

The impact of storage on total concentrations of phosphorus and nitrogen.

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Question: How big is the impact of storage on the total concentration of nitrogen and phosphorus?

SMHI method says preserve within 24 h and on TransPaper the samples are stored for maximum 4 days.

Outline

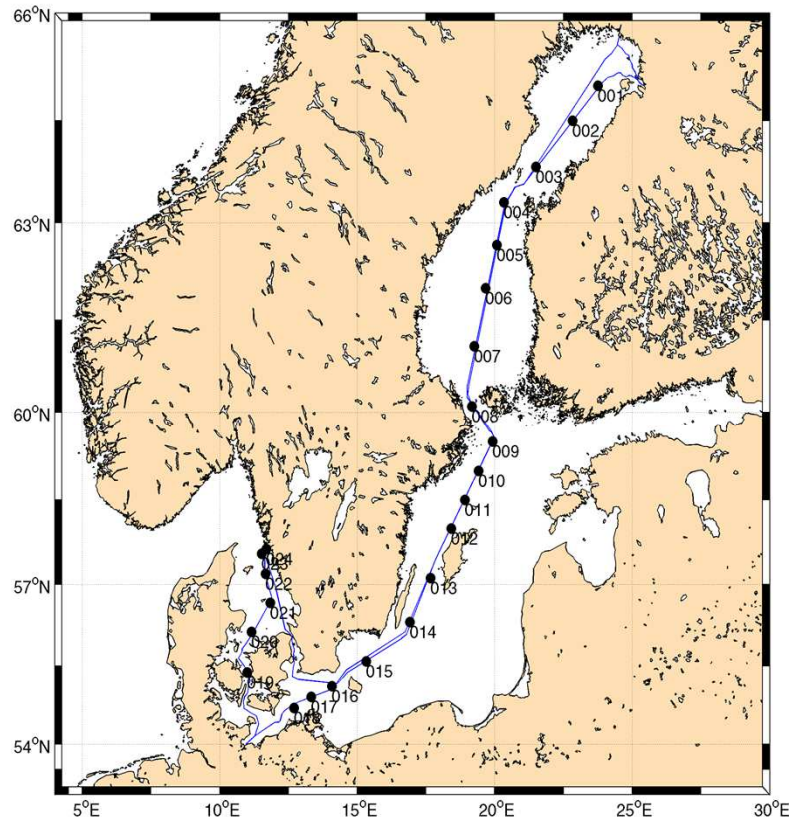
- Contamination test
- Storage test on samples from Bothnian Bay during National Monitoring Program, december 2013.
- Storage test on samples from the Swedish West Coast on 3 different occasions; December 2013, March 2014 and August 2014.

- The concentration of nutrients play an important role in the dynamics of the oceans.
- SMHI analyse nutrients once a month in the Baltic sea, Kattegat and Skagerak. With TransPaper we can analys nutrients once a week.

Total Phosphorus = Inorganic Phosphorus + Organic Phosphorus

Total Nitrogen = Inorganic Nitrogen + Organic Nitrogen

TransPaper route and sampling points



- Weekly Route: Gothenburg-Kemi-Oulu-Lubeck-Gothenburg
- 15 stations are automatically sampled along the TransPaper route every second week.

TransPaper parameters



In water, 3 m depth

- Flow rate
- Temperatur, intake
- Salinity
- Oxygen
- Chlorofyll fluorescence
- Phycocyanin fluorescence
- CDOM fluorescence
- (pH)
- ($p\text{CO}_2$)

In air

- Temperature
- Pressure
- Irradiation, PAR
- (CO_2)

