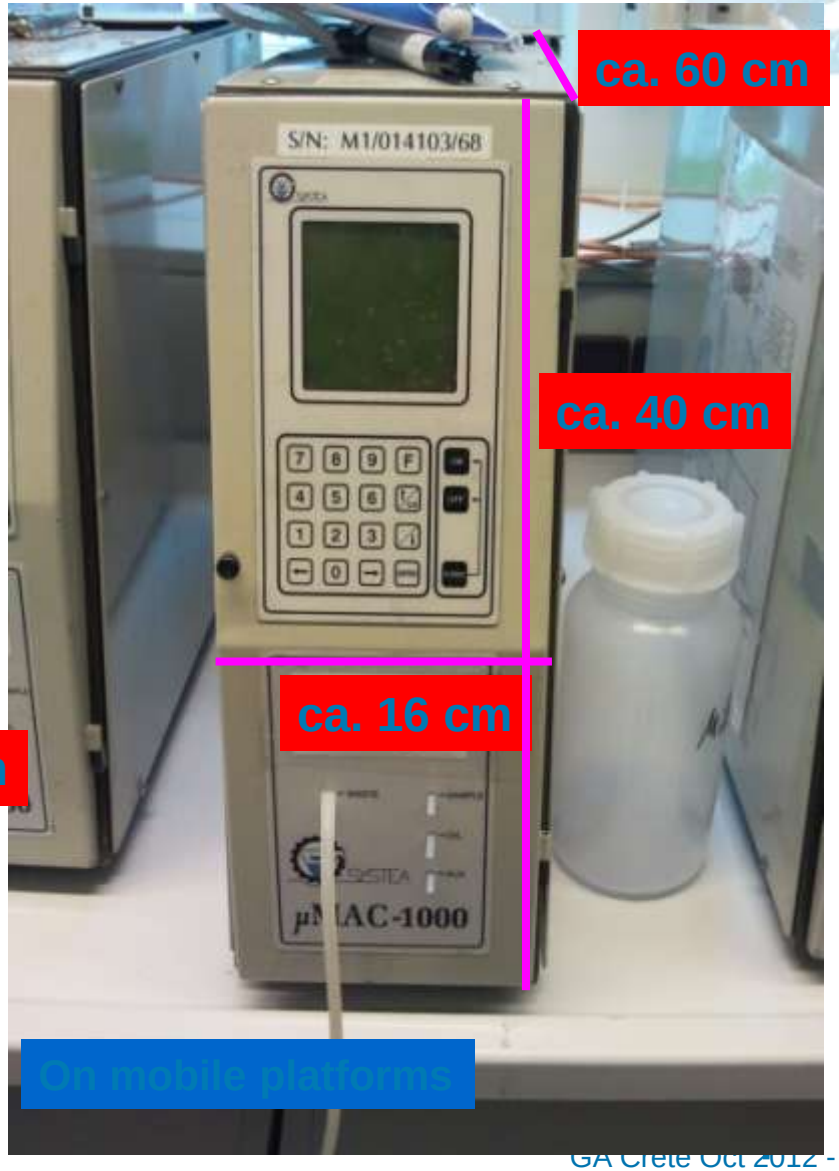
ACT Code	Document Name	File Size
Nutrient	Detailed Testing Protocols used for evaluating the performance of in situ nutrient analyzers are available for download	588k
ACT TD08-01	Performance Demonstration Statement for the American Ecotech NUT 1000	1.1mb
ACT TD08-02	Performance Demonstration Statement for the Satlantic ISUS V3 Nitrate Sensor	2.3mb
ACT TD08-03	Performance Demonstration Statement for the WET Labs Cycle-P Nutrient Analyzer	1.8mb
ACT TD08-04	Performance Demonstration Statement for the YSI 9600 Nitrate Monitor	1.4mb
Needs & Use	Customer Needs and Use Assessments (CNUA) of In Situ Nutrient Sensors 2005	7.3mb
Needs & Use	Customer Needs and Use Assessments (CNUA) of In Situ Nutrient 2 Sensors 2009	3.7mb

Nutrient Analyzer Technical Advisory Committee
Patrick Anderson, University of Wisconsin-Milwaukee; Earle Buckley, North Carolina State University; Lou Codispoti, University of Maryland Center for Environmental Science; Chris D'Elia, University of South Florida; Jan Newton, University of Washington

NUTRIENT MEASUREMENTS AT HZG



TWO DIFFERENT TYPES OF ANALYZERS (SYSTEA™)

