

SMHI FerryBox activities in JERICO



Presented by Malin Mohlin

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Route for ship TransPaper with FerryBox



Schedule

Day 1 Arrive to Gothenburg 9 pm

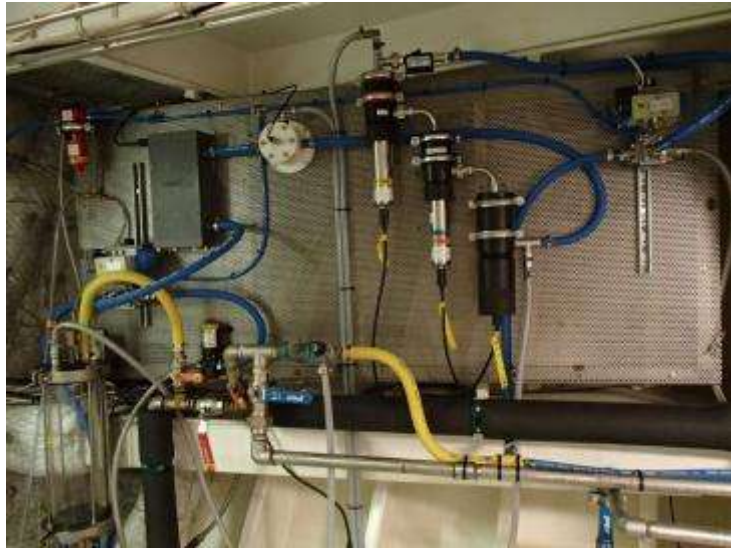
Service and sample collection for 4 hours

Day 11 Sampling start (in Kemi Finland) 24 stations are sampled from Kemi to Gothenburg to validate the sensors

Day 15 Arrive to Gothenburg...

And so on...

Sensors and water samplers



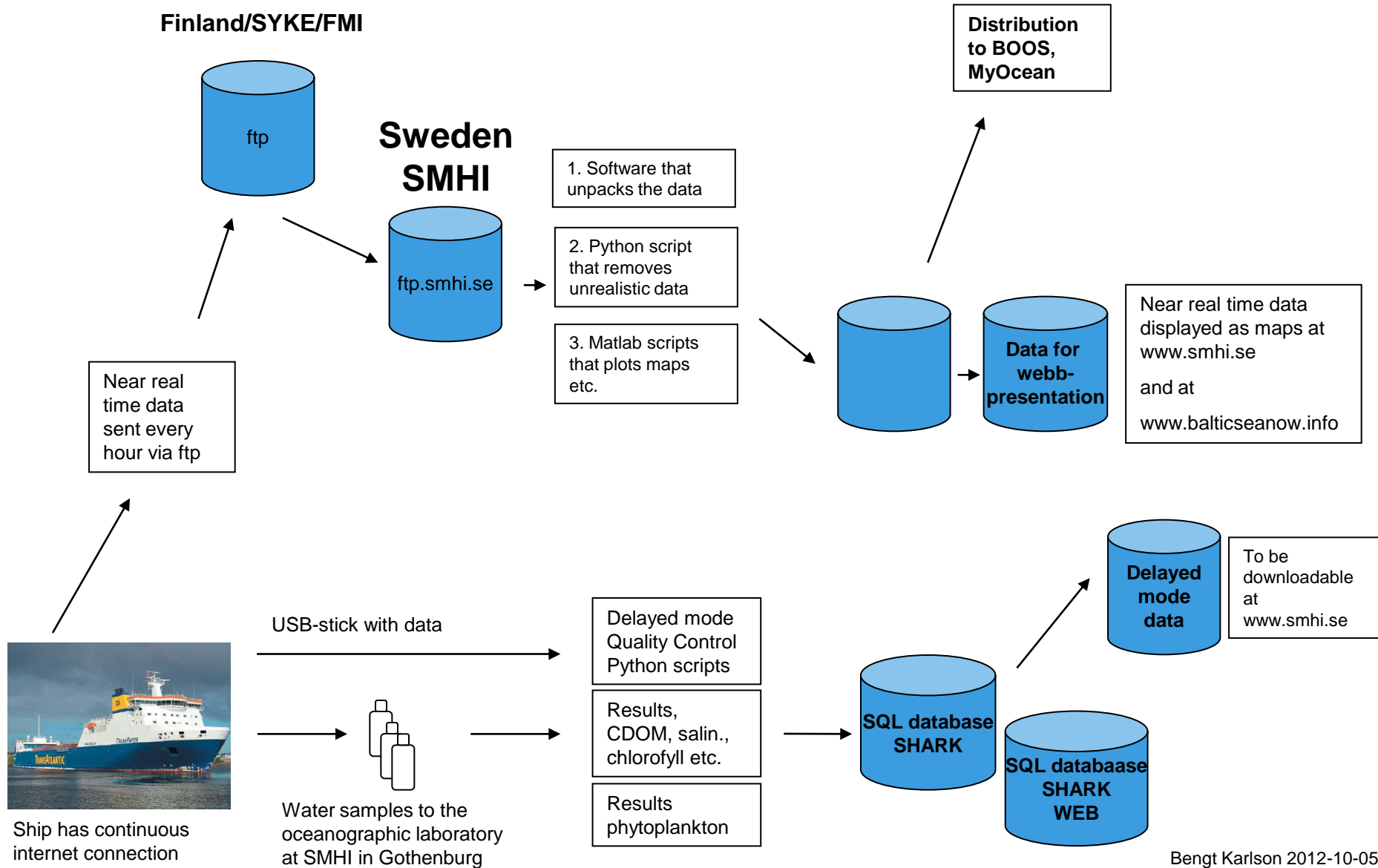
Real time data

Flow through system

- Temperature (SeaBird + near water inlet)
- Conductivity (SeaBird)
- Salinity (calculated)
- Chlorophyll fluorescence (WetLabs ECOFLNTUS)
- Phycocyanin fluorescence (TriOS)
- CDOM fluorescence (TriOS)
- Turbidity
- Oxygen (Anderaa Oxygen Optode 3835)
- CO₂ (General Oceanics 8050 being evaluated)
- pH (fluorescence based own development being evaluated)

In air measurements

- Air temperature
- Air pressure
- Irradiation (PAR, Photosynthetic Active Radiation, Biospherical Instruments
-)
- CO₂ (being evaluated)
- Position and time stamp (GPS)