Water samples

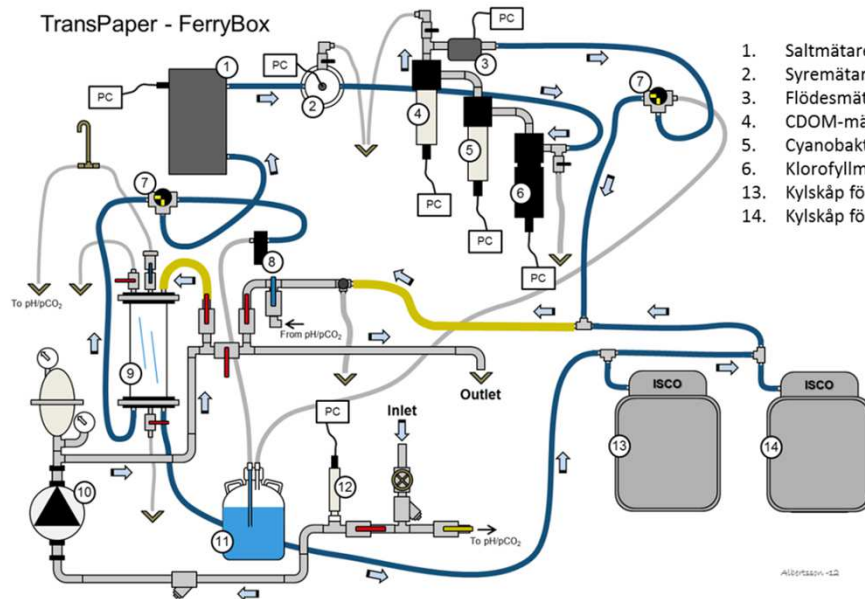
- Salinity
- Chlorofyll a
- CDOM
- Alkalinity
- Phytoplankton

Sampling frequency is every 20 sec for most parameters.

FerryBox on TransPaper



TransPaper - FerryBox



1. Saltmätare
2. Syremätare
3. Flödesmätare
4. CDOM-mätare
5. Cyanobakteriemätare
6. Klorofyllmätare
13. Kylskåp för vattenprovtagning
14. Kylskåp för vattenprovtagning



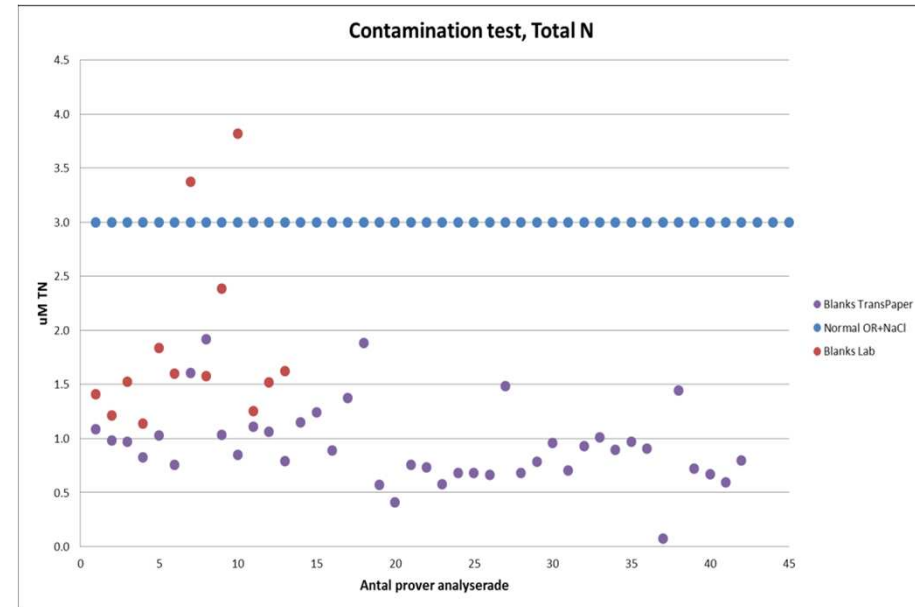
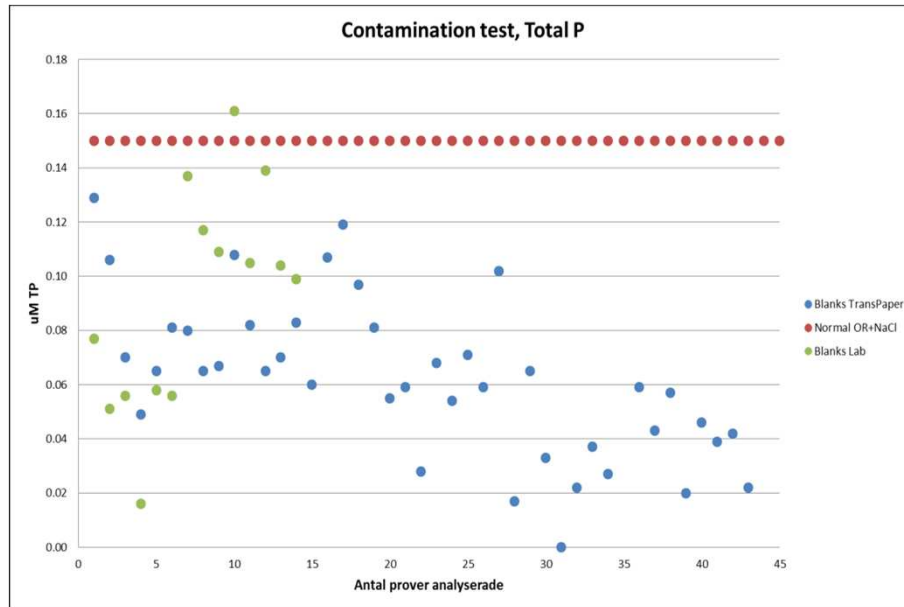
- The SMHI method measures TP and TN simultaneously using a wet-chemical, flow trough system with spectrophotometric detection.
- TP: ISO/FDIS 6878
- TN: SS-EN ISO 11905-1
- The watersamples on TransPaper is stored in 4 days before they are collected and brought to the SMHI laboratory.
- A validationtest (Nordtest) for the analysis of the total concentration of nitrogen and phosphorus gave the uncertainty:

