

FerryBox and Automated Ships of Opportunity as Operational Tools for Ocean Observing Tasks



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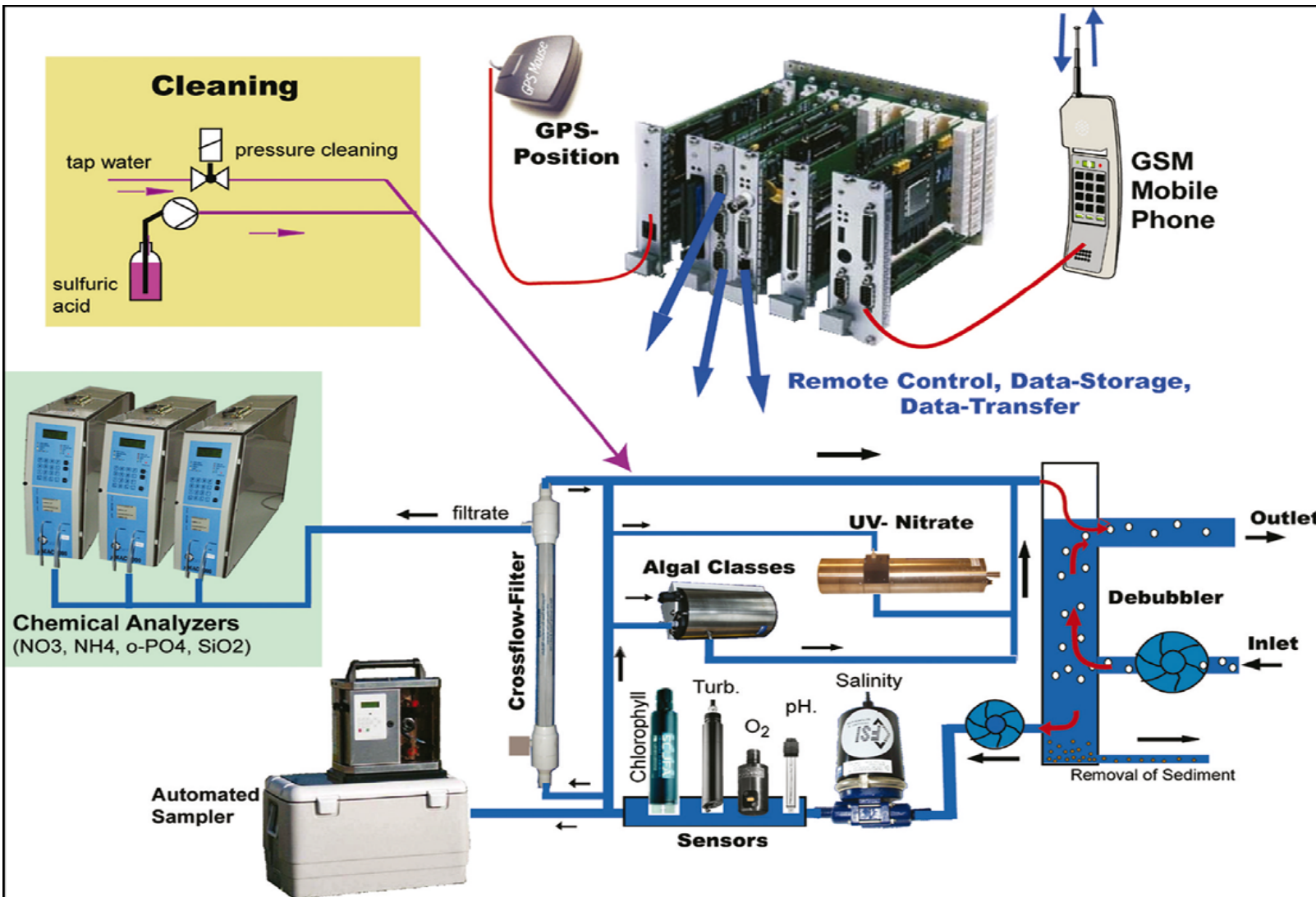
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OUTLINE

- FerryBoxes in Europe
- FerryBox System
- Data Management
- Data Examples North Sea
- FB & Coastal Observing Systems
- Data Dissemination
- Summary



FerryBox Flow-Through System



Measured Variables

- temperature
- salinity
- turbidity
- chlorophyll
- oxygen,
- pH
- algal groups
- nutrients

Main Features:

- running autonomously
- controlled by GPS position
- self cleaning (after each cruise)
- + automatic water sampler for further lab analysis

Industrial version of FerryBoxes (company 4H-Jena, Germany)

Standard FerryBox
incl. debubbler

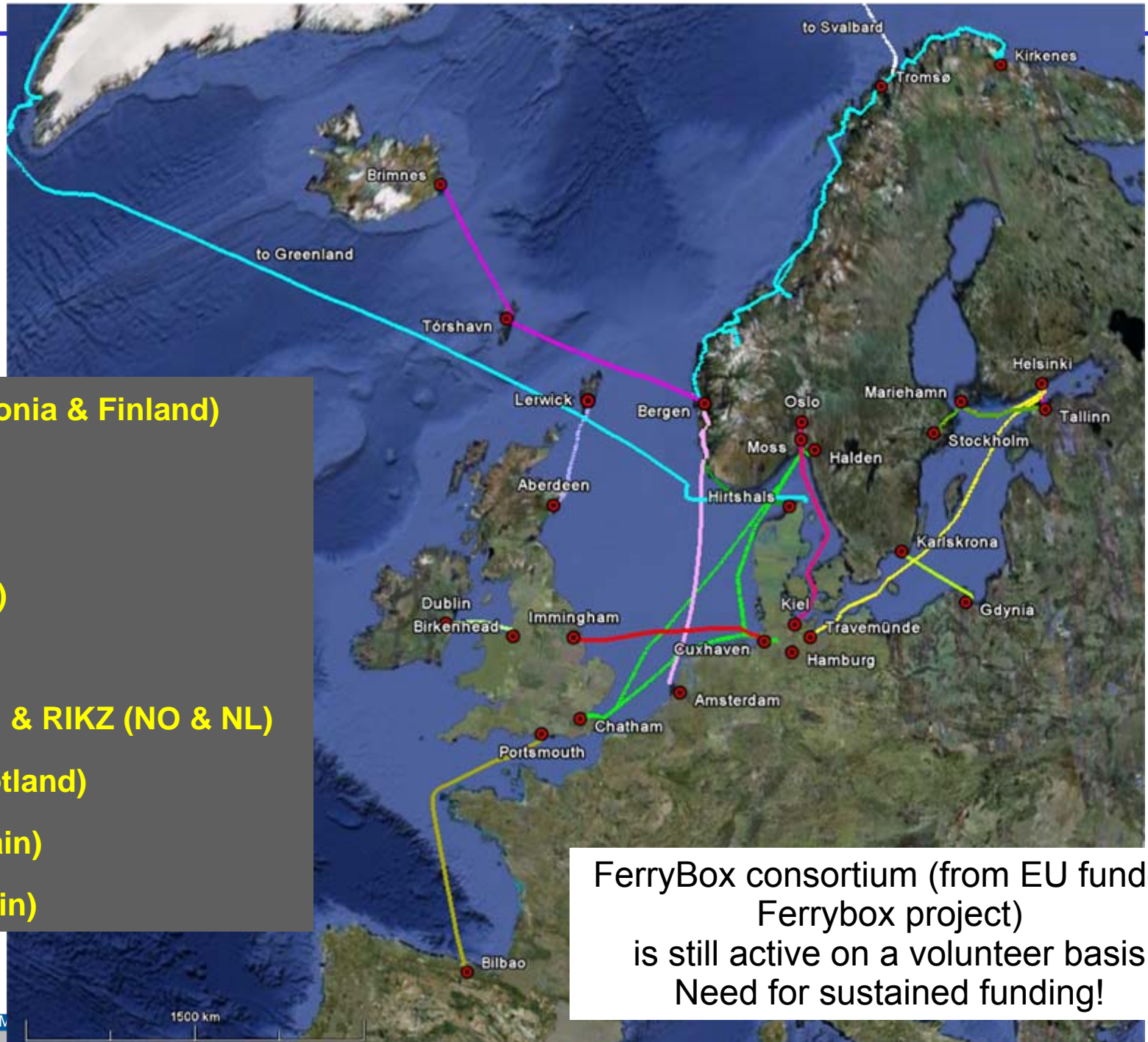


Pressure resistant
FerryBox II
(closed system)



