

A common European database for underway data from FerryBoxes

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Content

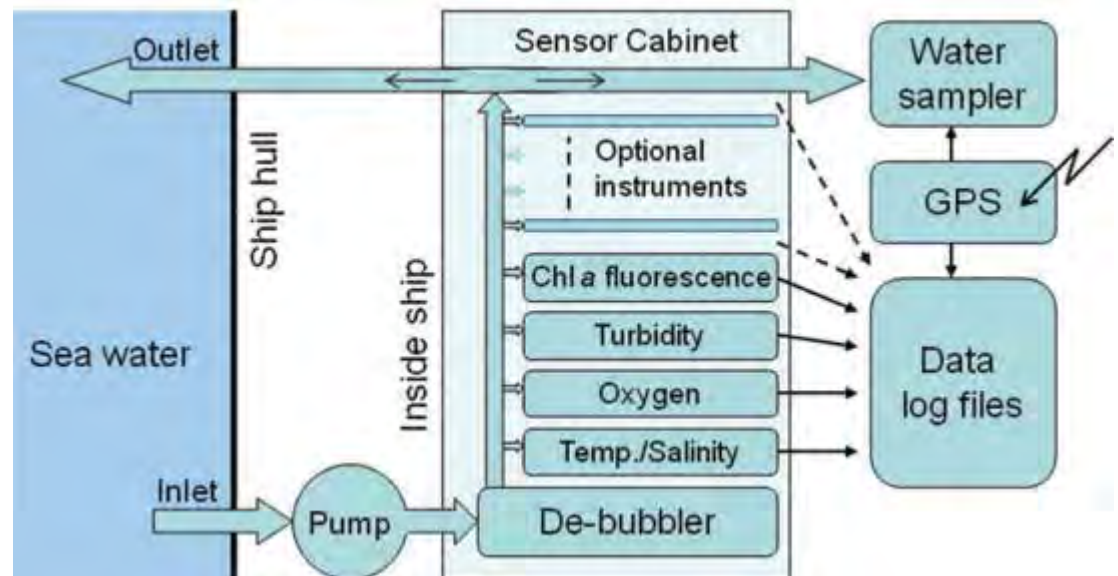
- FerryBoxes in general
- Ferrydata.hzg.de: The HZG approach for data from FerryBoxes on fixed routes.
- European FerryBox database
- First results from importing Hurtigrouten by IMR (Institute of Marine Research, Norway) on a regular base.
- SOS V2 access to FerryBox database

Ferries and container ships as monitoring platforms



core parameters measured by all systems: salinity, temperature, turbidity, chl-a fluorescence

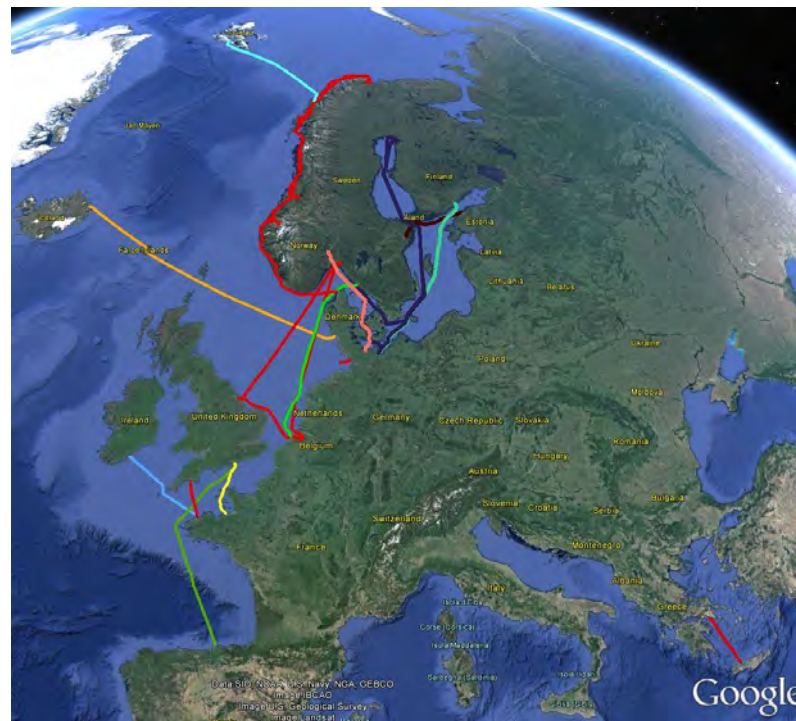
biogeochemical parameters: oxygen, pH, pCO₂, irradiance, nutrients, algal pigments, CDOM, discrete and passive samplers