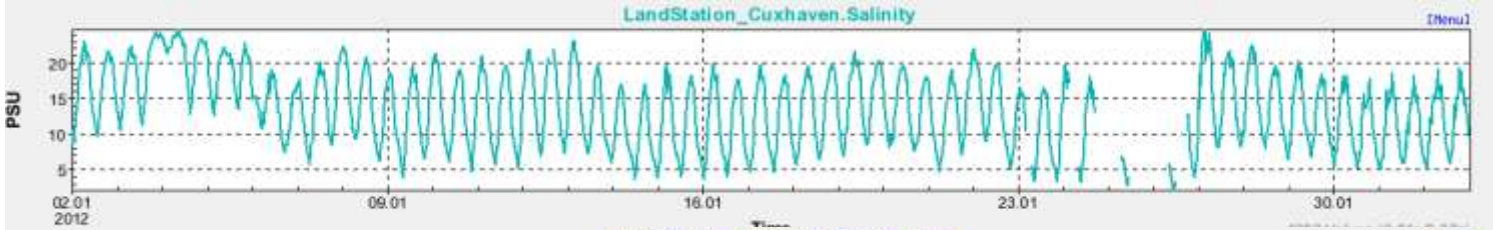


ADVANTAGES VS. DISADVANTAGES

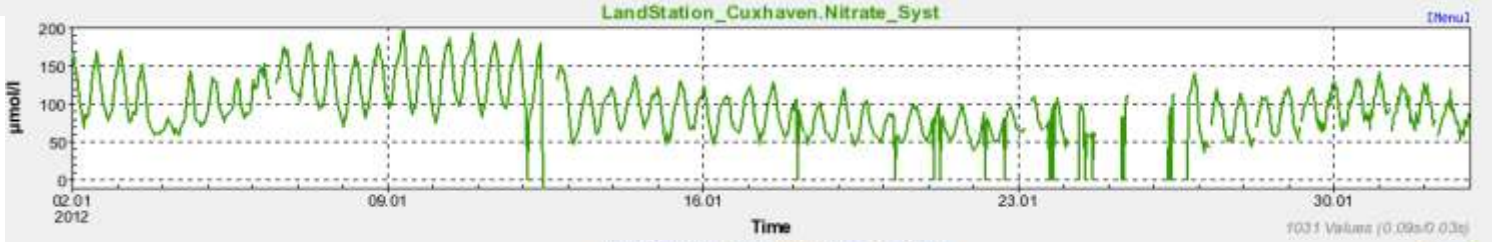
ADVANTAGES VS. DISADVANTAGES

DATA STATION (STATIONARY FB) CUXHAVEN JANUARY 2012

Sal



NO3



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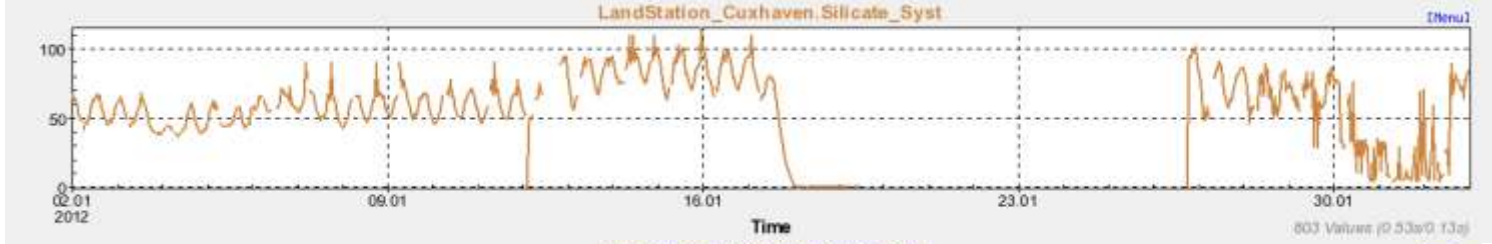

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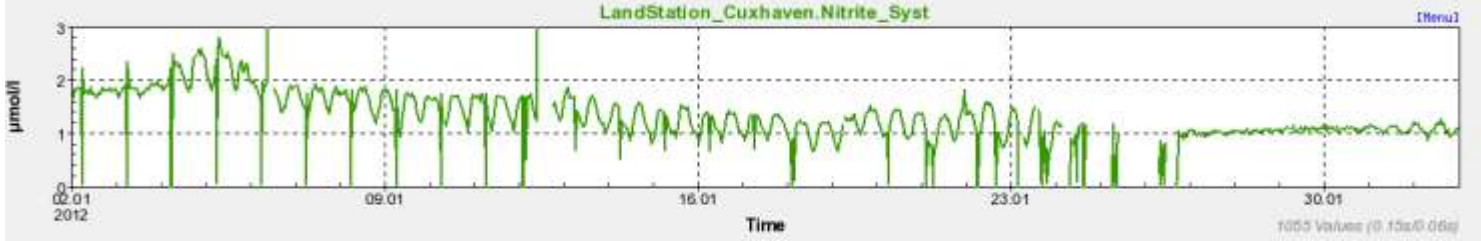
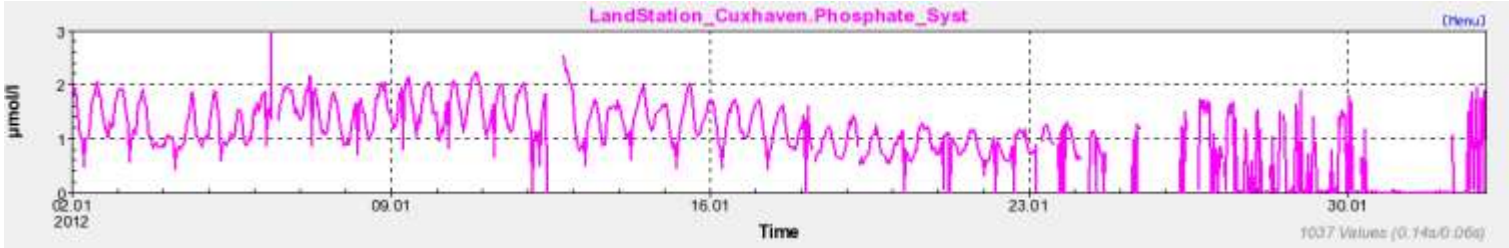