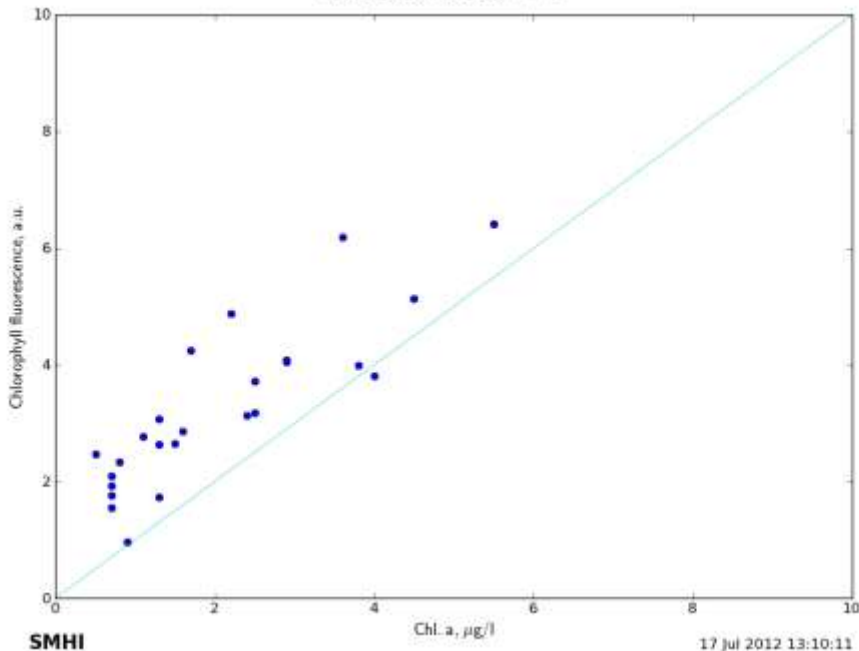
JERICO User Display – Cooperation SMHI-NOCS

Presentation system for the public developed by NOCS
Specification defined by NOCS and SMHI in cooperation
Large computer monitors to be displaying FerryBox data
A prototype has been shown to the shipping company TransAtlantic

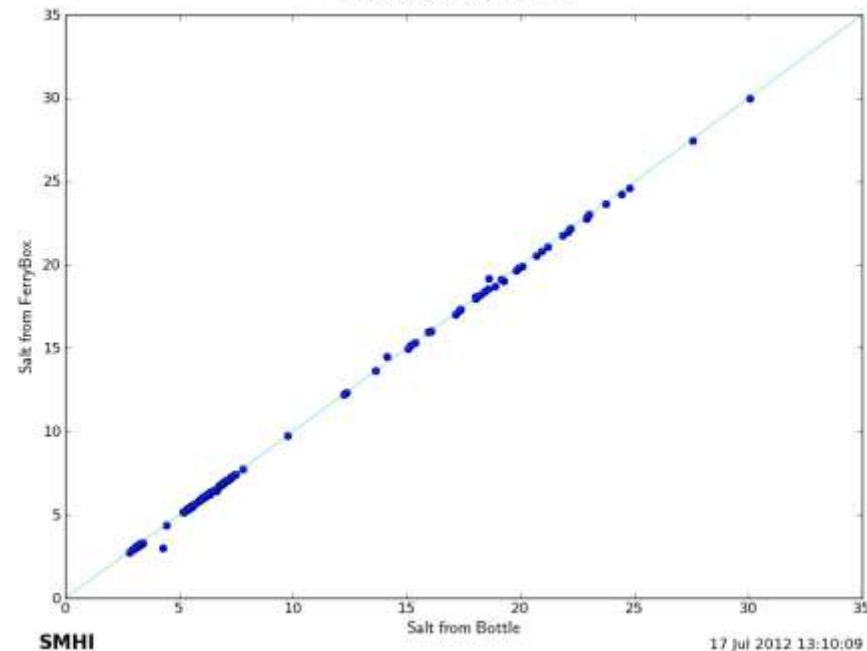
- Automated washing system fills sensors with freshwater and detergent every time the ship is in harbour (10 times in 2 weeks)
- Service every two weeks
 - Water inlet filters are cleaned
 - Manual cleaning of fluorometers and O₂-sensors and flow chambers
 - CO₂-system filter cleaned
- Less frequent
 - SeaBird conductivity sensor anti fouling device replaced (TBT)
 - Replacement of tubes with CO₂ reference gases
 - Replacement of tubing