FerryBox pros and cons

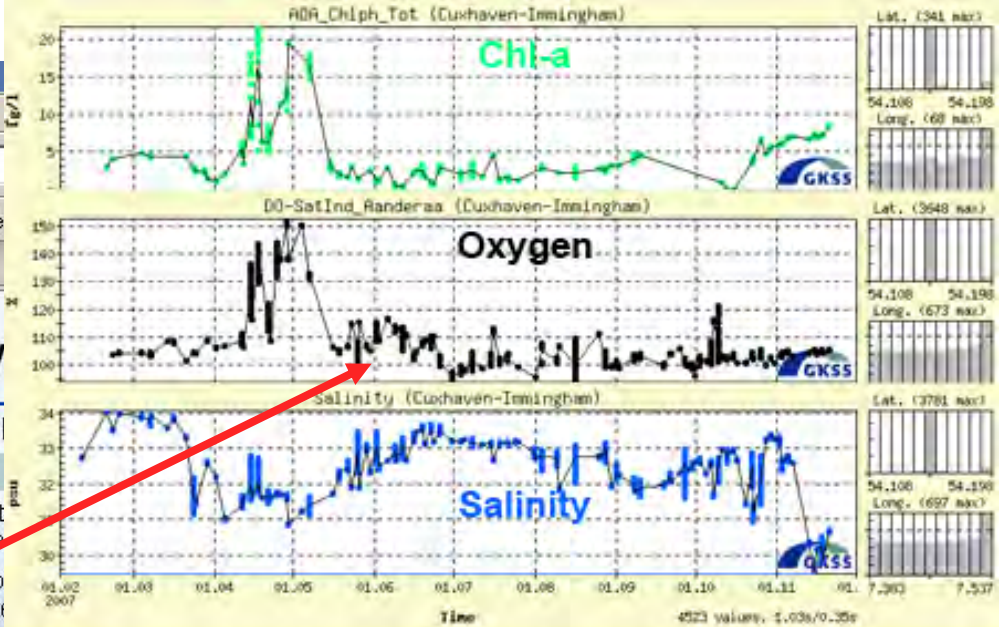
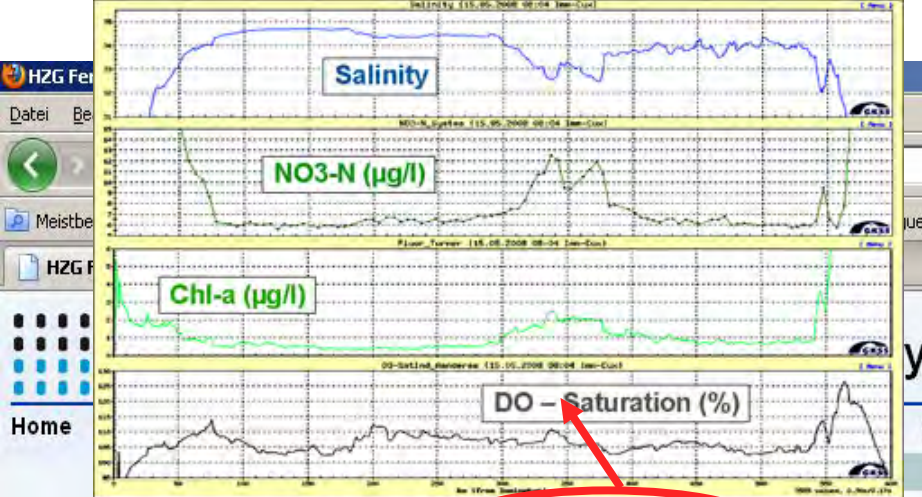
Advantages

- Cost effective (no costs for the platform)
- Real-time/near-real-time data
- High spatial and temporal resolution (repeat transects)
- Often covers regions of socioeconomic importance
- “Friendly” environment for the system
 - No energy limitations
 - Good for testing/operating new sensors that may be less robust, or sensors/samplers that have high energy or sample size requirements
 - Easy maintenance and antifouling measures
- Water can be sampled/preserved for advanced analysis in the lab