PO4



CALIBRATION OF SYSTEA ANALYSERS

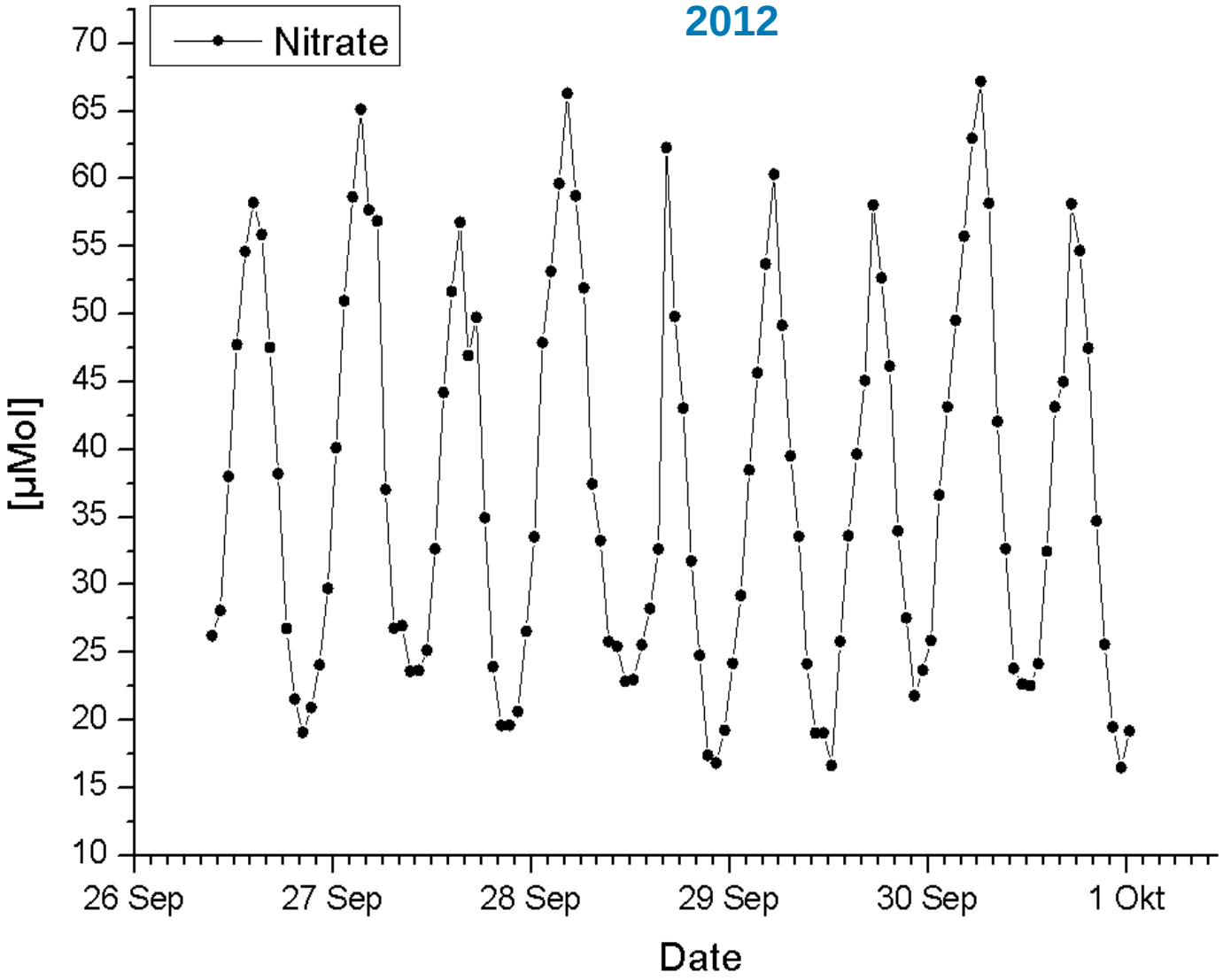
1-point calibration either in the lab or at the station

SPECIAL PROBLEMS FOR NITRATE

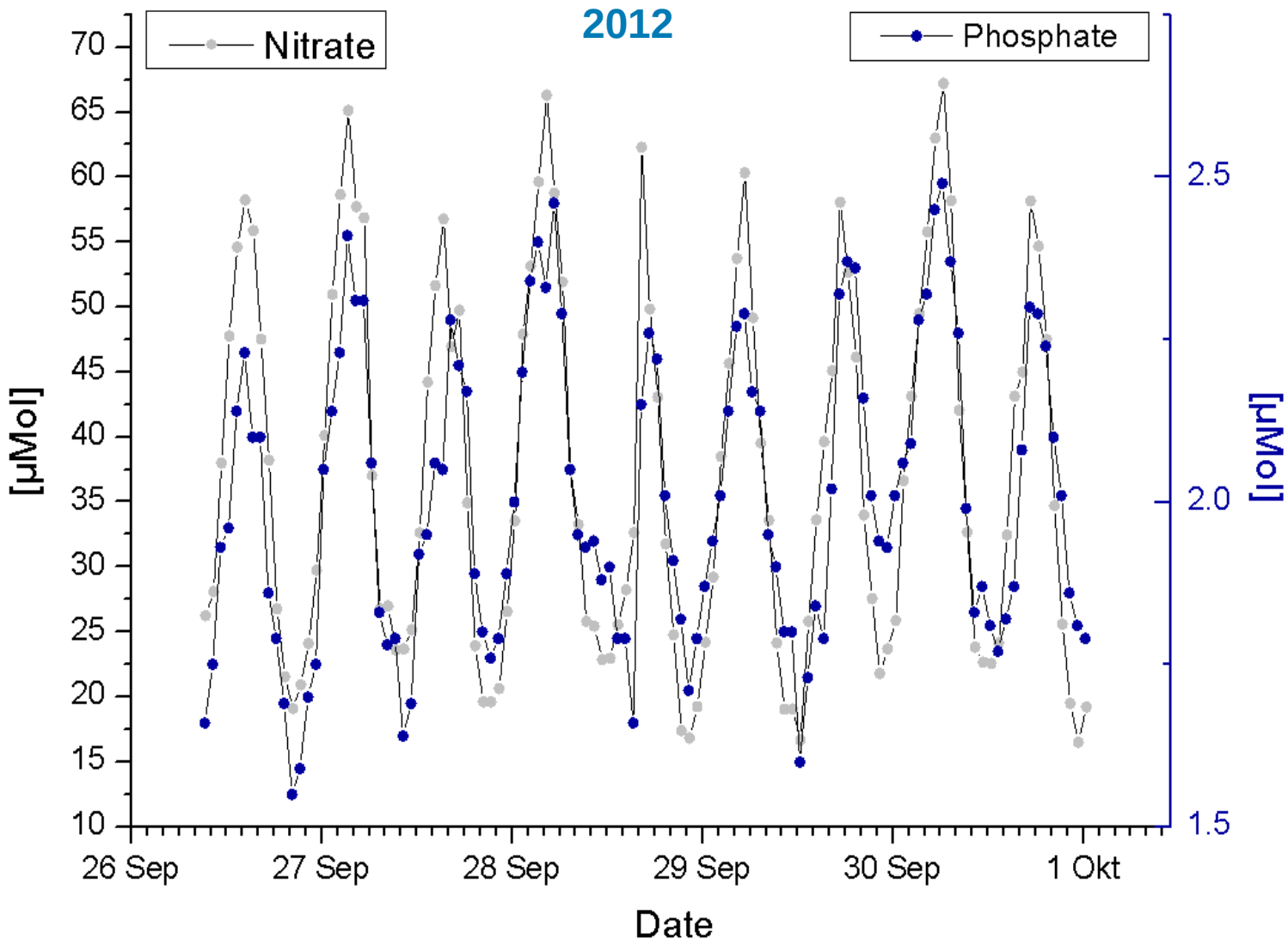
- *NO3 has to be chemically reduced to NO2 either by*
  - *A Cadmium reductor (column of activated Cd granulate material) or*
  - *UV radiation*
- *Issue:*
  - *Reduction yield has to be stable and reproducible (ideally ~100%)*
  - *Reduction has to be stopped at NO2 (problem of UV radiation)*