Transportable „Pocket FerryBox“
For field campaigns
aboard small boats

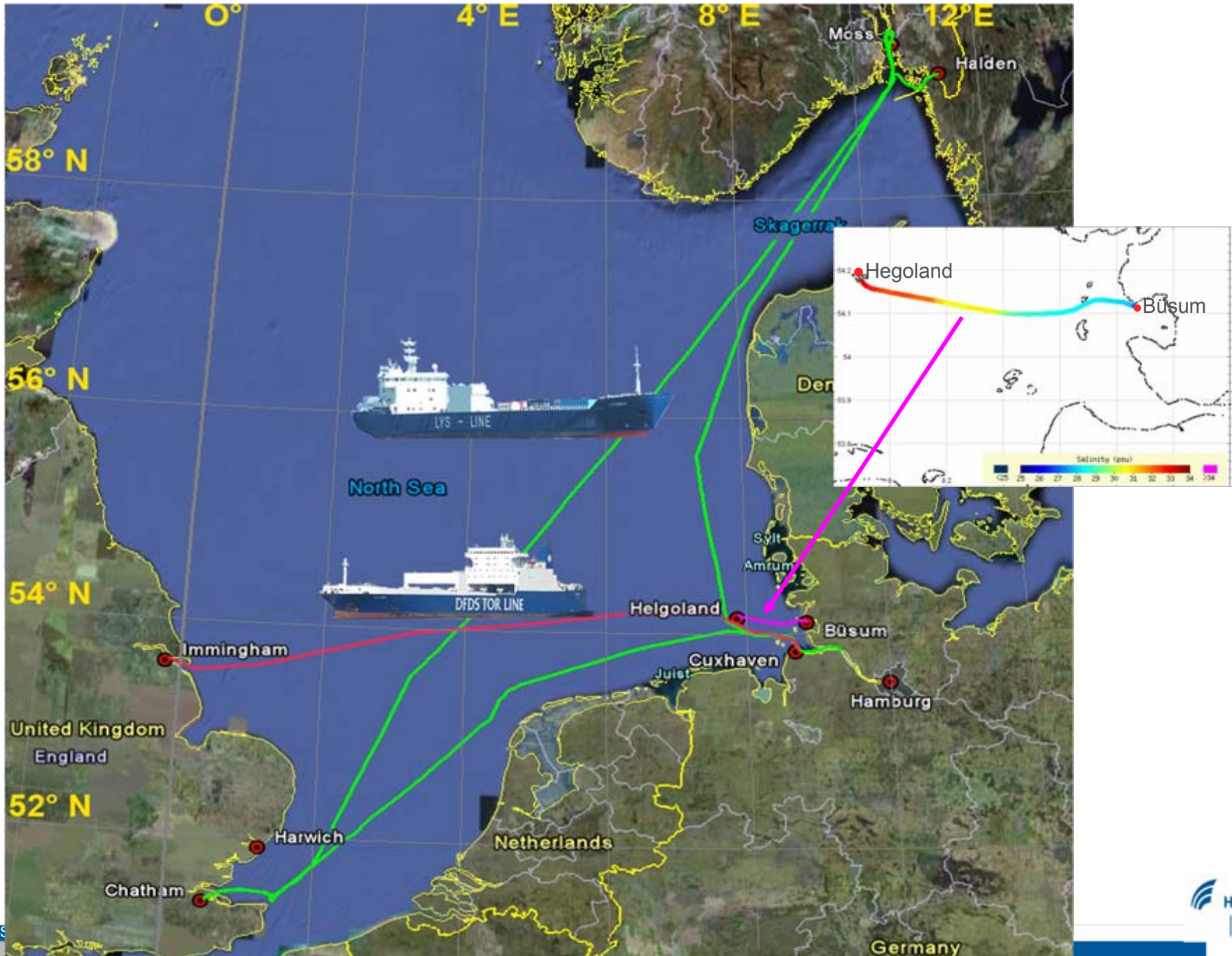
FerryBox Routes in Europe (2009)

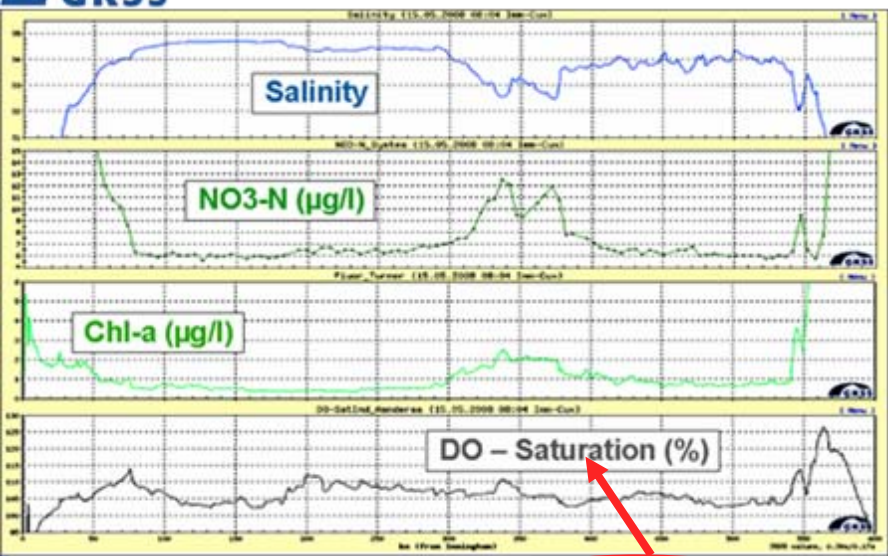


- EMI & FIMR (Estonia & Finland)
- FIMR (Finland)
- IMW (Poland)
- GKSS (Germany)
- NIVA (Norway)
- Bjerknes Bergen & RIKZ (NO & NL)
- FRS Marlab (Scotland)
- NOC (Great Britain)
- POL (Great Britain)

FerryBox consortium (from EU funded Ferrybox project) is still active on a volunteer basis
Need for sustained funding!