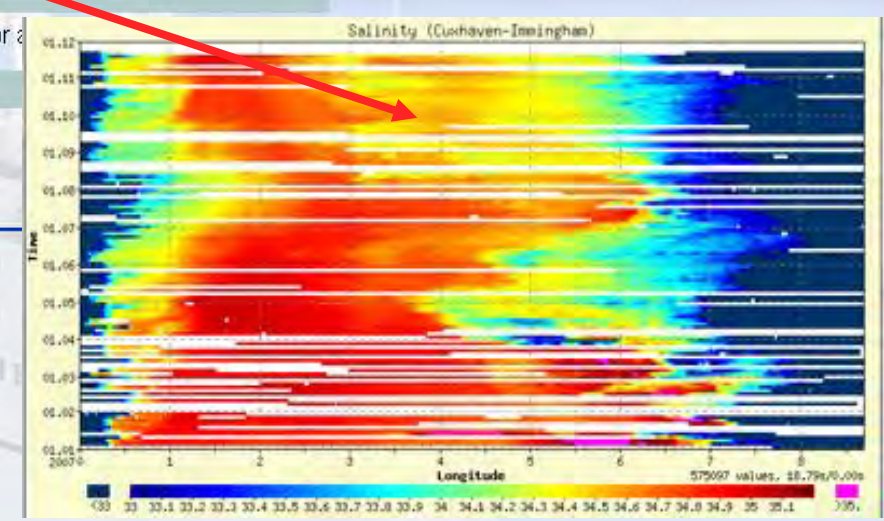
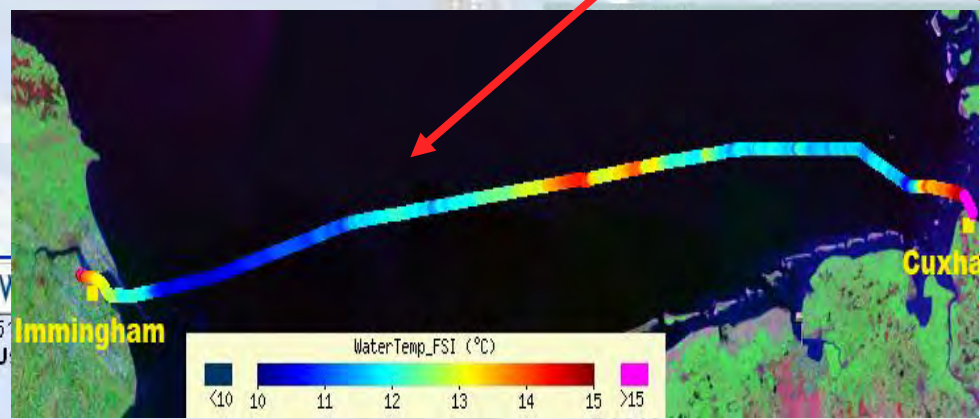


Limitations

- Data limited to the transect
- No depth profiles, unless XBTs are used
- Voluntary ships/routes can change



- Transect Plot I Plot of one select variables/parame
- Transect Plot II Plot of one or mo variable/parame
- Time-Series Plot Plot at a selected position of the route: One or more variables/parameters vs. time
- Scatter Plot Scatter Plot
- Map Plot Map Plot

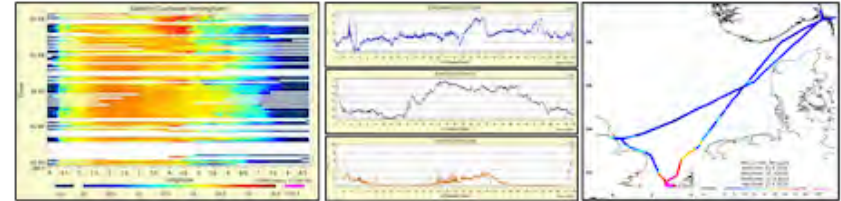


Datamodel for FerryBoxes on fixed routes

- Currently most FerryBox data on fixed routes are provided to CMEMS as daily or monthly data which is not suitable because the data are transect oriented.
- A suitable data model should keep the transect information.
- Such a data model should consist of:
 - Fixed routes (e.g. Hurtigrouten, Cuxhaven-Immingham)
 - Every route has two or more sections (about 70 for Hurtigrouten, two sections Cuxhaven-Immingham and Immingham-Cuxhaven)
 - Every transect has his own id.
 - All data are stored within one table together with the transect id.
- The European FerryBox database should be based on such a data model.
- Upload of data into the database can be adapted as needed.