    NO3 → NO2 → NH3 → N2

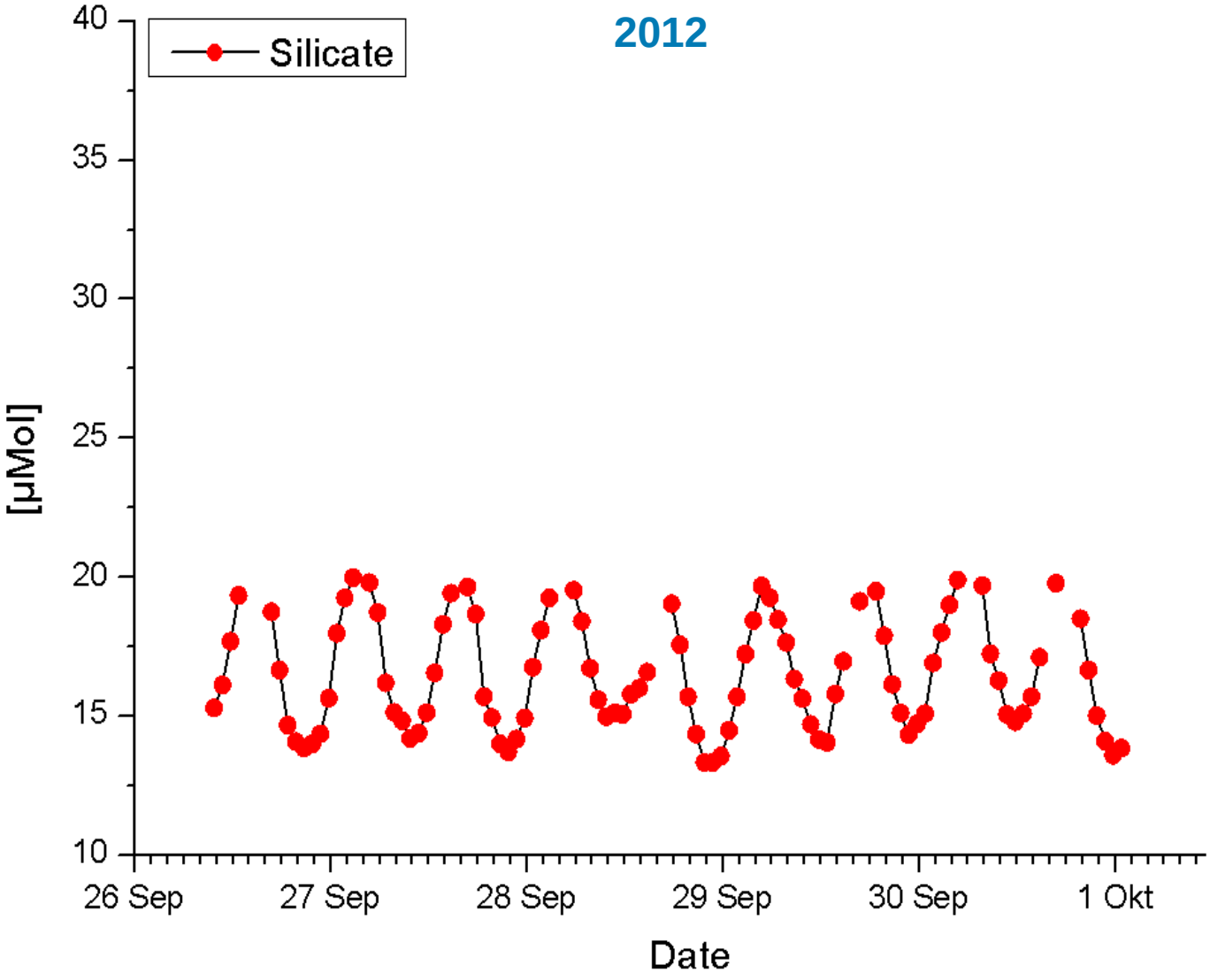
RECENT DATA FROM CUXHAVEN STATION



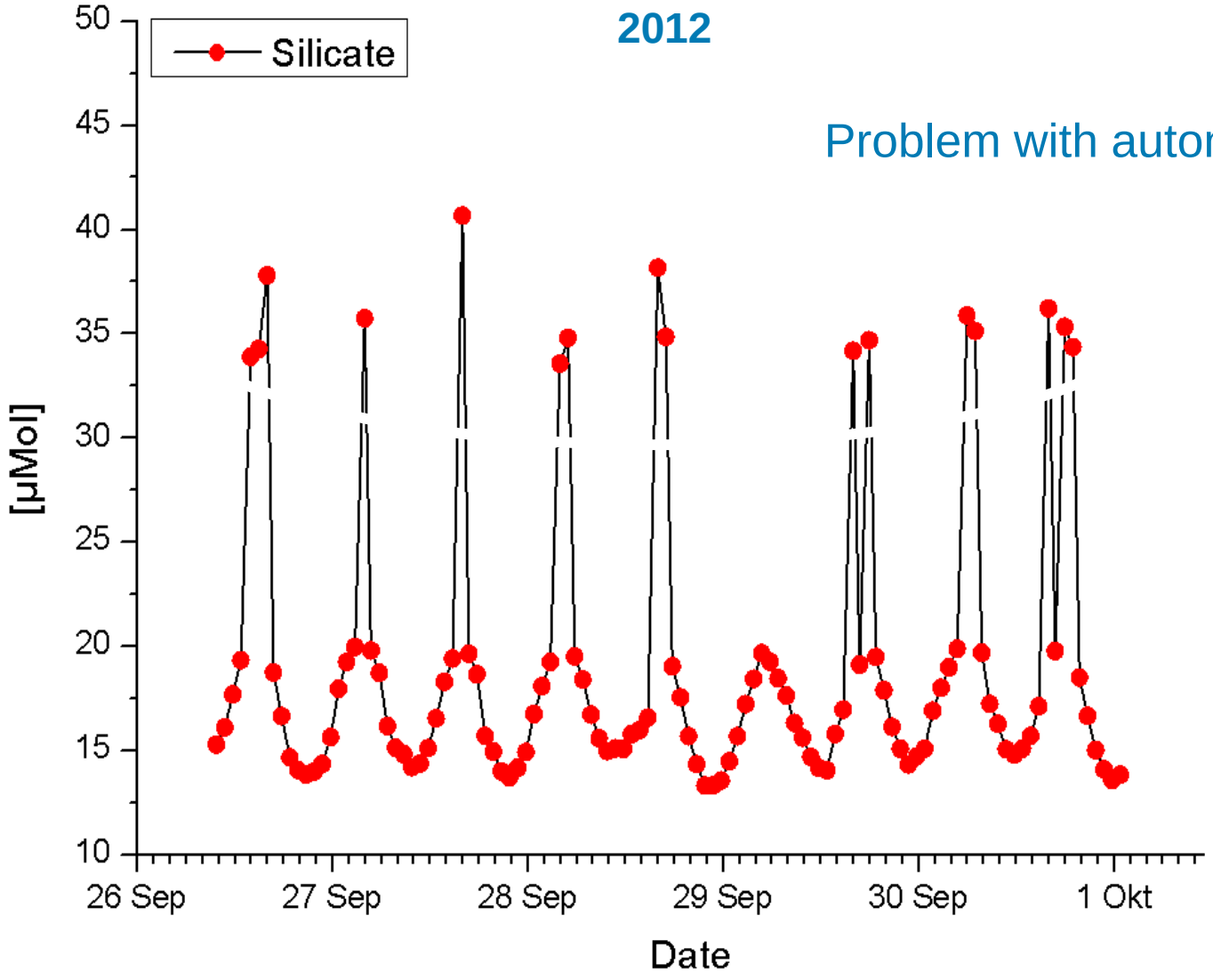
RECENT DATA FROM CUXHAVEN STATION