GKSS FerryBox Routes in the Southern North Sea 2009

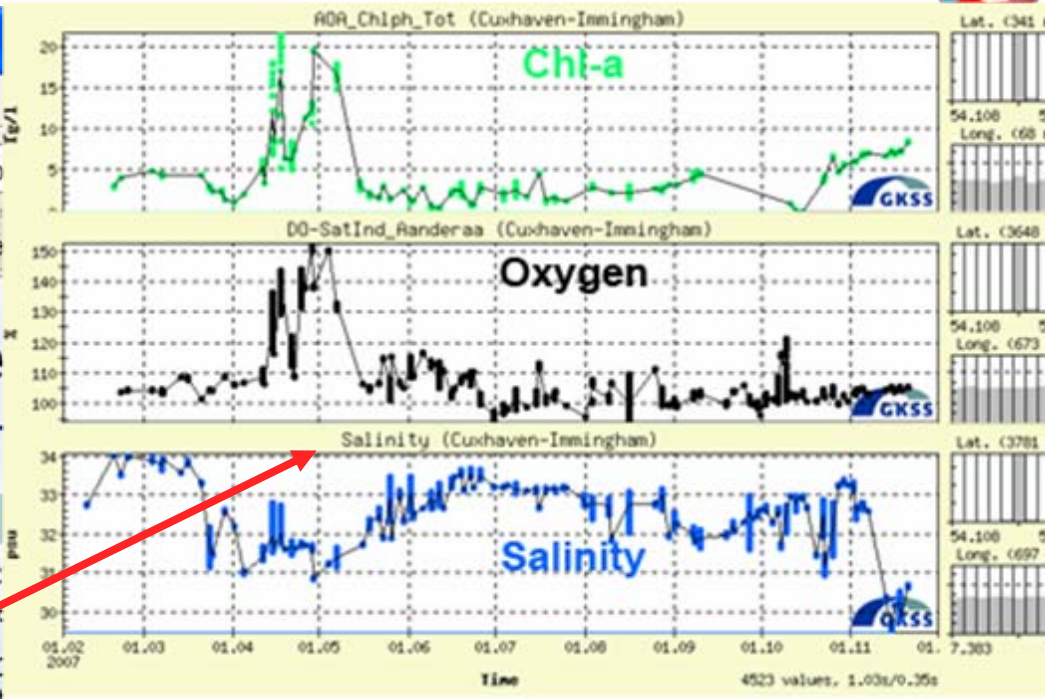




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GKSS Fe

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Transect Plot I

Plot of one selected variables/parameter vs. distance

Transect Plot II

Plot of one or more variables/parameters vs. distance

Time-Series Plot

Plot at a selected position of the route variables/parameters vs. time

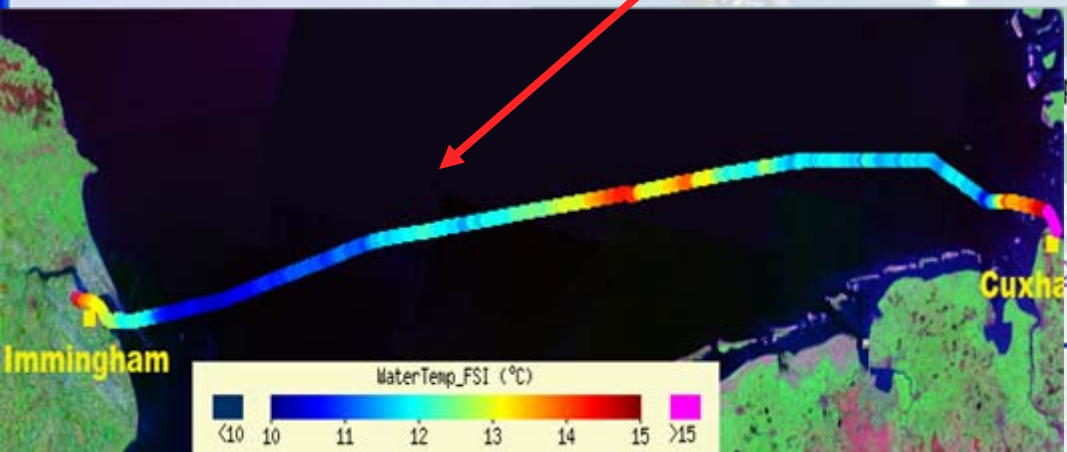
Scatter Plot

Scatter Plot

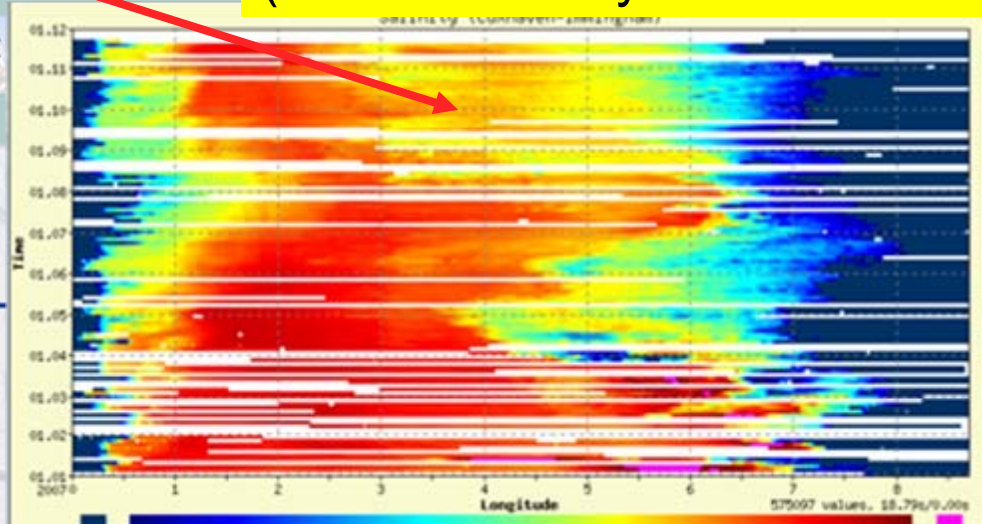
Map Plot

Map Plot

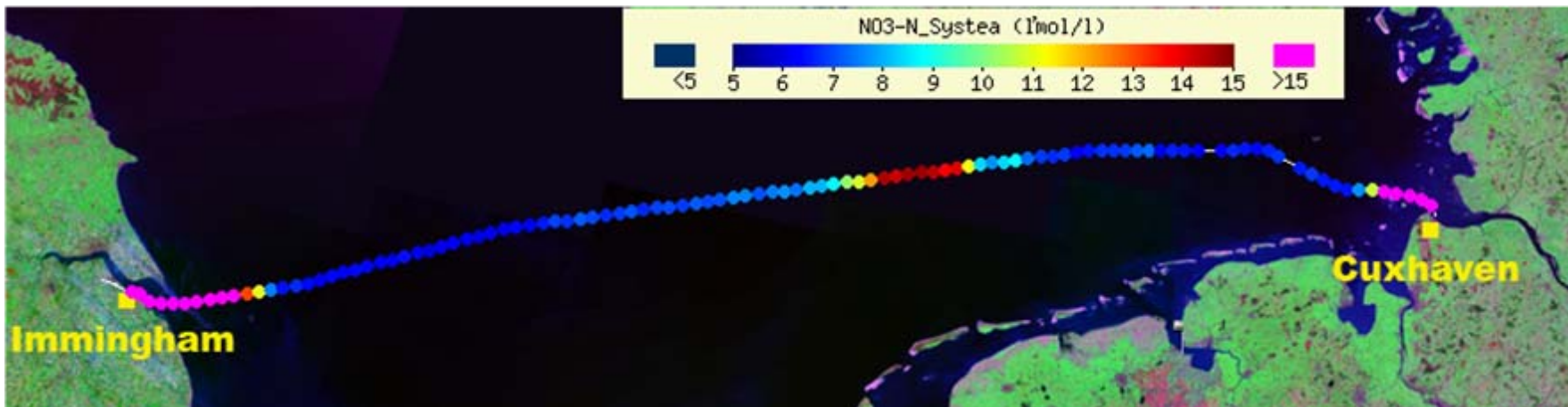
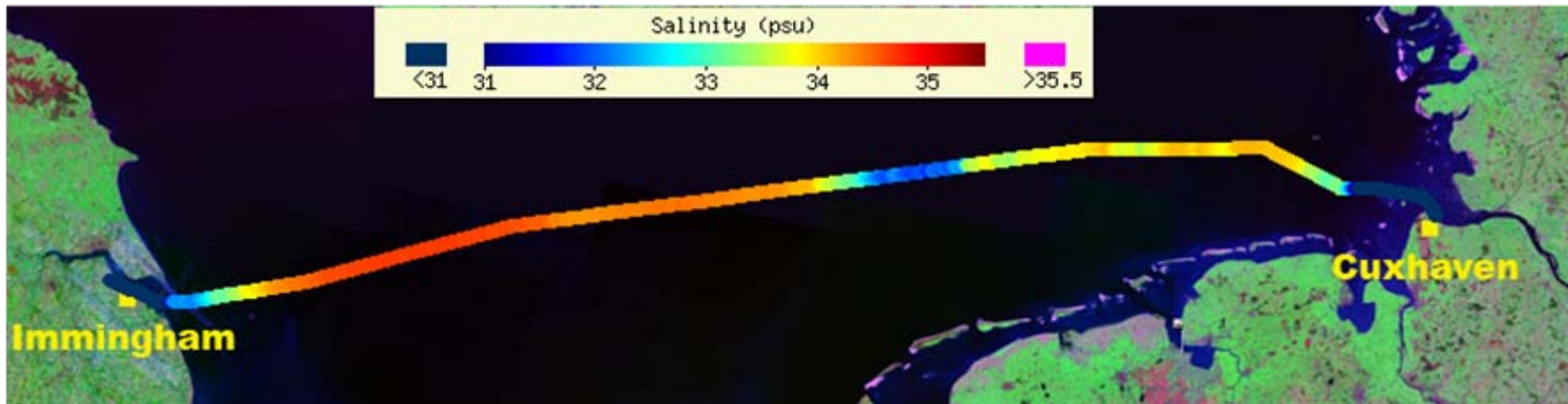
Interactive visualization of FerryBox data from website (access to FerryBox Oracle data)