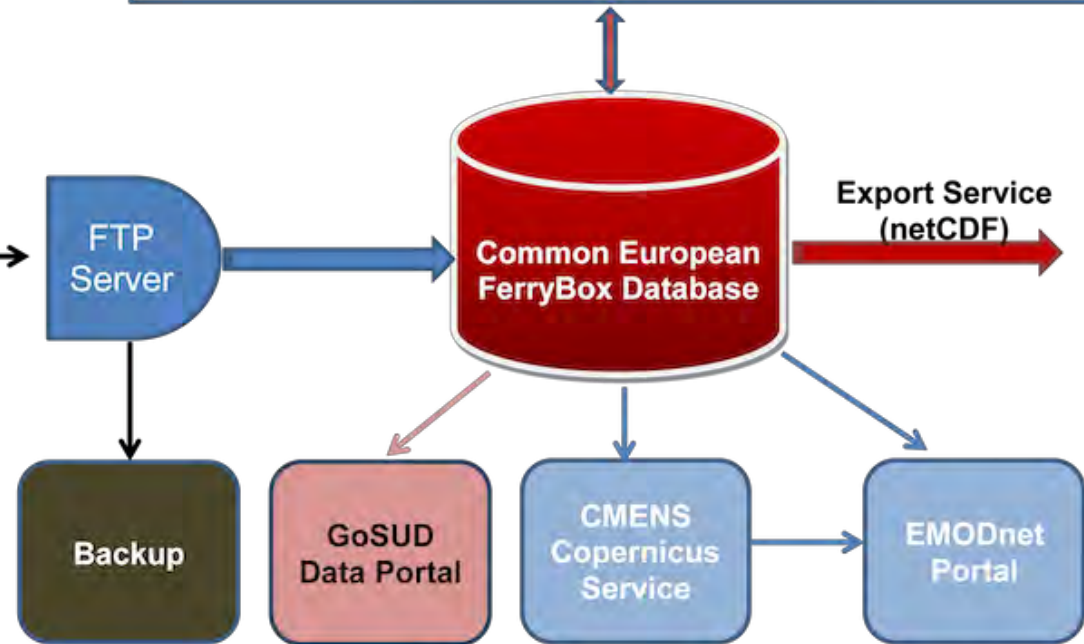
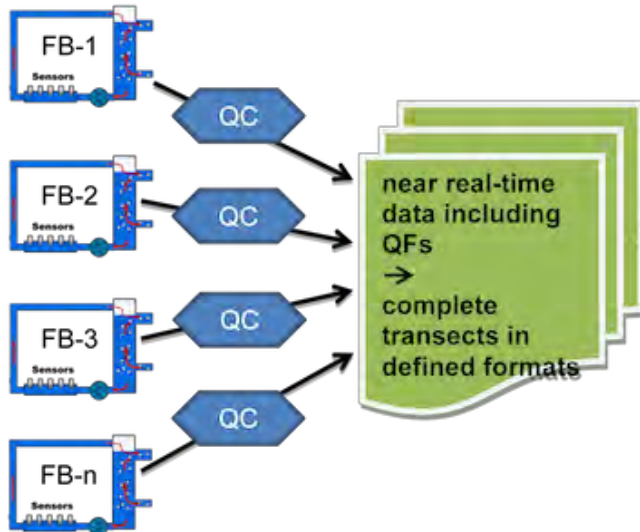
Proposed Scheme for a Common European FerryBox Data Management

European FerryBox Data Portal



- free choice to set a parameter as public or private
- all web based tools are also available for private parameters (e.g. for sensor development, testing etc.)

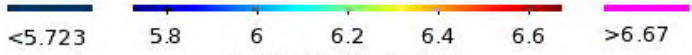
From Operator/Institute or via ROOSs



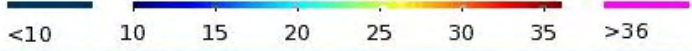
FerryBox Database

- Within JericoNext it was decided to use Ferrydata.hzg.de as a basis for an European database for all European FerryBoxes on fixed routes.
- Manually test imports were realised for most routes.
- Regular imports have been started for Hurtigrouten by IMR.
- IMR covers the costs partially.