RECENT DATA FROM CUXHAVEN STATION



RECENT DATA FROM CUXHAVEN STATION



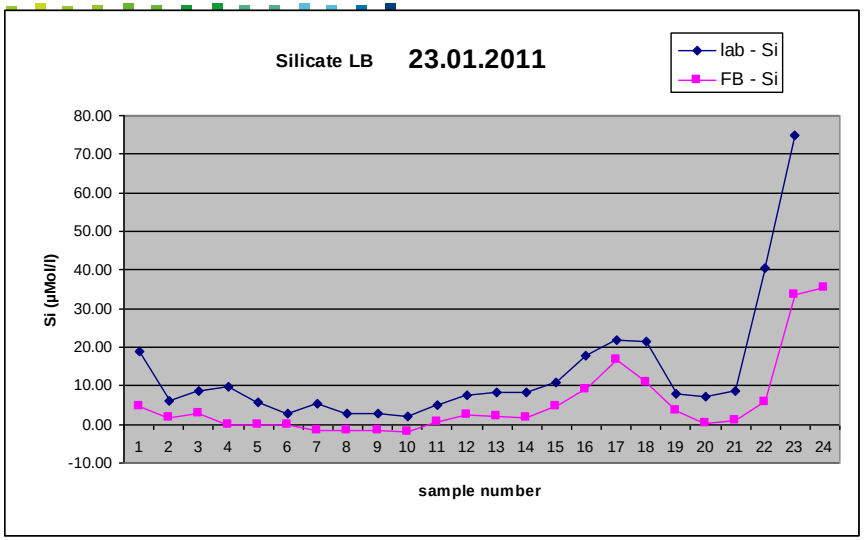
Problem with automatic dilution?

