Status on the Ferrybox network in Norwegian waters
(www.ferrybox.no, www.oceanbox.no)

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Outline

• The Ferrybox-network
• The sensor systems
• The status of the lines
• Applications
  – monitoring
  – satellite validation
• Data presentations (web portals)
• Future plans
Ferrybox network in Norwegian Waters
(NIVA and partners; IMR, GKSS, MarLab, Akvaplan-niva)

Norbjørn, NIVA/Akvaplan-niva
Trollfjord, NIVA/Akvaplan-niva
Vesterålen, IMR
Norønna, MARlab/NIVA
Bergensfjord, NIVA
Color Fantasy, NIVA
Lysbris, GKSS

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Status on NIVA lines

- Tromsø-Longyearbyen: Oct 2008---
  - 37 transects per year,
  - Sensors T,S,O2, Chl-a-Fl,Turb
  - Water sampler
- Bergen –Kirkenes: Jul 2004---
  - 35 transect per year (11 days trip)
  - Sensor:; T,S,O2, Chl-a-Fl,Turb, radiance
  - Water sampler
- Bergen-Hirtshals /(Hantsholm): 2005---
  - 2-3 transect per week
  - Sensors T,S,O2, Chl-a-Fl,Turb
  - Water sampler
  - 3 transects per week
  - Sensor:; T,S,O2, Chl-a-Fl,Turb, radiance
  - CDOM and pycocyanin
  - Water sampler
The Ferrybox systems on Color Fantasy between Oslo and Kiel (Flaggship)

Deck sensors (Ed (PAR), Ld, Lu)

Ferrybox-sensors at 4 meters depth
The Ferrybox installation
Ferrybox on Oslo-Kiel

- Cyano-bacteria
- CDOM
- Algae
- Particles
- Temperature
- Salinity
- pH (opt)
- Oxygen
Chl-a_Fluorescence/Chl-a ratio 2004- (“night” and “day” using PAR < or > 300)
Applications - end user projects

- **Oslo-Kiel route**
  - 3 monitoring stations, 22 x per year, state program
  - 4 monitoring stations, 7 x per year, local programs
  - 2 stations - toxic algal monitoring program
  - 2-6 stations for satellite product validation

- **Hirsthals-Bergen route**
  - 2 monitoring stations, 22 x per year
  - 2-4 stations – toxic algal monitoring

- **Bergen-Kirkenes route**
  - 1 monitoring station
  - Satellite product validation
  - WFD (plan for several stations)

- **Tromsø-Longyearbyen**
  - Monitoring (ocean acidification)
  - Satellite product validation
Spring bloom in Skagerrak and the Oslo fjord

Chl-a [mg/m³]

Fredrikshavn
Jan
Feb
Mar

Oslo
60°N

59°N

58°N

NORWAY
SWEDEN
Jomfruland
Lista
Arenbdal St. 2/3
High frequency measurements compared to routine sampling

Chl-a (mg/m³)

Sampling from Ferrybox

Sampling from traditional research cruises/monitoring program

NIVA
Algal bloom products from satellites needs verification
Algal bloom seen by satellite in the open sea verified with ship
Combination of the data confirming the algal bloom
Combination of satellite data of algae and Ferrybox data give overview of an algal bloom
MERIS TSM with different processors compared to TSM derived from Ferrybox

![Graph showing TSM distribution with different processors compared to TSM derived from Ferrybox. The graph includes lines for TSM_Ferrybox, IPF TSM, FUB TSM, and C2R TSM, with salinity as a secondary axis.](image-url)
Data example from the west coast of Norway
Water framework directive and the use of the Ferrybox platform

Water types
- Not classified
- Open, exposed coast
- Moderate exposed
- Coast/fjord/archipelago
- Protected coast/fjord
- Oxygen poor fjord
- Narrow strait

Proposed stations
- Trend
- Reference
SatOcean
NIVA web portal
Comparison of Ferrybox and Argos salinity at Anholt E 2008

Comparison between Argos bottle data and NIVA ferrybox data for Salinity within 50 km of Anholt E

Data from SMHI. Report Karlson et.al 2009

21. mars 2010
Comparison Ferrybox and Argos samples at Anholt 2008

Comparison between Argos bottle data and NIVA ferrybox data for Chlorophyll a within 50 km of Anholt E

Data from SMHI. Report Karlson et.al 2009
Ferrybox and Argos data 2009

ANHOLT E 2009
Ferrybox (Color Fantasy) and R/V Argos observations

Data from Bengt Karlson (SMHI)

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21. mars 2010
The Svalbard transect


Temperature (Deg.C)

Salinity
Future plans

• Marine acidification
  – Spectrofotometric pH (m-cresol-purple)
  – pCO2 system
  – Automatic sampling for TIC, Alk
• Nutrients analysers
• PSICAM sensor for Chl-a absorption
• Oil-fluorescence sensors
• Radiometric measurements
  – Tromsø-Longeyearbyen (tbd)