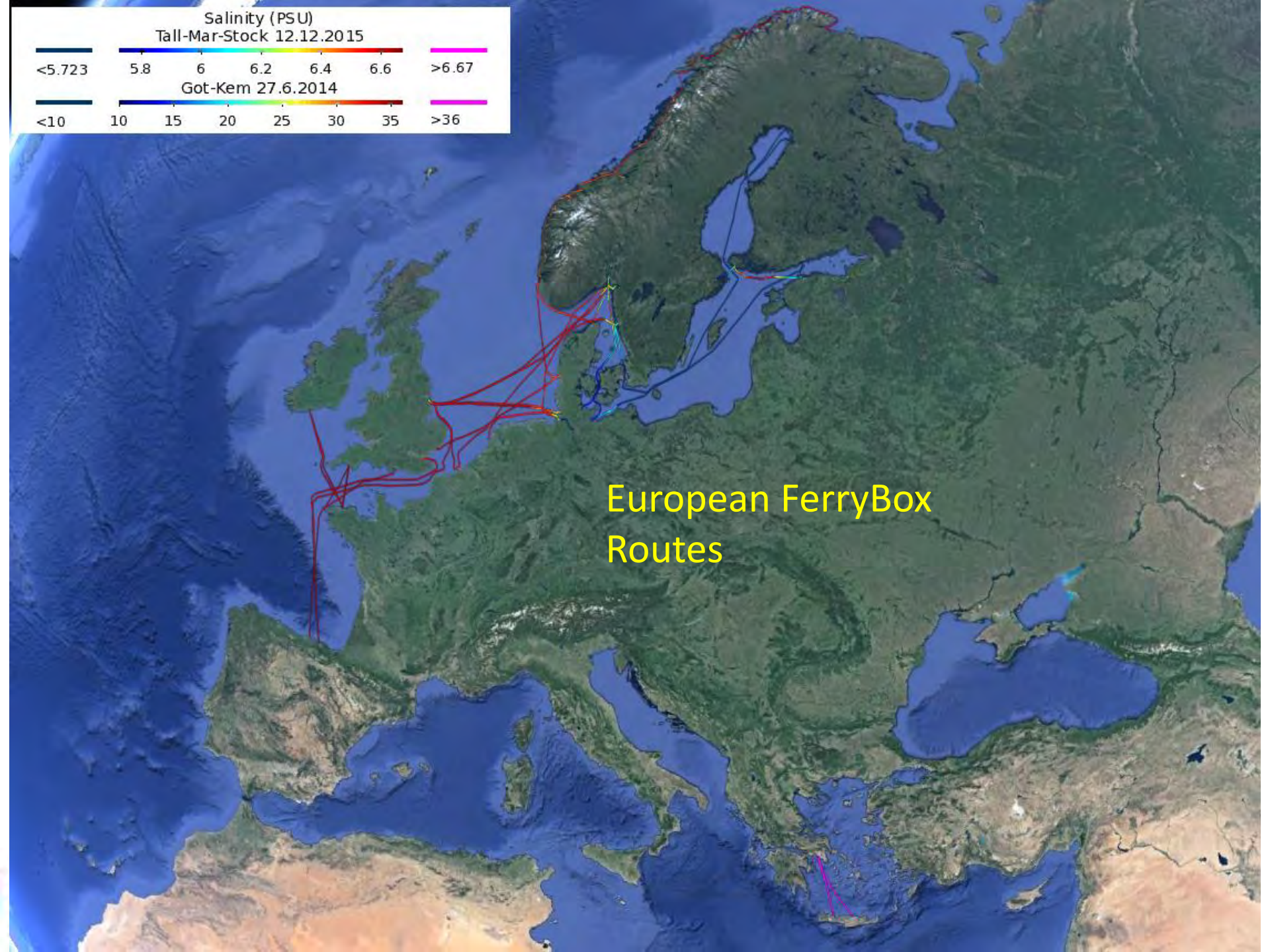
Salinity (PSU)
Tall-Mar-Stock 12.12.2015



Got-Kem 27.6.2014



European FerryBox
Routes



Hurtigrouten Bergen-Kirkenes

- Complete length: 2600 km
- About 70 sections from harbour to harbour.
- Parameter: Salinity, Temperature, Chlorophyll-a fluorescence (since 2016).
- First file imported: April 2015
- IMR gets files daily and put them onto a ftp server.
- The IMR ftp server is mirrored by HZG.
- Currently there are 2230 transect files mirrored and imported.