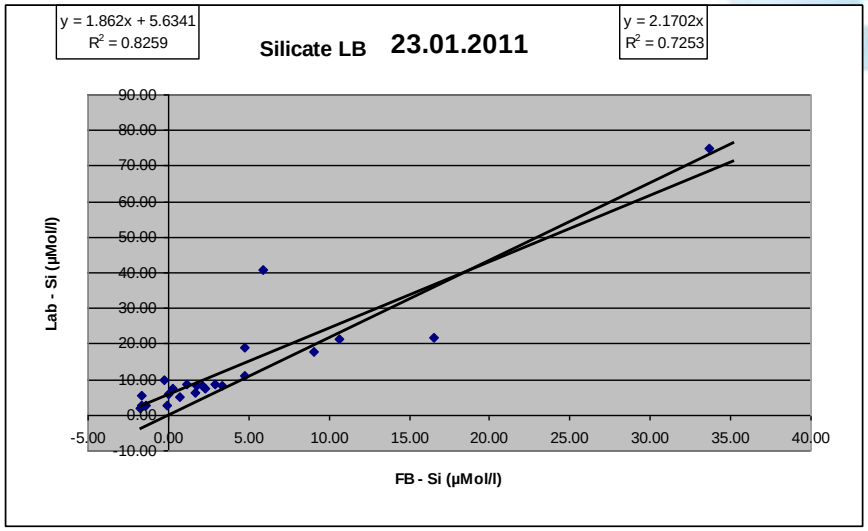
REFERENCE ANALYSIS OF BOTTLE SAMPLES (LAB)

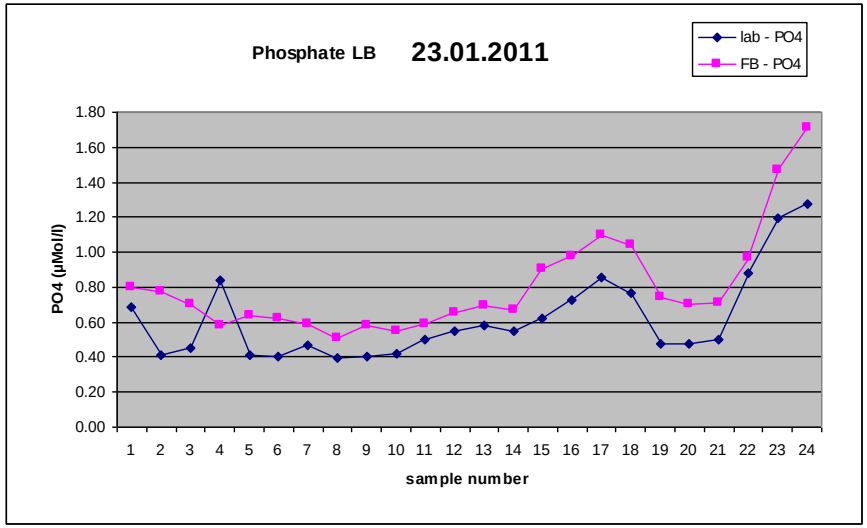
- Automatically sampling by a cooled water sampler
  - position control (FerryBox)
  - time control (Fixed Platform)
- Filtration of the samples in the lab
- Storage at -20°C
- Analysis with an Autoanalyser

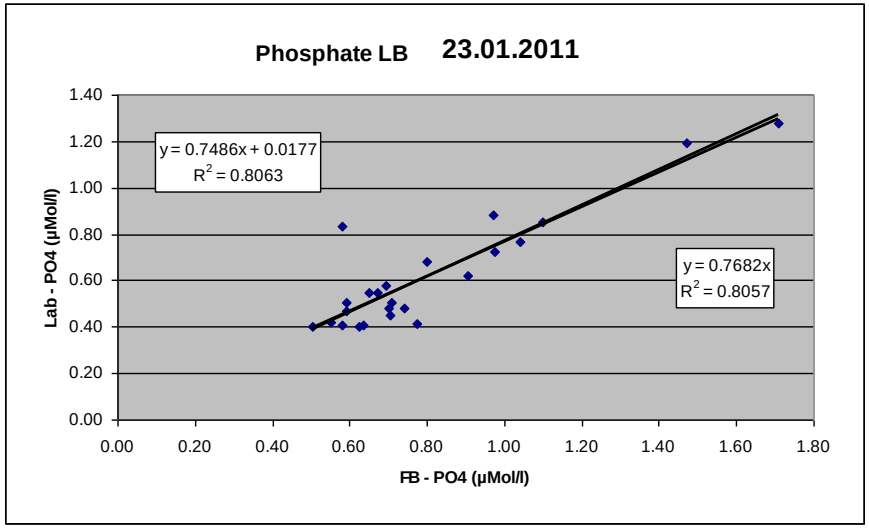
(SEAL AutoAnalyzer 3, segmented flow analysis)