Comparison reference water sampling vs automated measurements 2011

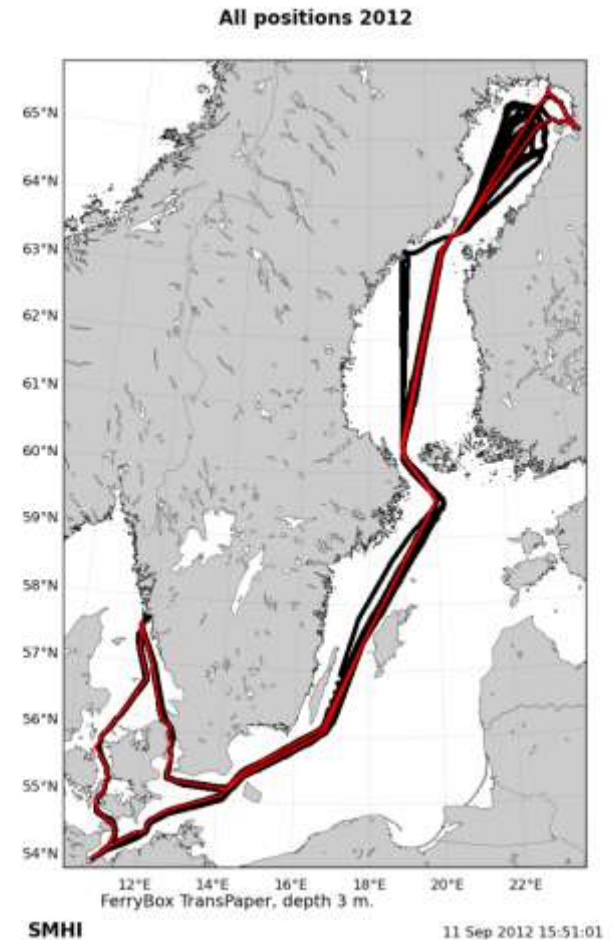
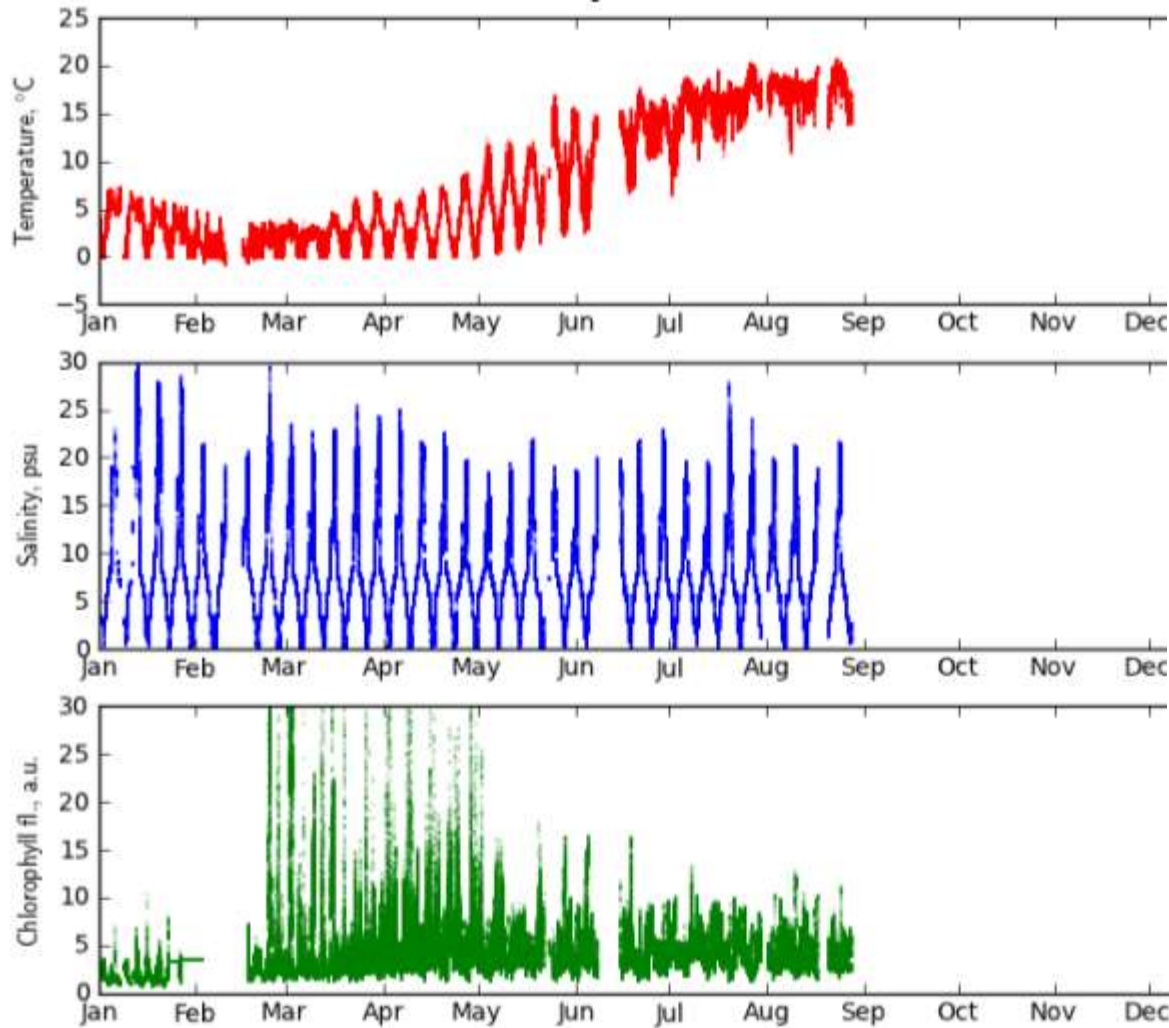
Chl. fluorescence vs chl. a