User: start (start)



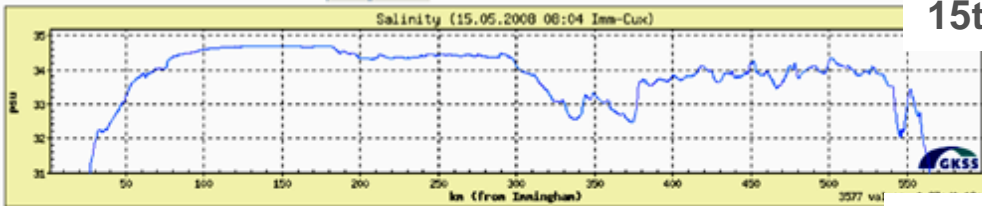
Data Example: Intrusion of Freshwater along the Route 6th to 15th of May 2008



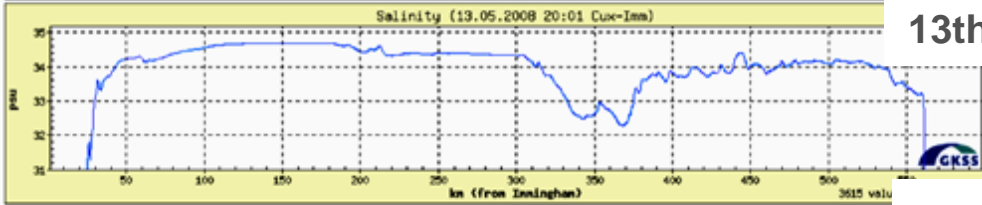
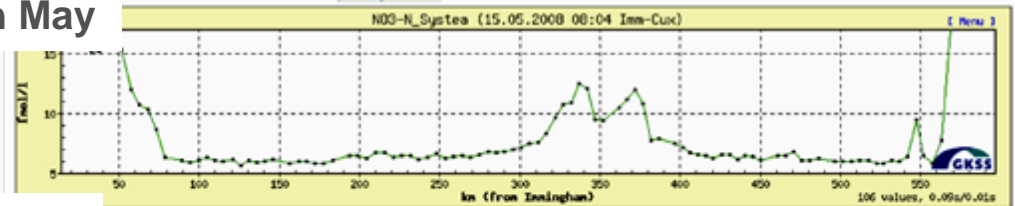
Intrusion of Freshwater along the Route 6th to 15th of May 2008

Salinity

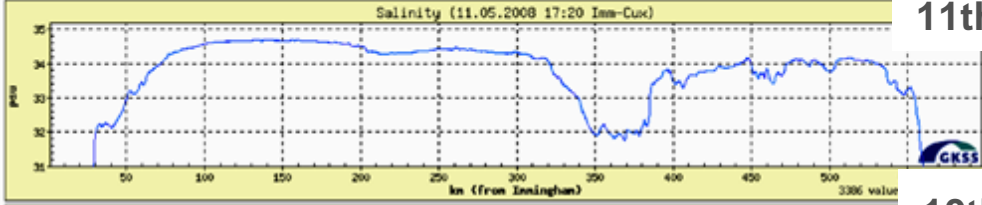
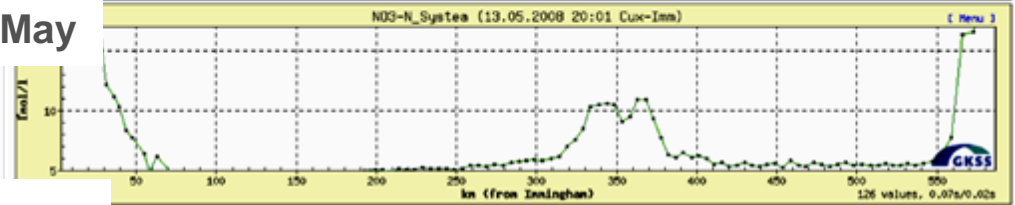
Nitrate



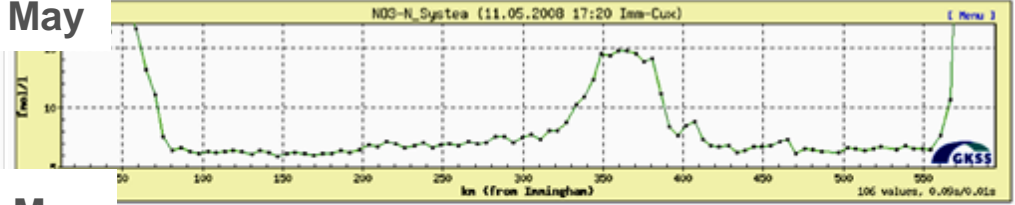
15th May



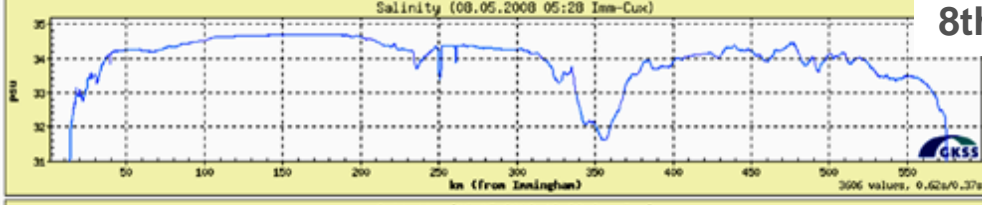
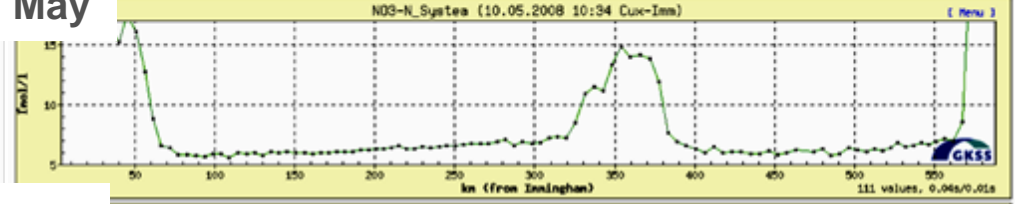
13th May