Salinity

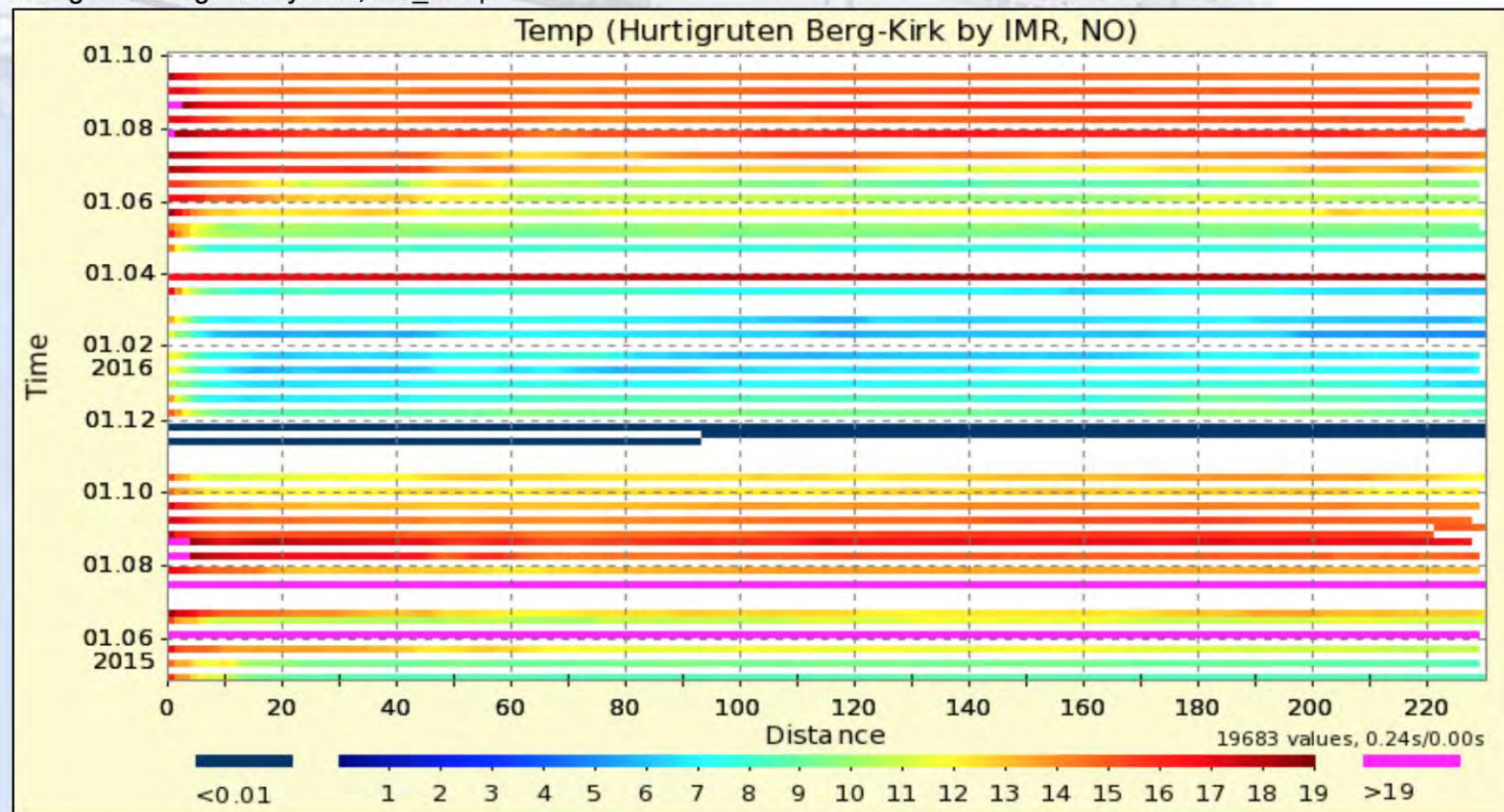


Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image Landsat
Image IBCAO
© 2016 Google

- **Route:** Hurtigruten Berg-Kirk by IMR, NO
 - **Section:** Tron-Rorv
 - **Parameter Selection:** Single Multiple
 - **Parameter:** Temp
 - **Begin Date:** 27.04.2015 (DD.MM.YYYY)
 - **End Date:** 04.10.2016 (DD.MM.YYYY)
 - **Location Axis:** Distance Lat. Long.
 - **Min:** 0 km
 - **Max:** 230 km
 - **Quality:** FerryBox COSYNA
- Quality: -1 0 1 2 3 4 5 6 7 8
-

- Max. Deviation:** (km)
- Range:** 0.01 - 19 (Deg C)
- Scaling:** fixed dynamic
- Logarithmic:** yes no
- Plot Caching:** yes no
-
- Plot Geometry:** auto x 450 (Pixel)
- Plot Colors:** White/Yellow
- Font Type/Size:** Arial (10pt)
- Point Size:** 4 x 4 **Bg.Color:** White
- < Range:** transparent dark blue
- > Range:** transparent magenta
- Grid:** yes no
- Info Text:** yes no
- Plot Title:** yes no

Hurtigruten Berg-Kirk by IMR, NO_Temp



X/Y: Time/Loc. Loc./Time

Max. Deviation: (km)

Range: - (mg/m**3)

Scaling: fixed dynamic

Logarithmic: yes no

Plot Caching: yes no

Plot Geometry: x (Pixel)

Plot Colors:

Font Type/Size:

Point Size: x Bg.Color:

< Range: transparent dark blue

> Range: transparent magenta

Grid: yes no

Info Text: yes no

Plot Title: yes no

• Route:

• Section:

• Parameter Selection: Single Multiple

• Parameter:

• Begin Date: (DD.MM.YYYY)

• End Date: (DD.MM.YYYY)

• Location Axis: Distance Lat. Long.