Kattegat and Belt Sea 2011



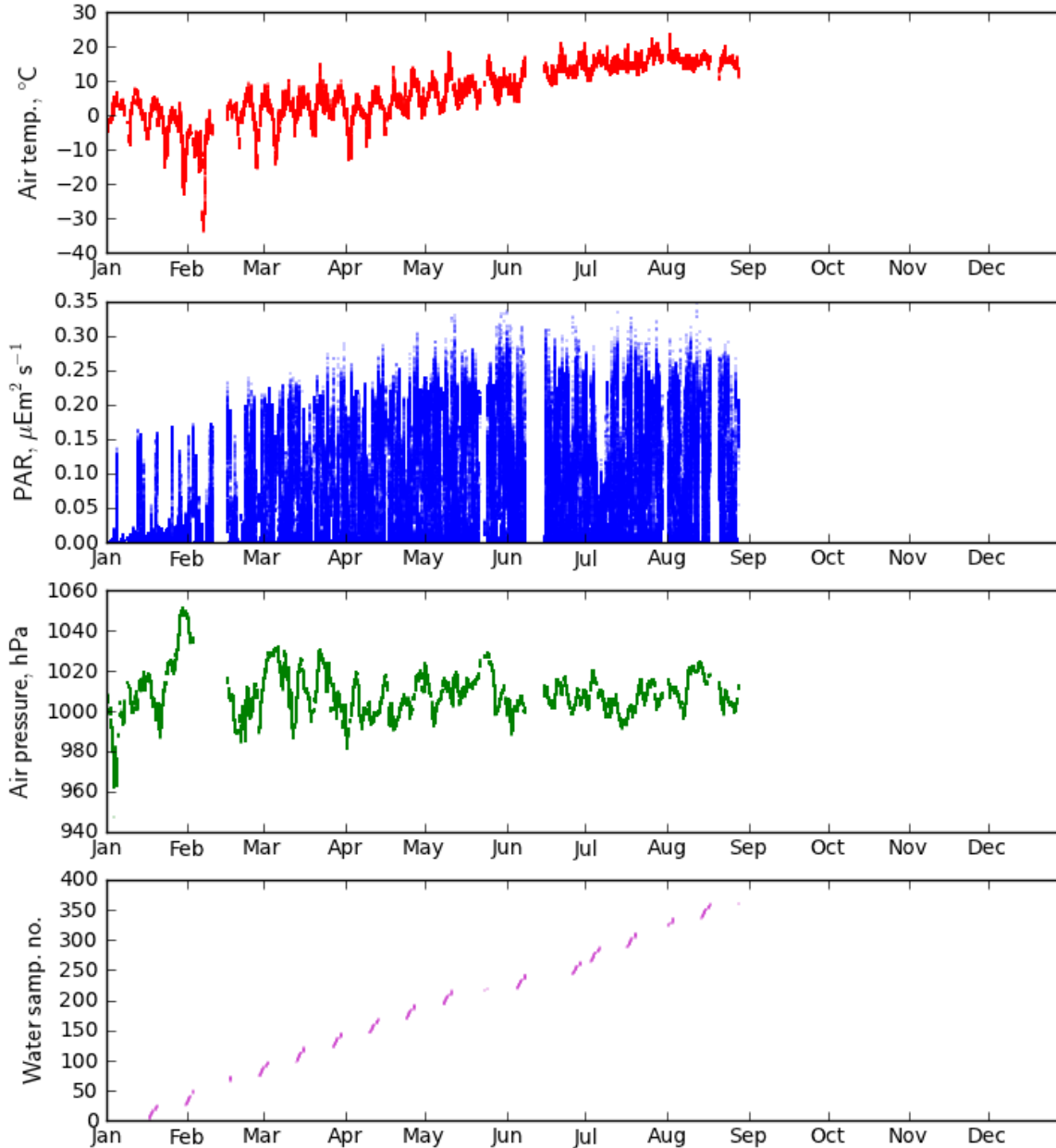
Salinity (SeaBird) vs salinity
Gulf of Bothnia, Baltic Sea,
Kattegat and Belt Sea 2011