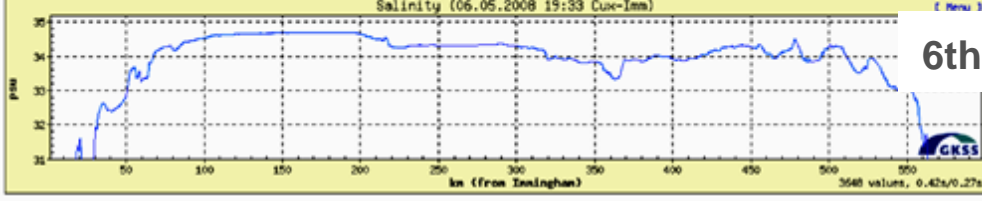
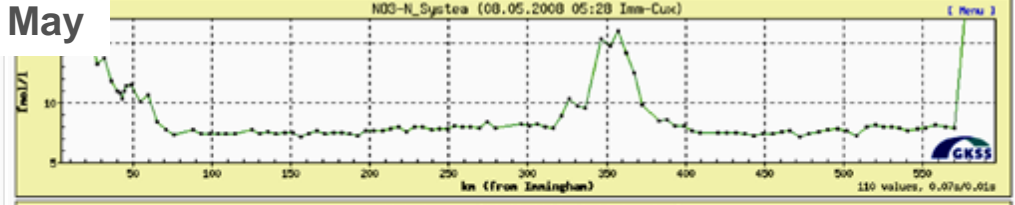
11th May



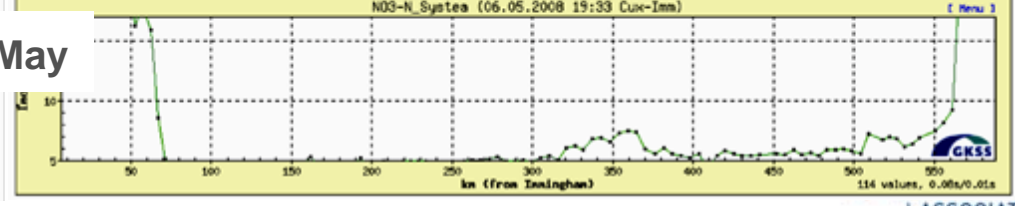
10th May



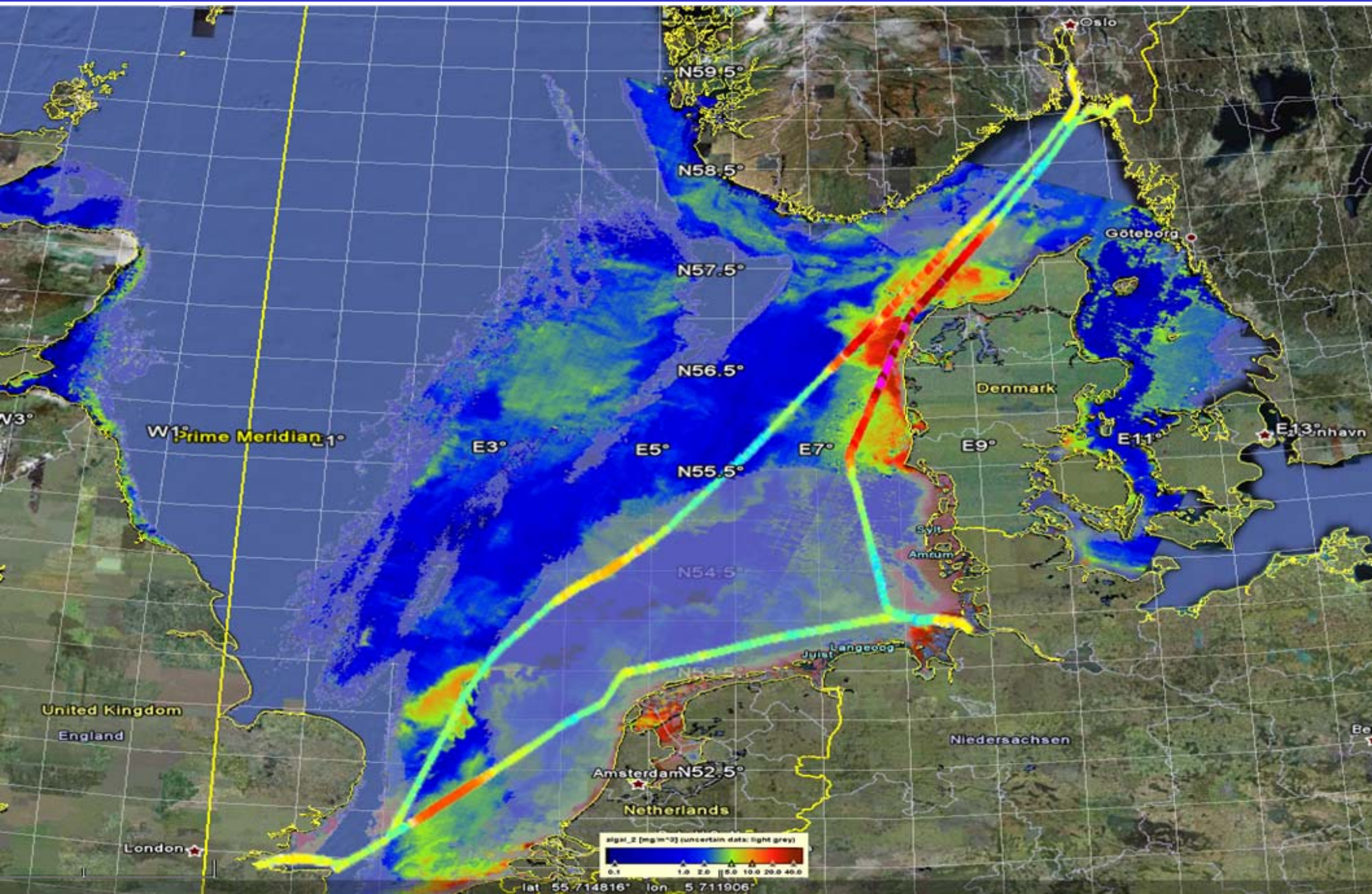
8th May



6th May



FerryBox Data (Transect) & Remote Sensed Data (April 2009)



Integration in Coastal Observing Systems



COSYNA

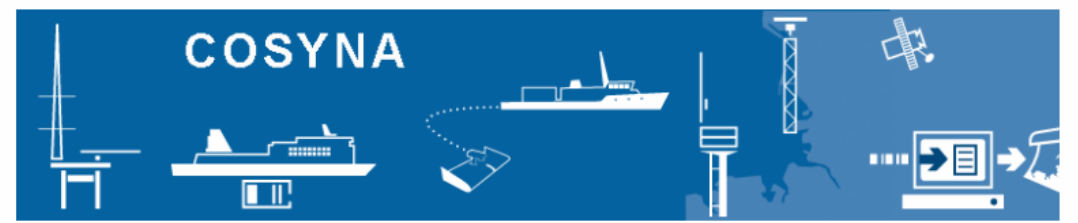
Coastal Observing System for Northern and Arctic Seas

Home

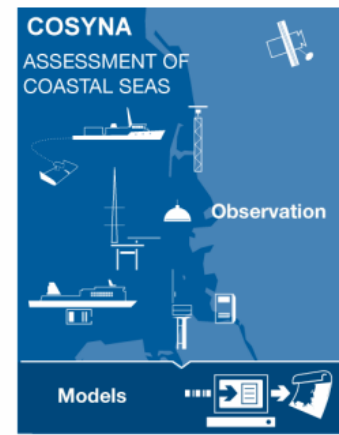
- PROGRAMMSCHWERPUNKTE
- INSTITUTE
- ZENTRALE EINRICHTUNGEN
- WISSENSCHAFT UND INDUSTRIE
- WIR ÜBER UNS
- PRESSE