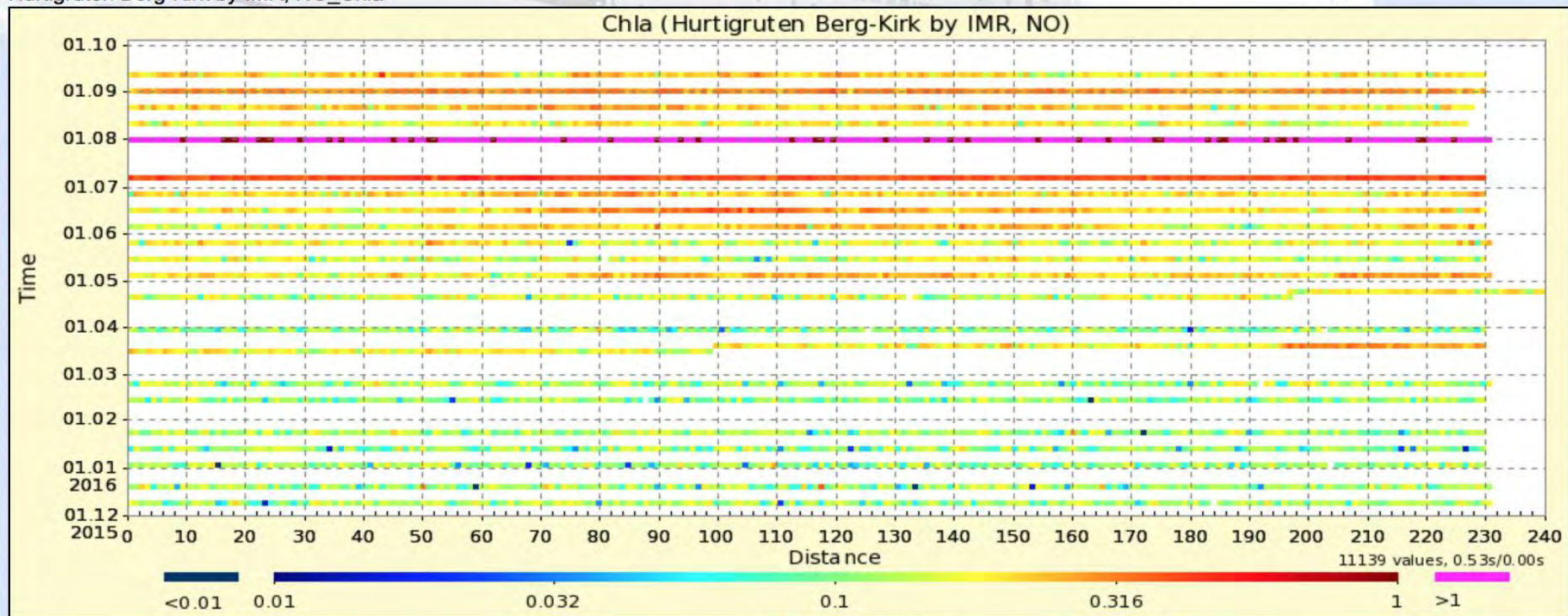
• Min: km

• Max: km

Quality: FerryBox COSYNA

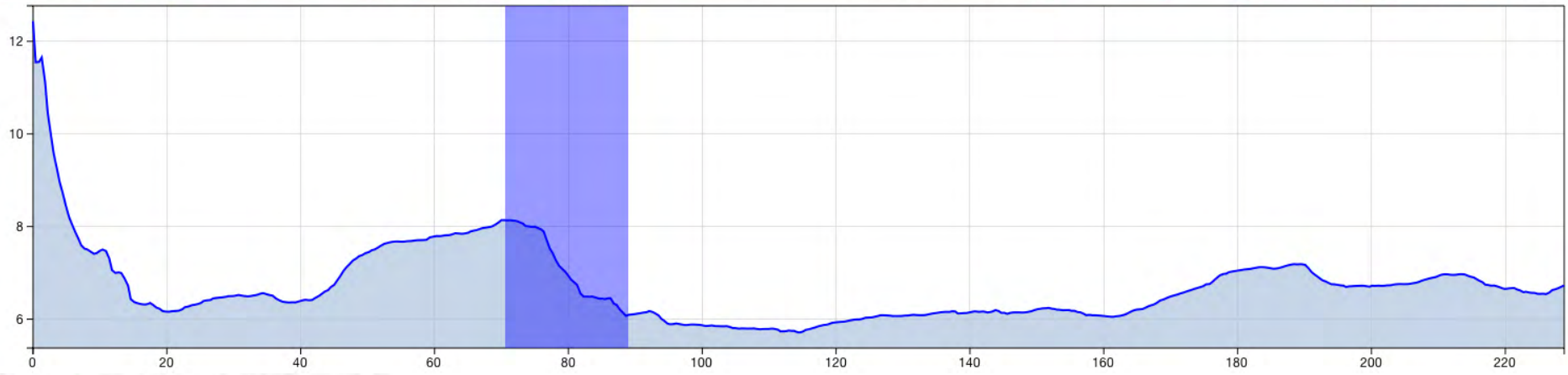
0 1 2 3 4

Hurtigruten Berg-Kirk by IMR, NO_Chla



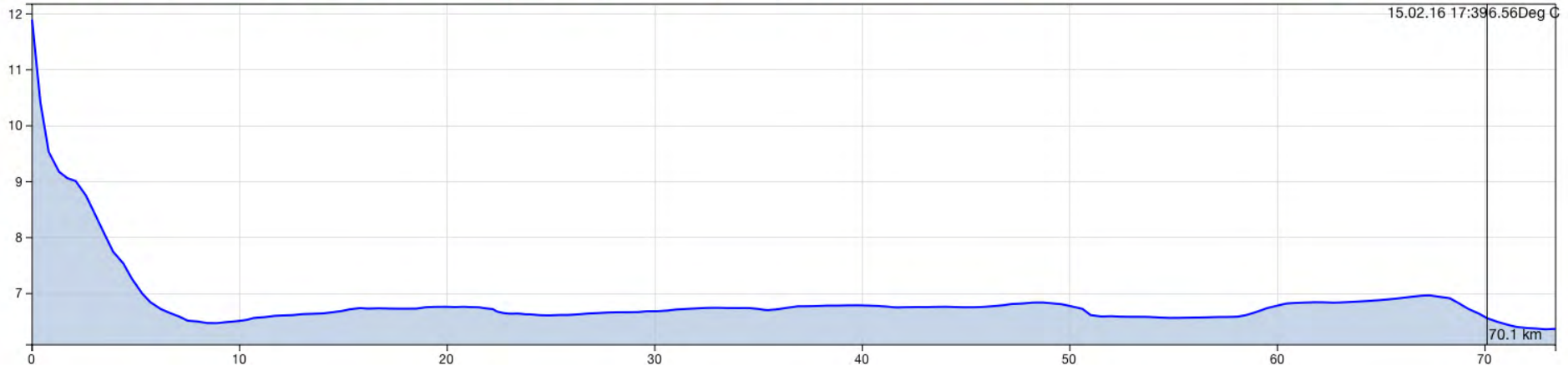
52North developed a SOS V2 client which could be adapted to access the FerryBox database.

First results for data from Hurtigrouten:



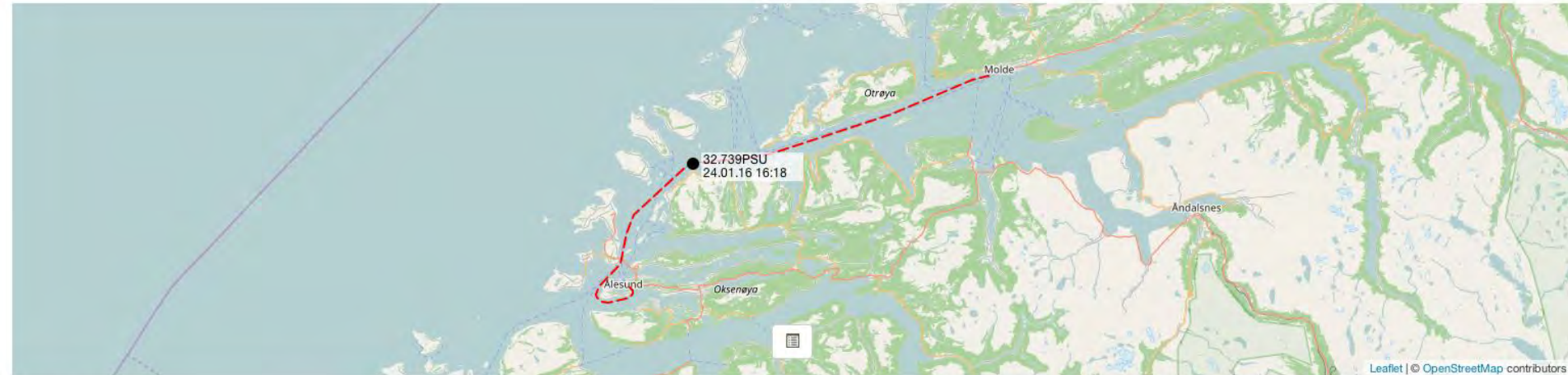
52North developed a SOS V2 client which could be adapted to access the FerryBox database.
First results for data from Hurtigrouten:

Temp FerryBox, Ales-Mold
Temp (Deg C)



SOS V2 example

Sal FerryBox, Ales-Mold
Sal (PSU)



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Conclusion and Outlook

- Ferrydata.hzg.de started to act as European FerryBox database and data portal.
- Ferrydata.hzg.de will try to import most European FerryBox routes on a regular base.
- Hurtigrouten by IMR is a first example.
 - A few problems should be corrected and quality control should be added.
- Other routes will start soon (Greek HCMR next).
- OceanSites netCDF output to Opendap can be provided.
- Further synchronisation with e.g. GOSUD must be developed.
- 52North's SOS V2 client for FerryBoxes seems promising.