Some preliminary data from 2012



More data from 2012

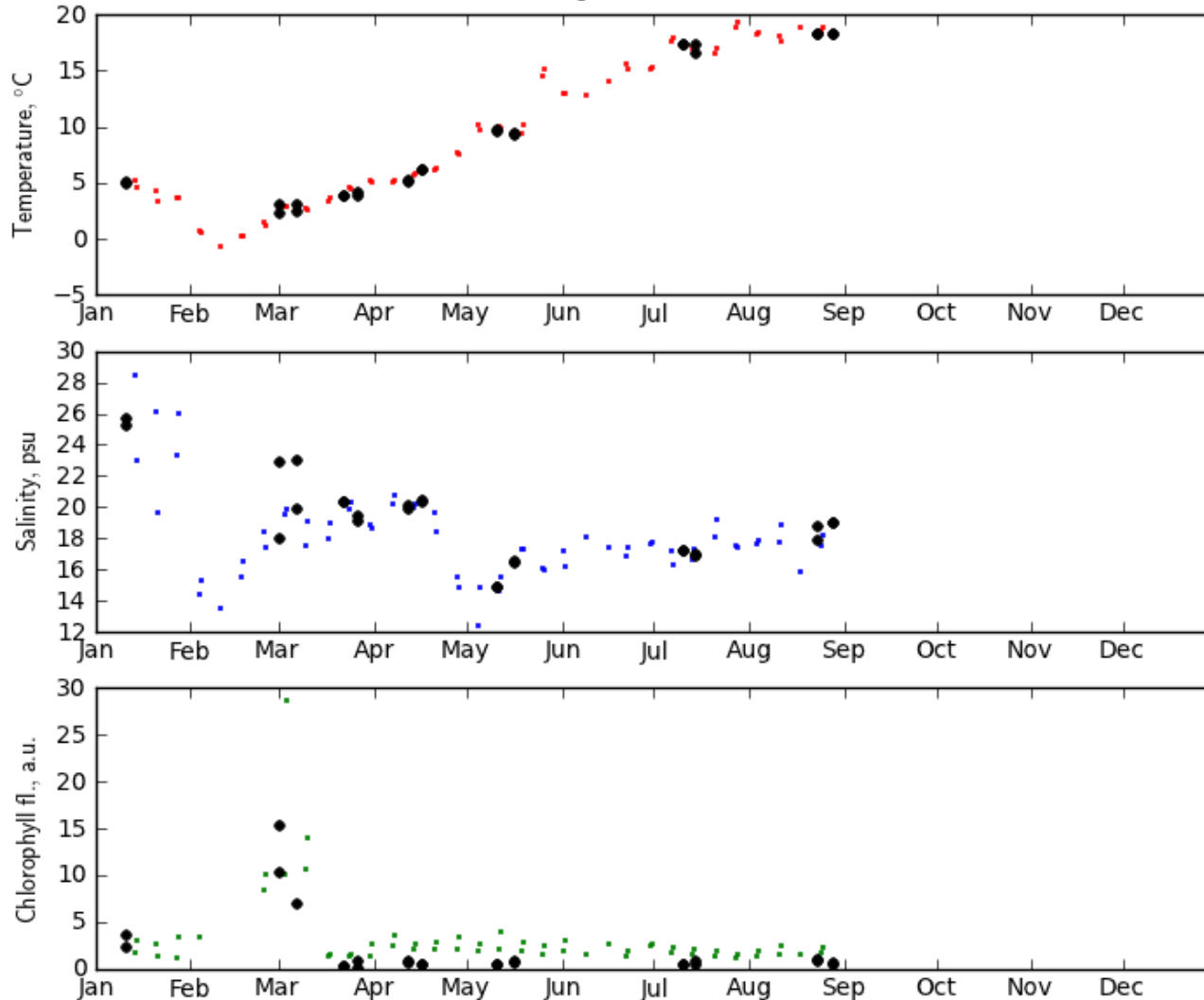


Unit of irradiance incorrect

Kattegat comparison

FerryBox vs research vessel sampling

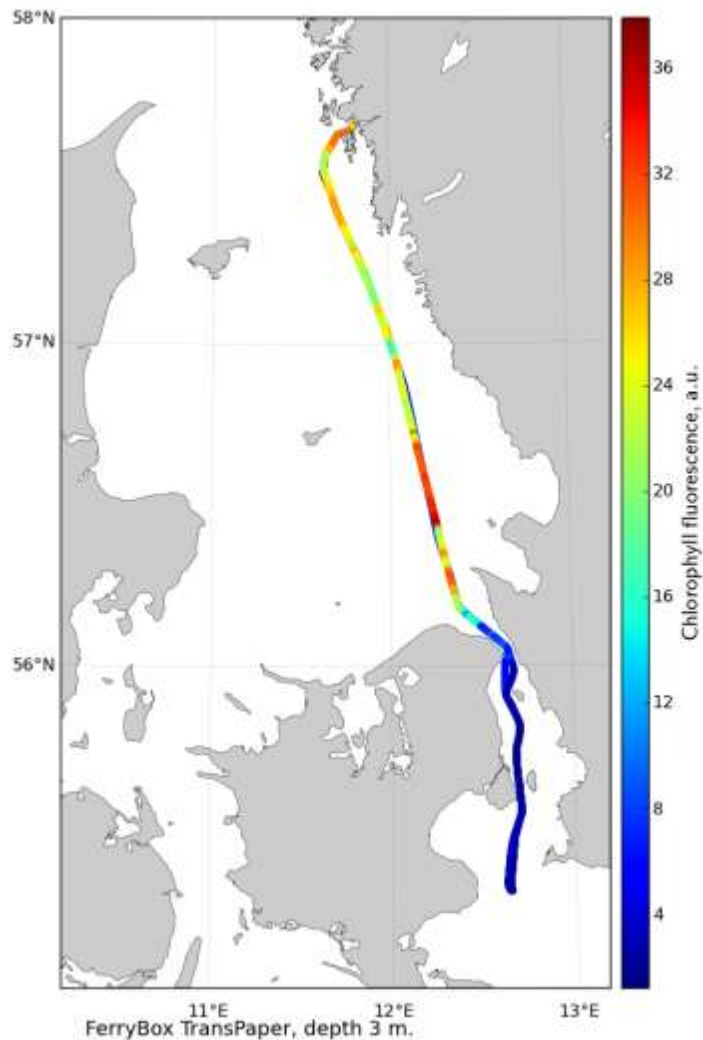
FerryBox TransPaper and SHARK ANHOLT E 2012 depth 3 m.



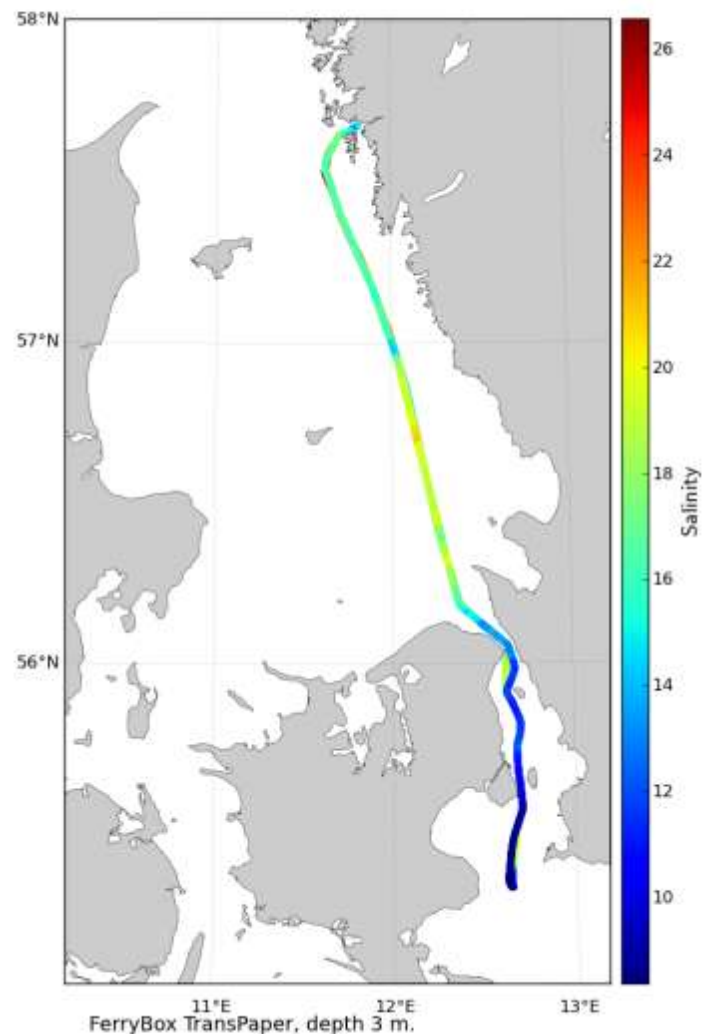
Black dots:
Water samples
0 and 5 m depth
from cruises

Spring bloom in the Kattegatt in February 2012

Chlorophyll fluorescence 24 Feb - 03 Mar 2012



Salinity 24 Feb - 03 Mar 2012



SMHI personell on ship TransPaper in June 2012 verify the quality of data from FerryBox sensors etc.

Water samples collected for:

Alkalinity - testing if storage affects quality of results – four days is OK

Salinity – SeaBird works fine!