- Executive Summary
- Motivation
- Integrated System
- Objectives
- Step 1: 'ICON'
- Step 2: COSYNA
- Publications
- Observation & Model Data
- Animation
- External links
- Home IfK

> COSYNA



COSYNA ("Coastal Observing System for Northern and Arctic Seas")



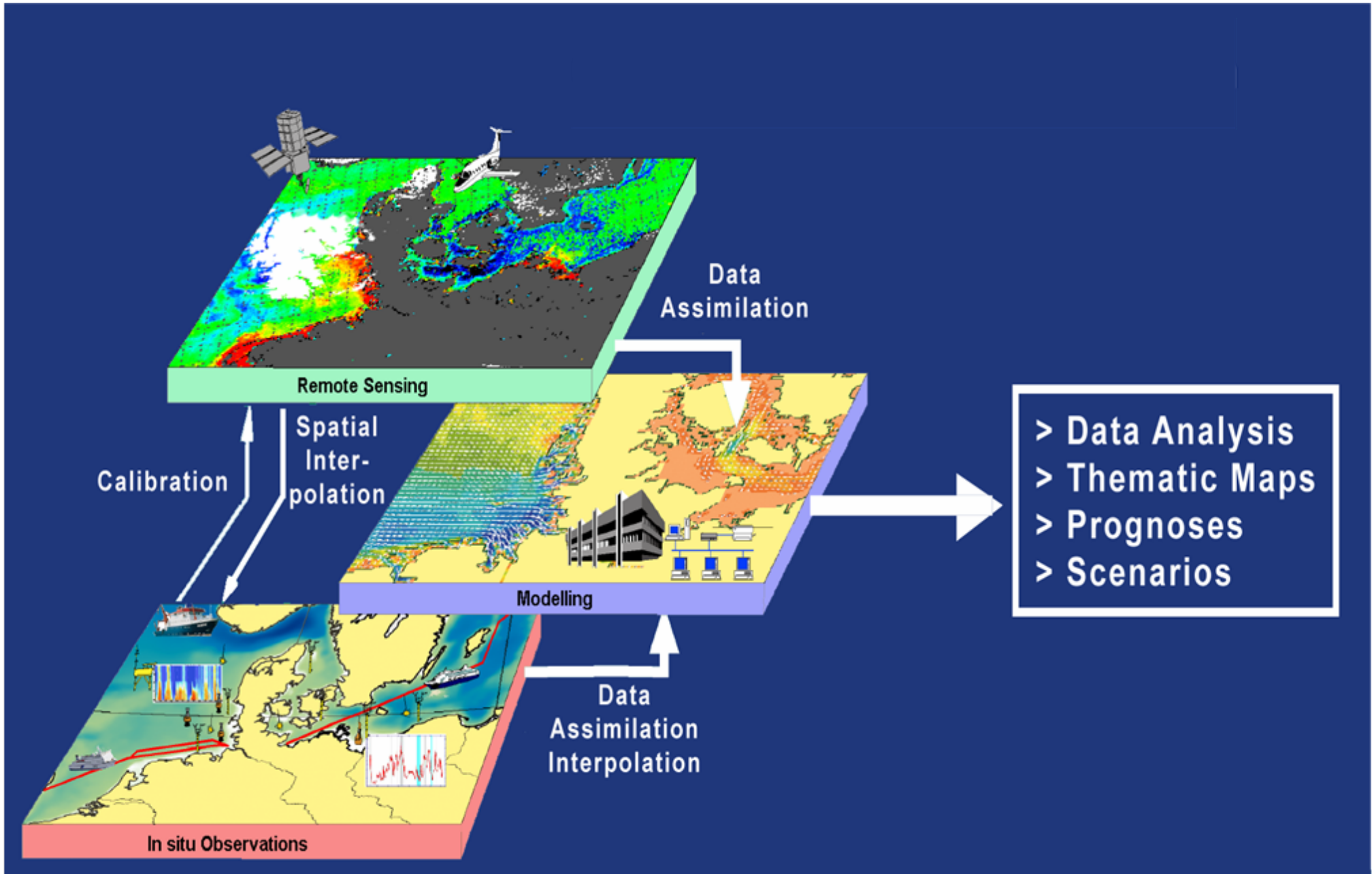
The principal goal of the COSYNA-Project is the construction of a long-term observatory for the German part of the North Sea. Elements of the observatory should also be deployed as prototype modules in arctic coastal waters. This is expected to strengthen and bundle expertise and infrastructural equipment existing at the two Helmholtz Association centres GKSS and AWI with expertise available within the consortium of German marine research (KDM) in order to create a centrally managed, operational, large-scale monitoring and modelling system. By providing knowledge as well as hardware, the system will, in addition, enable future research projects pursued by individual partners within the consortium. In cooperation and agreement with the German Federal Maritime and Hydrographic Agency (BSH), GKSS seeks to pinpoint the German role in the international development of marine monitoring and long-term observational strategies. As a nationally funded project COSYNA is aimed to link to European partners.

www.cosyna.de

The COSYNA-Project is realised within two steps:

- Step 1:** Building and testing of near-coastal stations (existing and new ones) in the inner German Bight and the Wadden Sea and first applications of models and data assimilation. This step is realised within the knowledge-induced investment "ICON = Integrated Coastal Observation Network North Sea").
- Step 2:** Expanding the ICON-System towards offshore regions of the North Sea to build an integrated observing and modelling system together with different scientific partners from KDM and monitoring agencies.

– COSYNA – Integrated Approach



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http://www.openioos.org/index.html

Meistbesuchte Seiten LEO Deutsch-Englisch... Ferry Box Principle Google Search Meris-scenes f... Google Maps FerryBox-Activities ServiceIntern GKSS FerryBox Datab... GKSS Time Series Dat... Why a FerryBox? >>

OPENIOOS.ORG
AN INTEGRATED OCEAN OBSERVING SYSTEM TESTBED

WHERE STANDARDS ENABLE INNOVATION
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POWERED BY SURA SCOOP IN SUPPORT OF IOOS

REAL-TIME DATA 24/7 PREDICTIONS RETROSPECTIVES MODELING TEST BED GUIDES & RESOURCES

Real-time WW3 wave height forecast & observations

Click the station icons on the map to compare the forecast with actual observations

[MORE INFO](#)

No Currently Active Storms

SOS Realtime Map

Over 1000 Platforms Reporting

[MORE INFO](#)

Katrina water-level models and observations

Click on an observing station to see a time-series plot

[MORE INFO](#)

COASTAL DATA NETWORK

Real-time Data

- [Networking data systems](#) with web services
- [Web mapping](#) that integrates networked data with web-based GIS (Geographic Information Systems)
- [Concept design](#)
- [System architecture](#)

IMPROVING COASTAL PREDICTIONS

24/7 Predictions

- [Water level](#) - East coast & Gulf of Mexico
- [Waves](#) - Atlantic & Gulf of Mexico
- [Chesapeake Bay](#) forecast model comparisons

Retrospectives of historical storms

- [Storm surge](#) (Katrina and others)
- [Hurricane Waves](#) (Katrina and others)

GUIDES & RESOURCES

Data networking with standards

- [Learn](#) how to publish, access & visualize observations and model results.

Resources for modeling (waves, water level & inundation)

- [Catalog and Data Services](#)
- [Comparing Different Models](#)
- [Performing Numerical Experiments](#) -- Retrospectives or Ensemble Forecasts

USE THE SYSTEM TO...