TP \pm 27 %

TN \pm 14%



Results: Contamination test

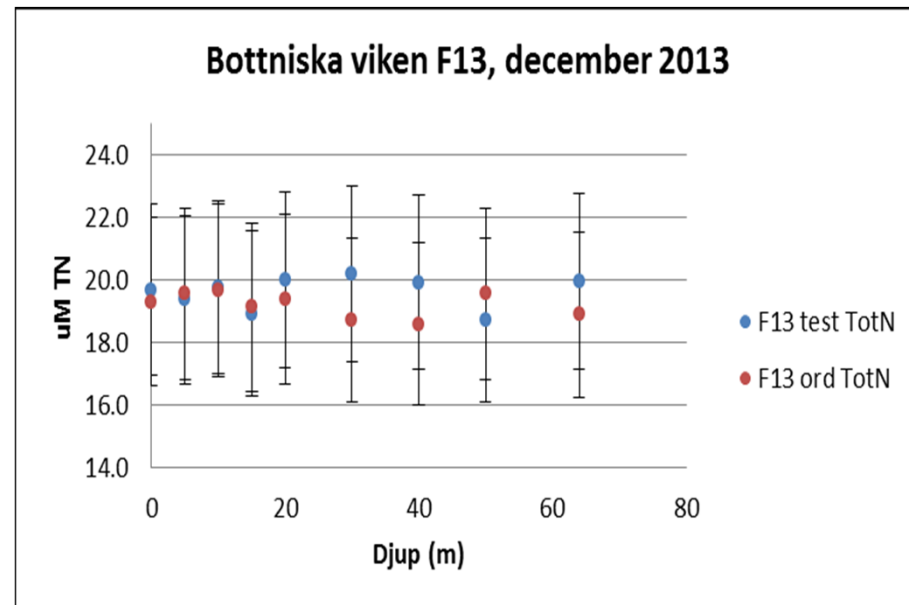
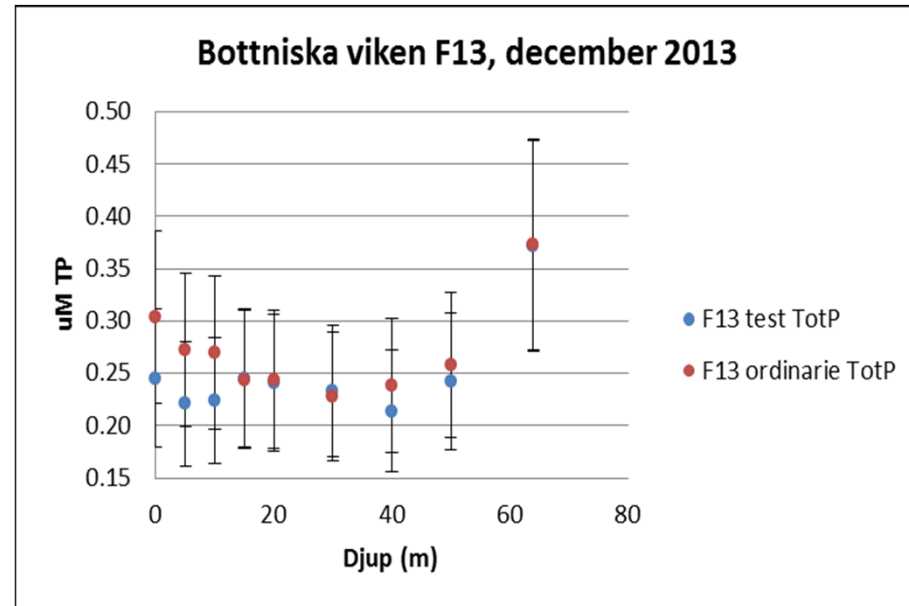