LAB CHECK FERYBOX

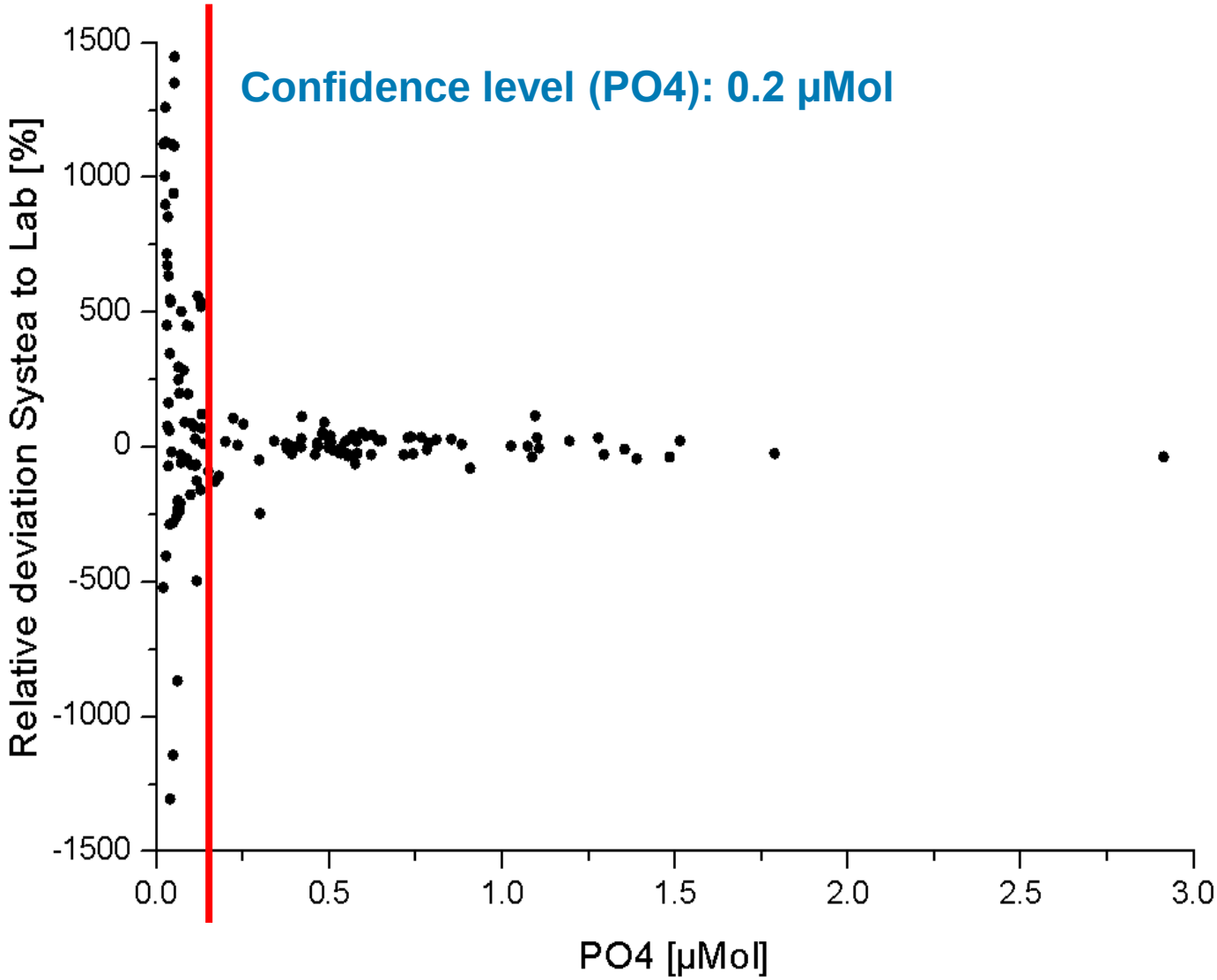








RESULTS OF LAB CHECK



Conclusion (prelimanary)

-Operation of chemical nutrient analysers requires well trained and experienced operators (not a plug&play instrument)

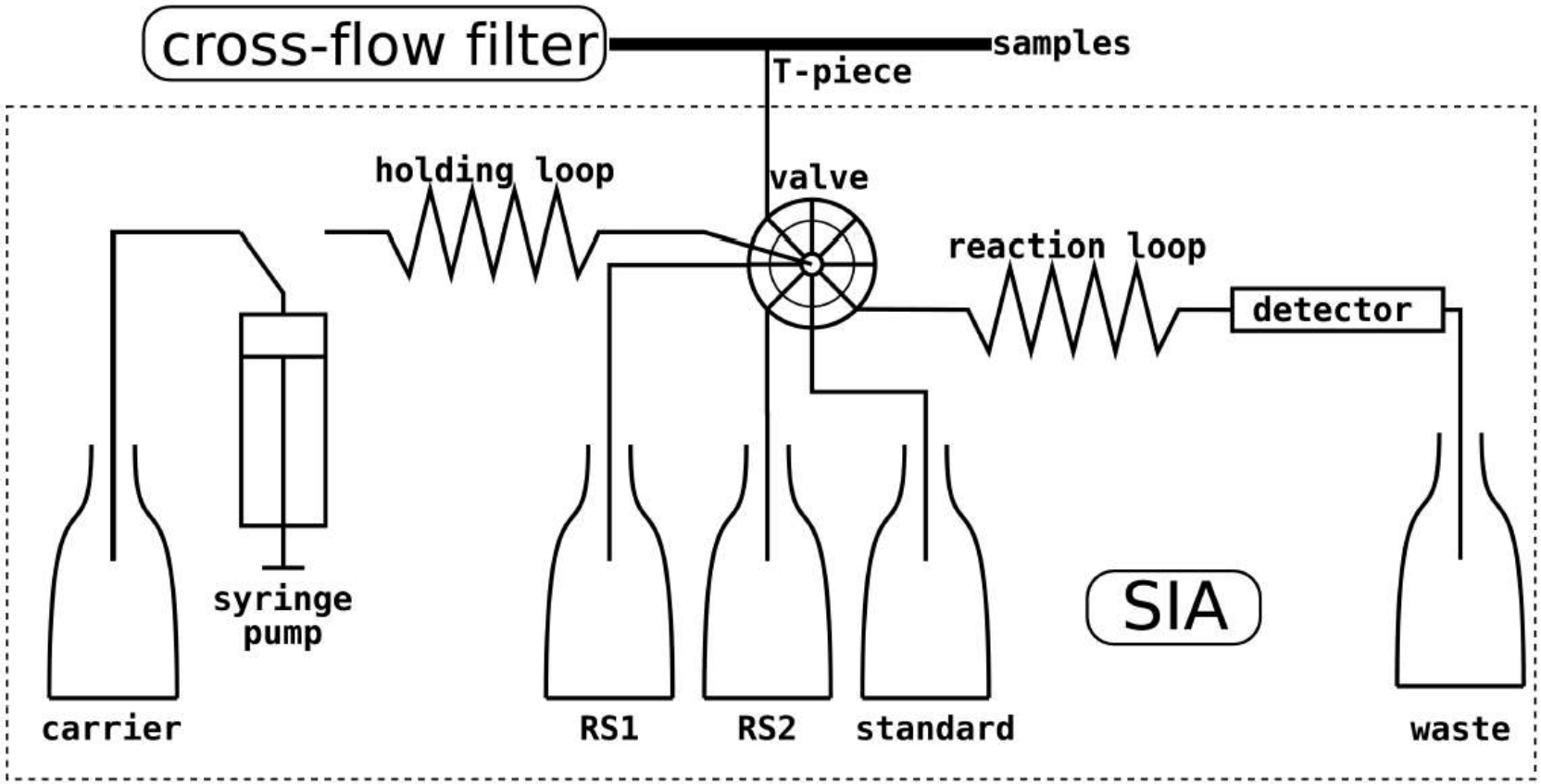
- re-calibration in the field are time consuming and results in higher errrors