Chlorophyll a- good correlation with chl. a fluorescence

CDOM – not yet evaluated

Phycocyanin samples still in -80 freezer

Phytoplankton samples to be analysed for cyanobacteria



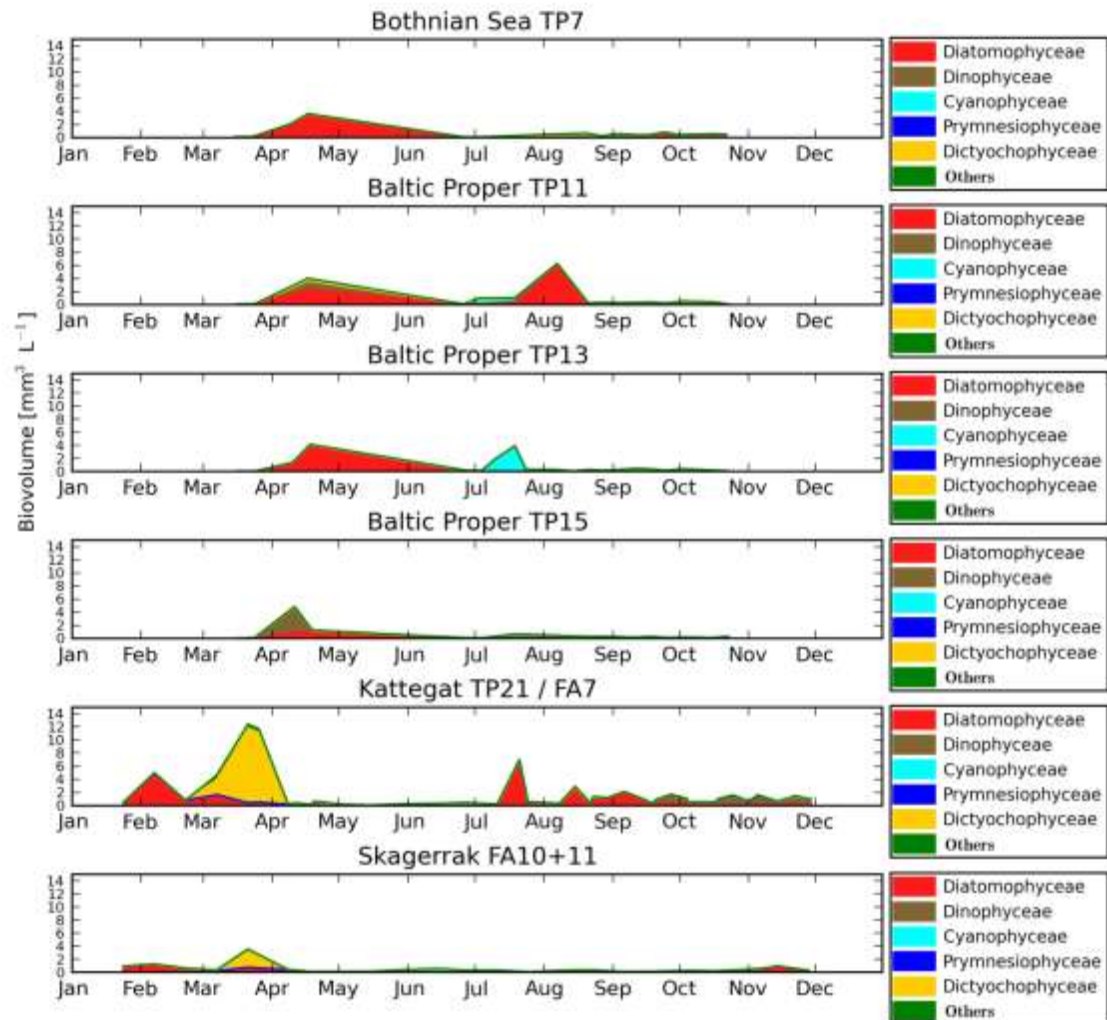
Phytoplankton monitoring using FerryBox

- Automated water sampling for microscope analysis of phytoplankton
- Chlorophyll a fluorescence – a proxy for phytoplankton biomass
- Phycocyanin fluorescence – a proxy for cyanobacteria biomass



Biovolume of phytoplankton groups

Biovolume AU+MX ferrybox samples 2011



Thank you for your attention

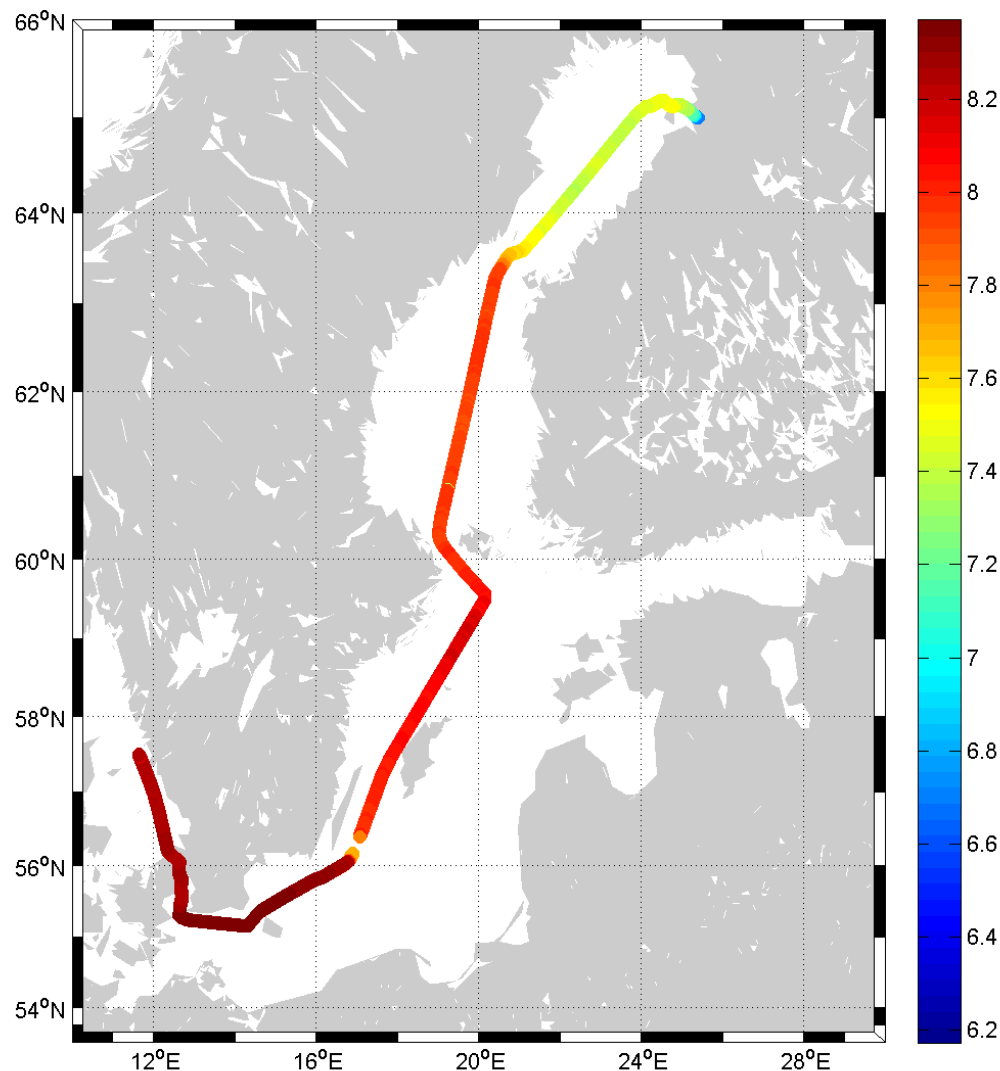
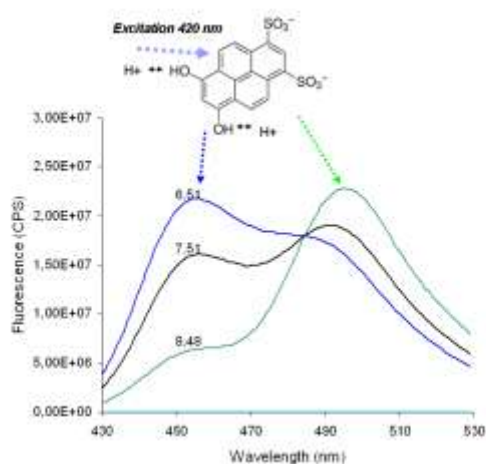