Blanks onboard TransPaper: Syntetic sea water (7.5 psu) is placed in ISCO during one week.

Blanks at SMHI Laboratory: Syntetic sea water (7.5 psu) is placed in a refrigerator during one week.

Results

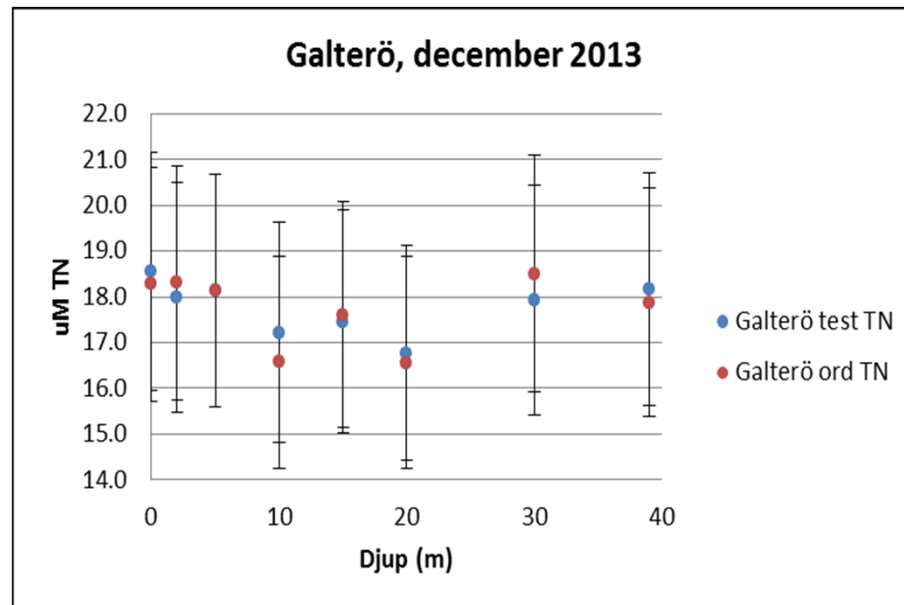
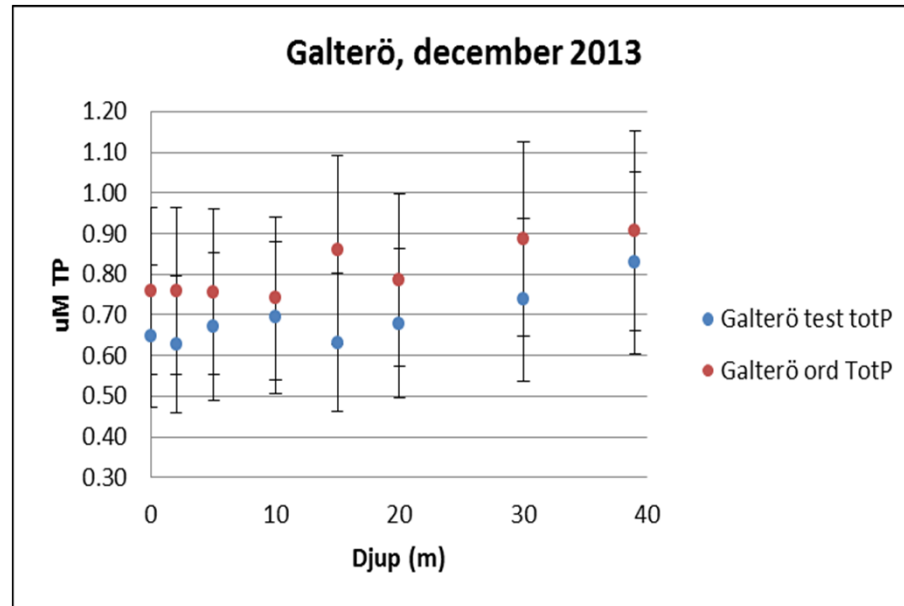
Bothnian Bay,
December 2013
Salinity: 3 psu