-Recalibration from bottle samples (lab analysis) are recommended

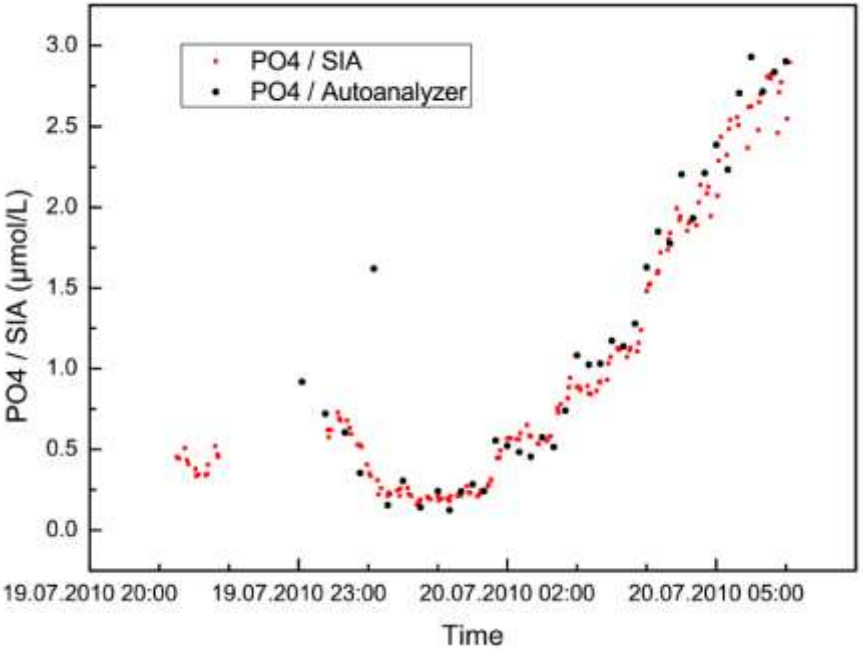
-Commercially available instruments suffers on long-term stability for unattended operation

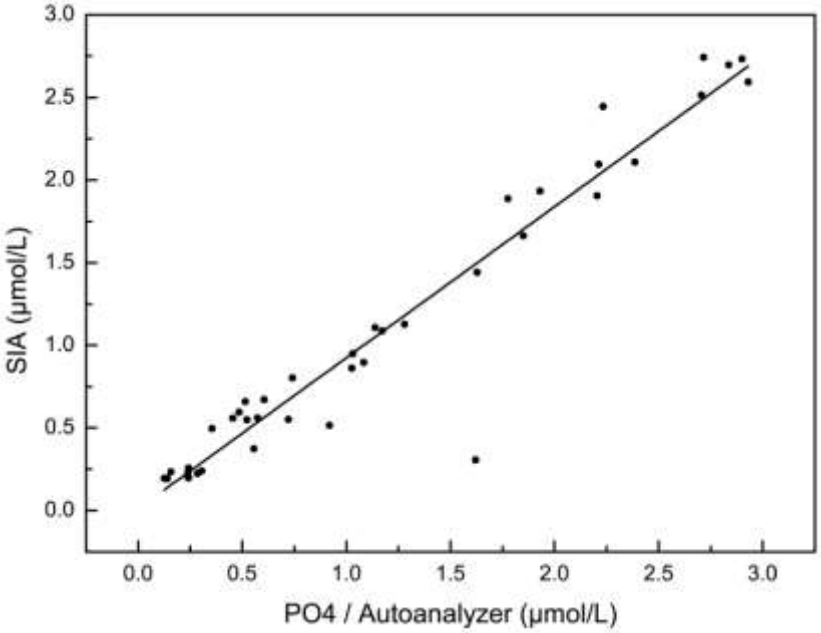
- there is still a demand on more robust and reliable instruments with high sensitivity

NEW NUTRIENT ANALYSER BY SEQUENTIAL INJECTION ANALYSIS (SIA) DEVELOPMENT AT HZG



TEST SIA ANALYSER FOR PO4
IN GERMAN BIGHT (RV HEINCKE)





Thanks for your attention!