- [Search](#) and access data in the network.
- [Serve](#) my data to the network (model results or observations)
- [Conduct](#) my own numerical modeling experiment using the SCOOP cyber infrastructure
- [Compare](#) my model results to others using network technologies

ABOUT OPENIOOS

- [Funders and sponsors](#)

OpenIOOS

OpenIOOS SOS Map - Mozilla Firefox

http://www.openioos.org/testbed/sos/gm_sos.html

Powered by: **SURA SCOOP**

OpenIOOS.org ...where standards enable innovation

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Real-time Data Maps
Sea Surface Temperature
OGC Sensor Web

24/7 Forecasts
Water Level
Waves

Historical Storms
All Storm Forecasts
Most Recent (Paloma)

Data Providers
AOOS
GoMOOS
MBARI
MVCO
NANOOS
OCEANWATCH
SEACOOS
TABS TAMU
UNH Marine Program

This site funded by

Site Contributors
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USGS (Winds)
USGS (Waterwatch)
NASA (Satellites)
NASA (JPL)
Navy (ONR/CBLAST)
GoMOOS
NYHOPS
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This interoperability demonstration represents an effort to develop a Web Services Architecture for Ocean Observing that is enabling observing systems to move closer to the vision of 'network as platform'. We are seeking participants who would like to serve their in-situ observation data via SOS based Web Services.

SOS Realtime Map 6 Platforms reporting: - All Observed Properties -

Karte Satellit Hybrid

GKSS/IFK SOS Service
Organization: [GKSS Institute for Coastal Research](#)
Platform: Pile_Hoernum1
The pile is situated in the inner part of Hornum Deep. It serves for hydrographic and meteorological measurements. It is built in a modular way both the platform and the measuring devices. Operating there since May 2002
Lat: 54.794167 Lon: 8.451389
Air Temperature: 13.91 deg C at 05/15 13:40
Winds: 9.73 9.83 at 04/15 15:50
(Times are UTC)
[Describe Sensor XML](#)

IOOS Variables:
- All -
ALL

Zoom To:
- select -

Organizations:
GKSS

- [OOSTethys.org](#)
- [How this map was produced](#)
- [Mapserver Version](#)
- [SOS Registry](#)

◆ Recent observations
◆ No recent observations

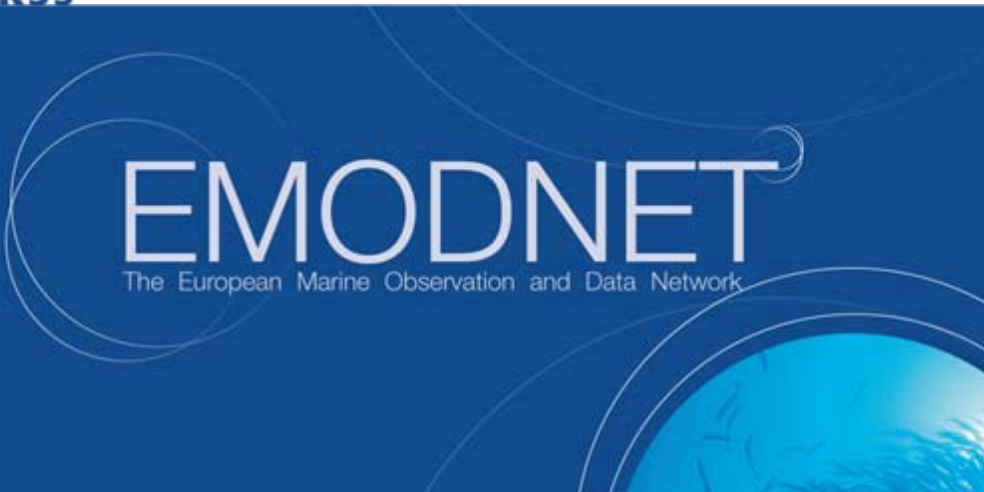
Integration in other European activities

The screenshot shows the homepage of the European Marine Ecosystem Observatory (EMECO). The header features the EMECO logo and the text 'European Marine Ecosystem Observatory'. A navigation menu includes 'Home', 'Overview', 'Ocean Threats', 'Ocean Health', 'About', and 'Contact'. A search bar is located in the top right corner. The main content area is divided into three columns:

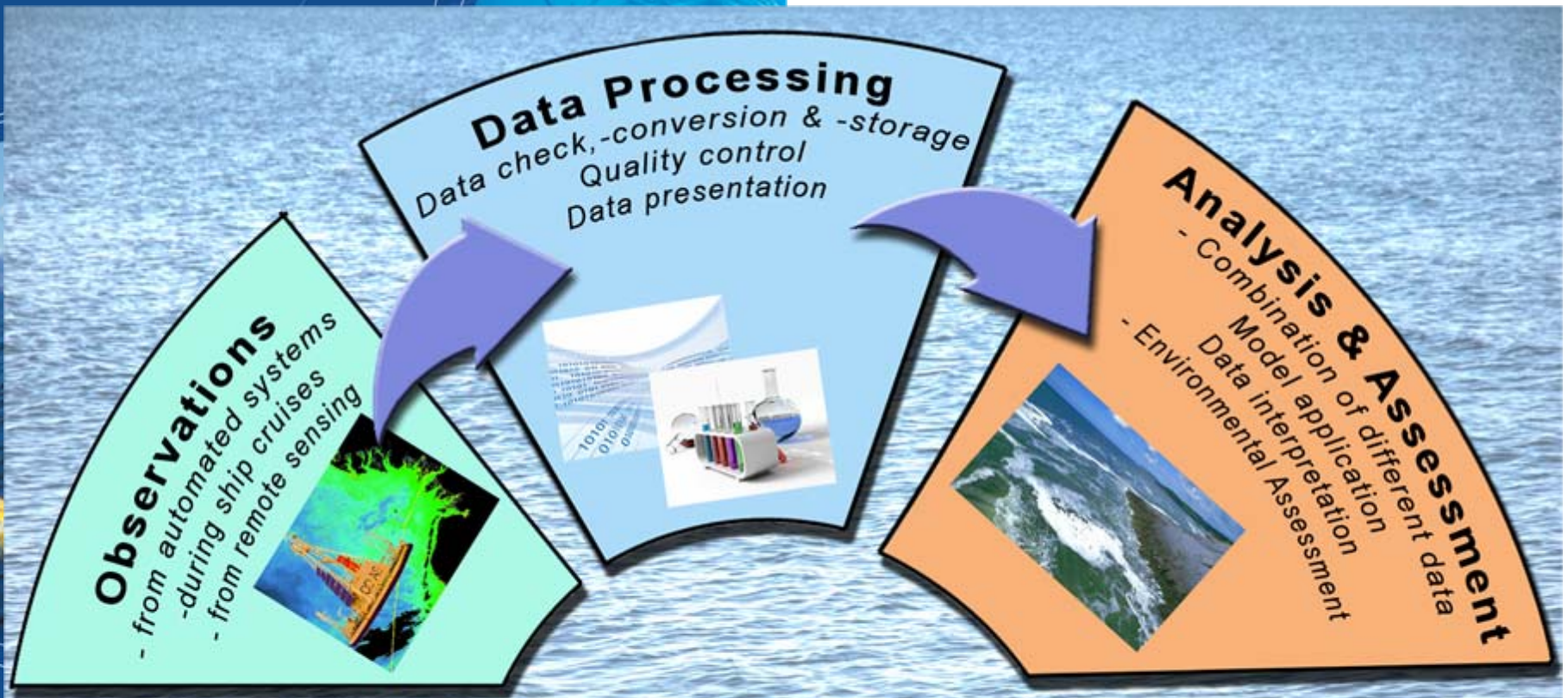
- Left Column:** 'Information for:' with links for Policy Makers, Researchers, Partners, and General Public. 'Quick Links:' with links for Projects, Monitoring Tools, and Modelling Tools. A list of partner organizations: CEFAS, GKSS, IMR, Deltares, and NIVA.
- Middle Column:** 'Welcome to EMECO' section. It describes EMECO as a consortium of specialists in marine environmental monitoring, modelling, and research. It mentions that EMECO partners manage large amounts of data gathered over long periods. Below this is a 'Projects' section with a sub-section for 'Oyster Grounds', describing a collaboration between the Rijkswaterstaat and Deltares laboratory (NL) and Cefas (UK).
- Right Column:** 'News & Events' section with an RSS icon. It lists several news items: 'Arctic currents may be warming the world', 'Greenpeace wages war at sea against tuna fishers in Pacific Ocean', and 'North Sea is slow to feel the heat as spring springs'. Below this is a 'Resources' section with a link to 'North Sea Chlorophyll March 2008' and a corresponding satellite image of the North Sea.