Results



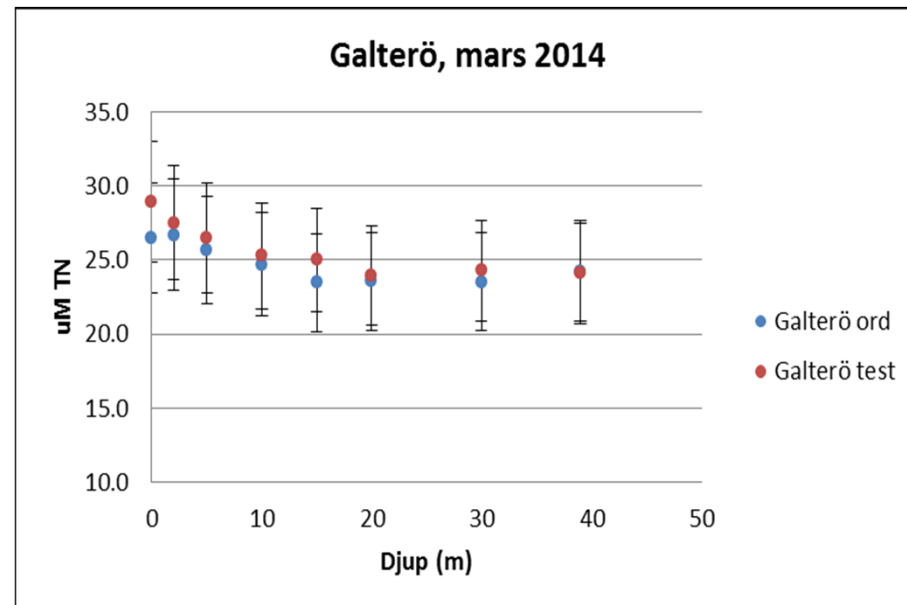
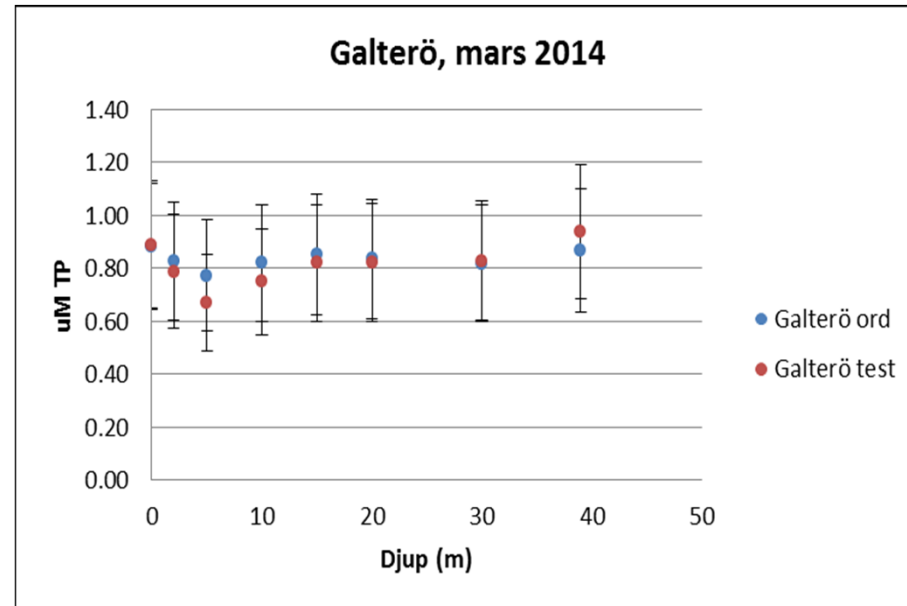
Swedish West Coast,
December 2013
Salinity: 25-31 psu