Extra slides after this one to be used if needed

pH – new method still pre-operational



DHPDS fluorescence



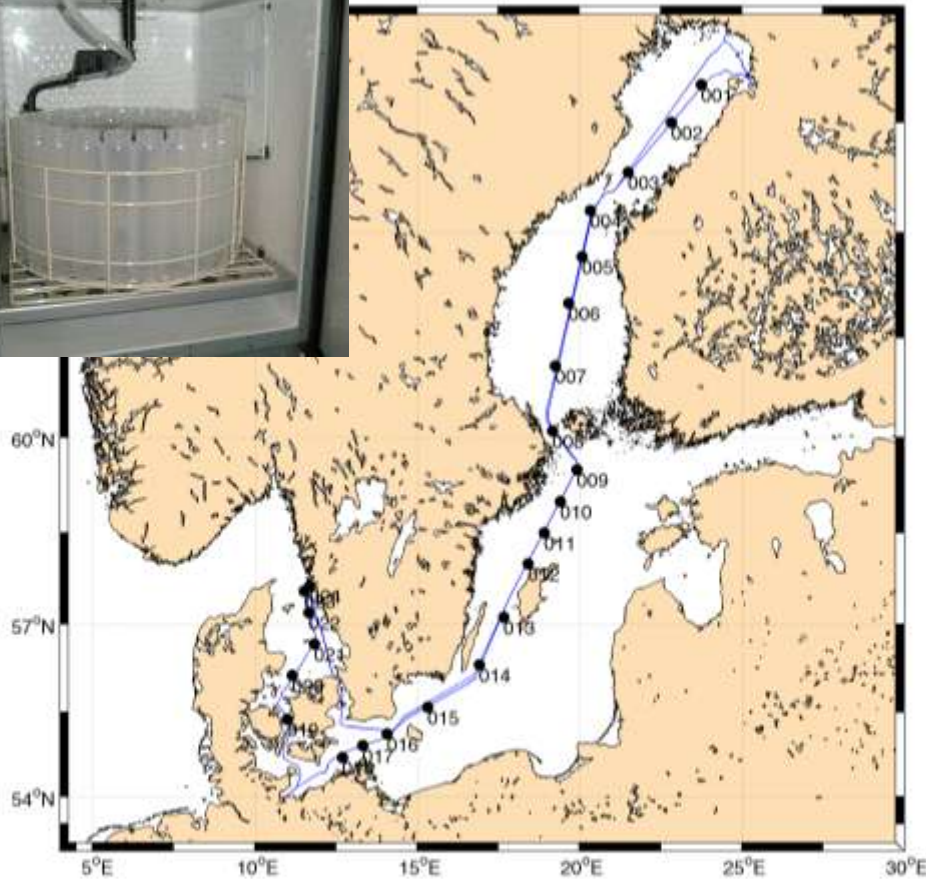
More info: aron.hakonen@smhi.se

FerryBox systems in the Skagerrak – Kattegat and in the Baltic Sea



No. on map	Ship	Route	Institute
1	Baltic Princess	Tallinn-Helsinki	EMI
2	Color Fantasy	Oslo-Kiel	NIVA
3	Finnmaid	Helsinki-Lübeck-Gdynia-Helsinki	SYKE
4	MS Bergensfjord	Bergen-Hirtshals	NIVA
5	Lysbris	Hamburg-Immingham-Halden	NIVA and HZG
6	Silja Serenade	Helsinki-Mariehamn-Stockholm	SYKE
7	Stena Spirit	Gdynia-Karlskrona	IMGW-PIB
8	TransPaper	Gothenburg-Oulu-Kemi-Lübeck-Gothenburg	SMHI
9	Victoria	Tallinn-Mariehamn-Stockholm	MSI