A prominent yellow box in the upper right of the screenshot contains the website address: **www.emecogroup.org**. The email address 'info@emecogroup.org' is visible in the top right corner of the page.

Integration in other European activities



Marine Board of ESF & EuroGOOS: EMODNET Brochure 2008



From Observation to Information

Co-operation within Europe

- BSH German Hydrographical Service
- RIKZ National Institute for Marine and Coastal Management
- NIVA Norwegian Institute for Water Research
- CEFAS Centre for Fisheries Research
- FIMR Finnish Institute for Marine Research
- NOC National Oceanographic Centre
- IFREMER French Research Institute for Exploitation of the Sea

European FerryBox Community: www.ferrybox.org



Browser address bar: <http://www.ferrybox.org/routes/index.html.en>

Navigation icons: Home | COSYNA | Print

FerryBox Community

Why a FerryBox (FB)?

Objectives

Ferry Box Principle

Ship Routes

North Sea

Baltic Sea

Atlantic

Table of Routes

FerryBox Institutions

FB Online Data

FB Applications

EU-Project "FerryBox"

FB Future Perspectives

Other FB Links

Observation Networks

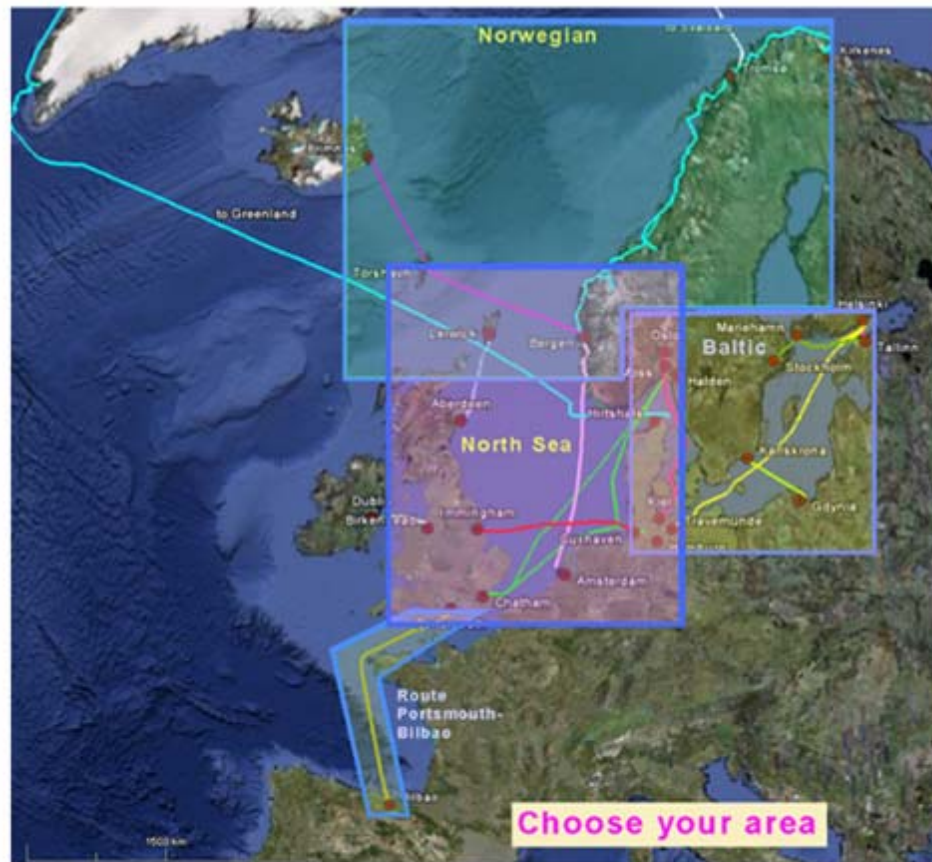
Publications

Companies

Internals

> Home > Ship Routes

Main Routes of 'Ships of Opportunity' in Europe



Choose the area in the map from which want to have more detailed information.

Website hosted by:



<http://www.gkss.de>



[OCEANS'09](#)

[OceanObs'09](#)

[Oceanology 2010](#)

Contact

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 Fax: +49 4152 87 2366
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Global Co-operation

- GOOS: FerryBox adopted as pilot project
- JCOMMOPS: ships-of-opportunity program
- EUROGOOS: Incorporation into operational services of European regional systems (MOON, NOOS, BOOS)
- ICES: International Council for the Exploration of the Sea

Future Developments

Flexible FerryBox system:

(“ship are coming and going”)

- “Plug and Play” FerryBox systems.

Preparing new vessels and other SOO’s for an installation of a FerryBox (water inlet & outlet, power supply, communication cable ..).

Expansion of FerryBox parameter set :

More focus on ecosystem and biogeochemical variables:

- **p-CO₂** sensor (FB North Sea June 2009)
- new sensors for **more precise pH + alkalinity measurements** (under development)
- **PSICam** (point-source integrating-cavity absorption meter) for **better quantification of chlorophyll-a** and detection of algal species
- **gen probes** for detection of algal species (under development)

Summary I

FerryBox characteristics:

- System runs autonomously, is controlled by GPS position, is self cleaning and has a automatic water sampler.
- Standard variables
 - temperature, salinity, turbidity, chlorophyll-fluorescence
- Extended variables:
 - oxygen, pH, algal groups, nutrients, pCO₂, alkalinity

Strengths:

- cost effective (no ship operation costs)
- no energy restrictions,
- regular maintenance possible,
- transects sampled repeatedly,
- captures short-term but important (in terms of magnitude) events (e.g. algal blooms)
- bio-fouling can be easily controlled for long-term reliability of data

Weaknesses

- sampling limited to transects
- no depth sampling

Summary II

Aims: Integrated Monitoring:

- Integration with other datasets including satellite data for synoptic surface measurements
- Data assimilation in numerical models (hydrodynamic and ecosystem models)

Ongoing activities

- Within Europe looking for new (sustainable?) funding by the EU commission
- Marine Board of ESF (intergration of European activities)
- Community white paper (Hydes et al.) at **OceanObs'09** (Venice Sept 2009)
- **SCOR*/IAPSO**** initiative **OceanScope** (Tom Rossby et al.) (observation of the ocean through close collaboration with the merchant marine industry)

*SCOR: Scientific Committee on Oceanic Research

**IAPSO: International Association for the Physical Sciences of the Oceans

Thank You!

European FerryBox Website

<http://www.ferrybox.org>

further information FerryBox GKSS

<http://www.ferrybox.de>

access to all GKSS-FerryBox data:

<http://ferrydata.gkss.de>

Sensor Package