Results

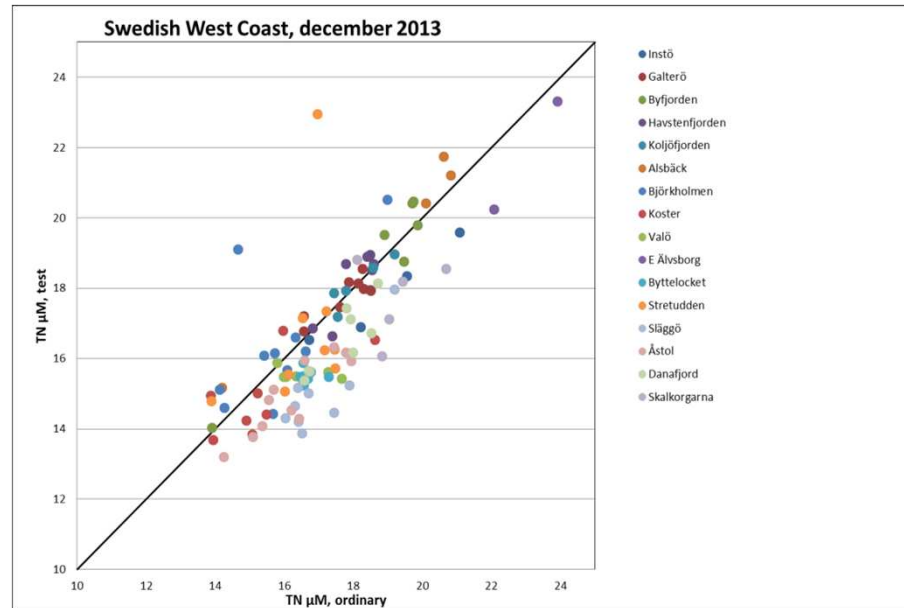


Swedish West Coast,
March 2014
Salinity: 25-31 psu

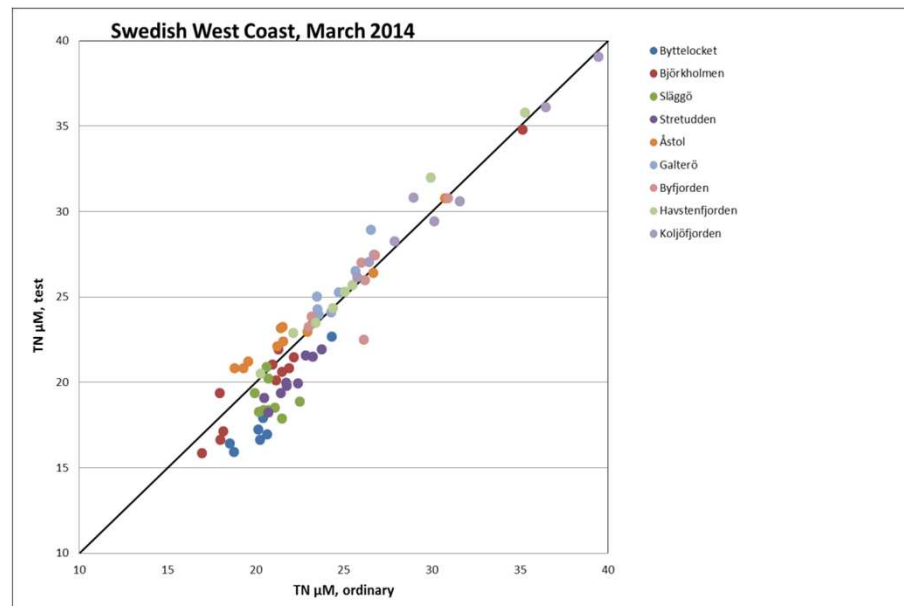


Results Total Nitrogen

Swedish West Coast,
december 2013:
Test samples plotted against the
ordinary samples.