TransPaper sampling locations



Sampling frequency

- Every two weeks

Parameters

12 locations

- Salinity
- CDOM/humic substances
- Alkalinity

6 locations in the Kattegat-Öresund

- Chlorophyll a

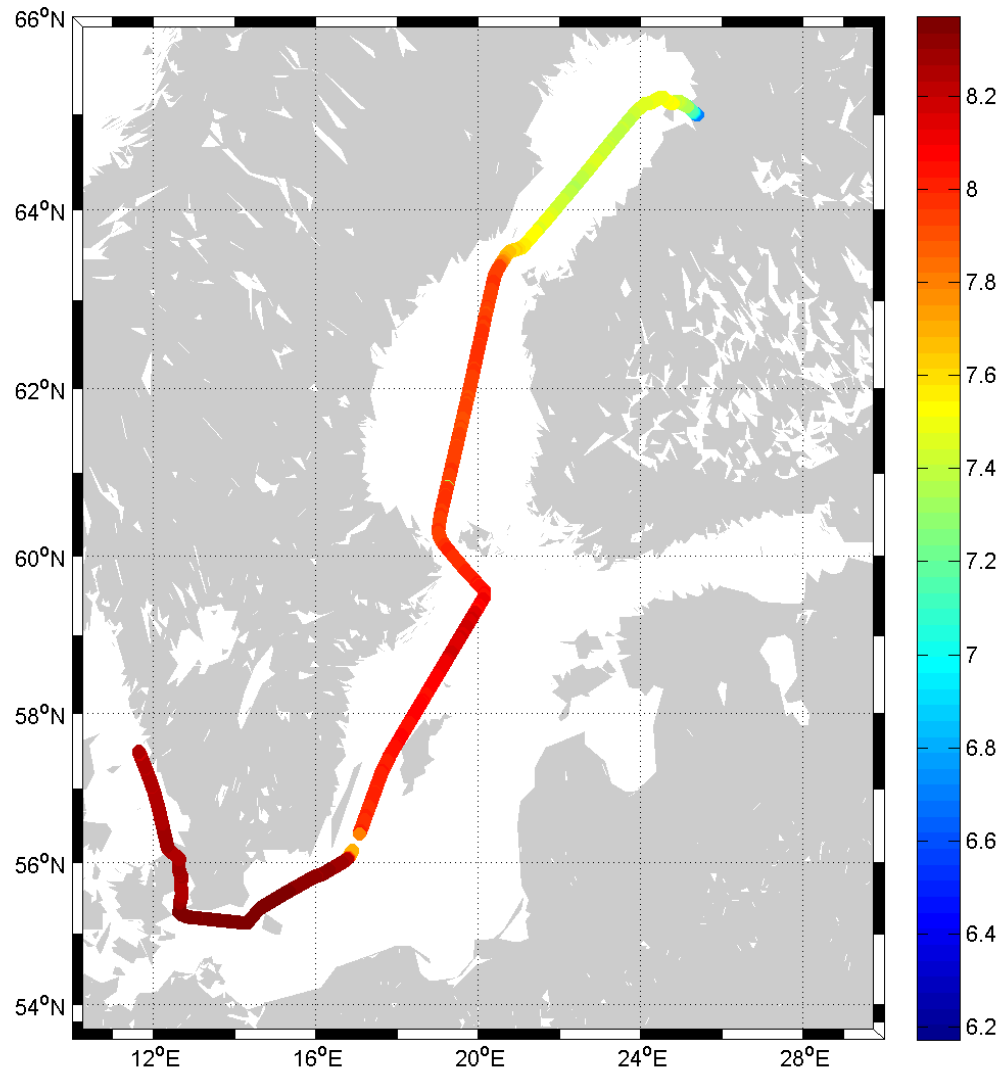
5 locations

- Phytoplankton

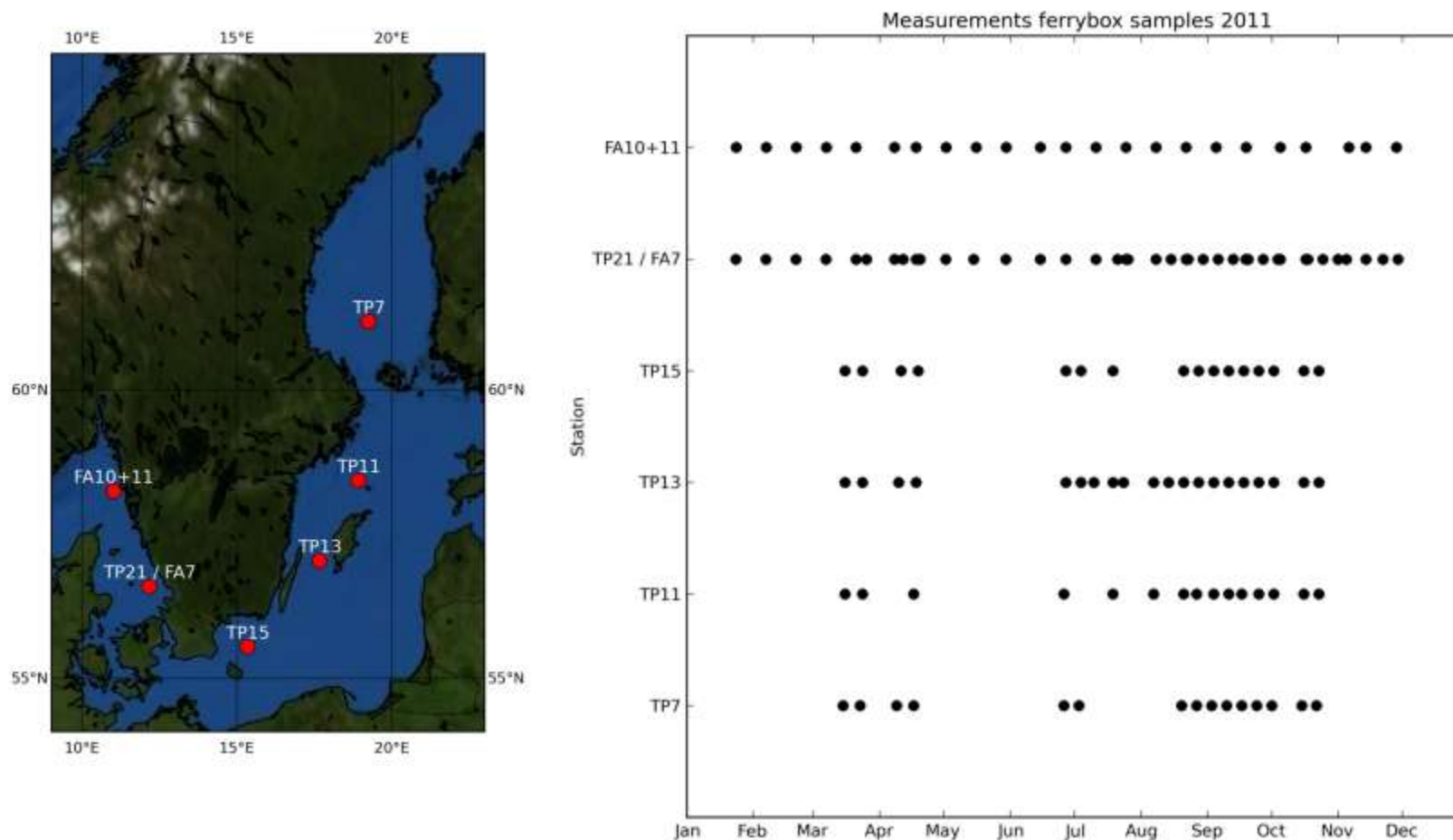
Water samples



pH – new method now pre-operational



Sampling frequency 2011



Phytoplankton analysis method - Utermöhl