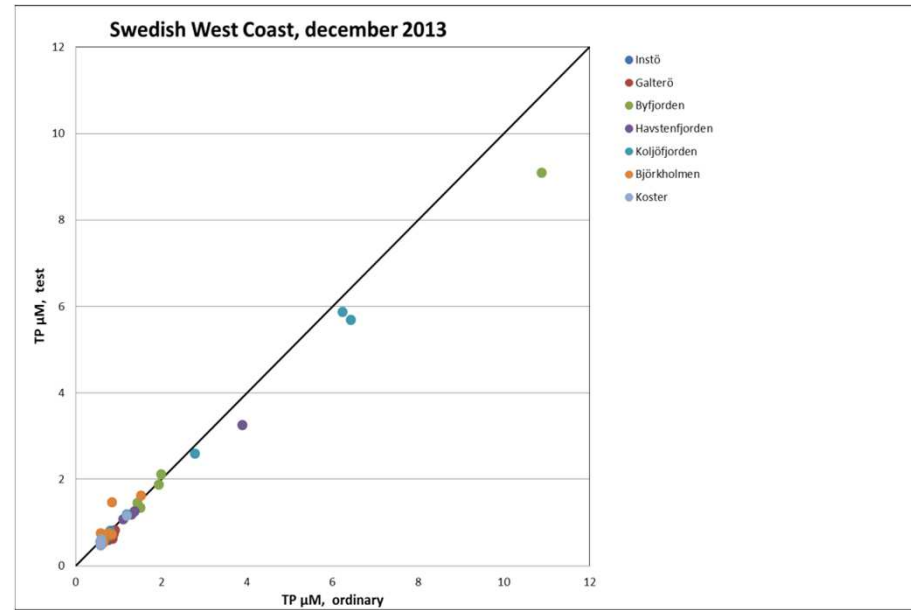
Swedish West Coast,
March 2014:
Test samples plotted against the
ordinary samples.



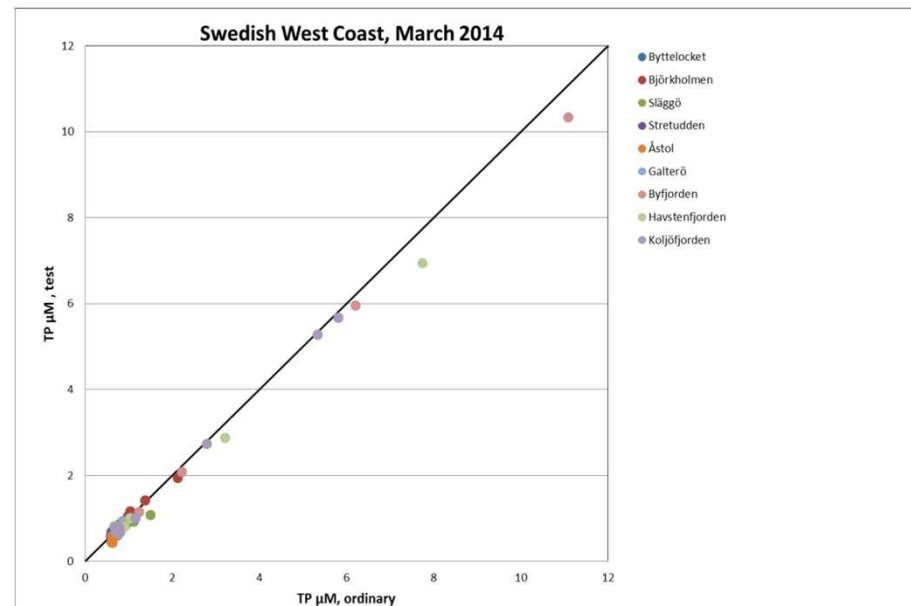
Results Total Phosphorus



Swedish West Coast,
december 2013:
Test samples plotted against the
ordinary samples.



Swedish West Coast,
March 2014:
Test samples plotted against the
ordinary samples.



- The samples from the storage test in August 2014 will be analysed and evaluated.
- Triplicates will be taken at all 24 stations along the TransPaper route. They will be compared with samples taken by the ISCO sampler.

Conclusion

- All of the analysed samples is within the calculated uncertainty of the metod.
- No risk of contamination onboard TransPaper.

The conclusion based on existing results is that it is possible to analys the total concentrations of Nitrogen and Phosphorus on samples taken onboard TransPaper.

Thank you!

SMHI



Chlorofyll a concentrations during test period along the Swedish west coast

