# Meriympäristö

# Mittaukset merialueilla, Algaline, Utön asema ym.

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**JatkuvaLaatu – uusia tehoja ympäristönseurantaan**

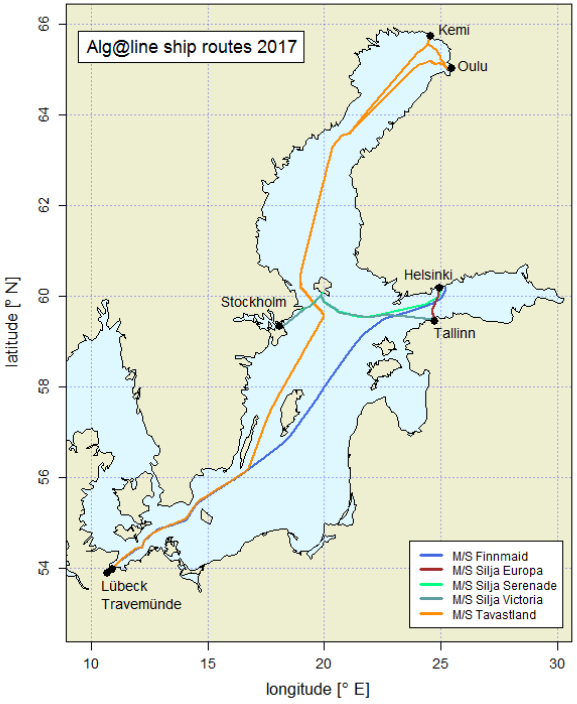
5.4.2018 , SYKE, Mechelininkatu 34, Helsinki

# Alg@line-ferrybox measurements since 1993

Research and monitoring project using ‘ship-of-opportunity’ (SOOP) approach

Automatic flow-through instrumentation and water samplers onboard commercial vessels, mainly ferries

Cost-effective method offering more spatio-temporal coverage than traditional water sampling

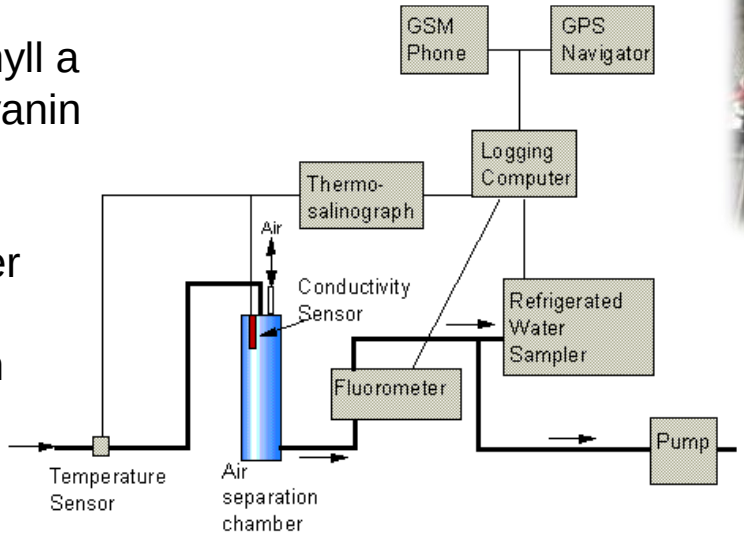
# Alg@line-ferrybox measurements since 1993

Water is pumped from 5 m depth, through an opening in the ship's hull

- Air separation chamber
- Thermosalinograph
- Fluorometers
  - chlorophyll a
  - Phycocyanin
  - CDOM
- Turbidity
- Water sampler

+++

- Phycoeryhtrin
- $O_2$
- $pCO_2$
- pH
- Reflectance
- FRRF, Primary productivity




# Alg@line-ferrybox measurements since 1993

Data:

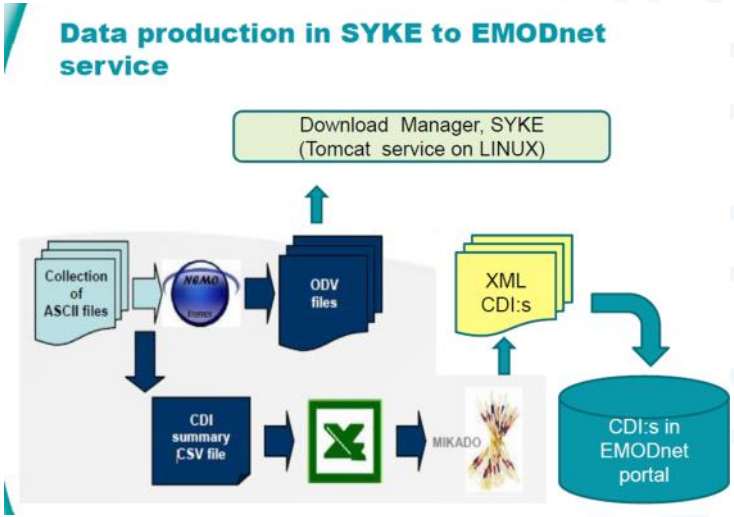
- Backup in M:\galgaline
- Linux server navicula.env.fi: scripts to gets data 1-hour intervals, QC, format change (ODV, NetCDF), plotting

Data reporting to

- Copernicus Marine Environment Monitoring service (flowthrough data)
  marine.copernicus.eu/
- Emodnet chemistry (bottle data)
  www.emodnet.eu/chemistry
- Ferrybox.org server (flowthrough data)
  ferrydata.hzg.de/index.cgi?seite=start
- Meriwiki: www.jarviwiki.fi/wiki/Algaline

EU-Projects:

- EMODnet,CMEMS, SeaDataCloud, JericoNEXT




SYKE SeaDataNet Funded by the European Union Copernicus JERICO next

# Alg@line-ferrybox measurements since 1993

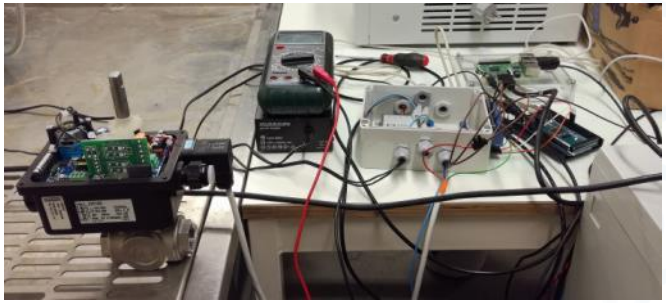
Developments:

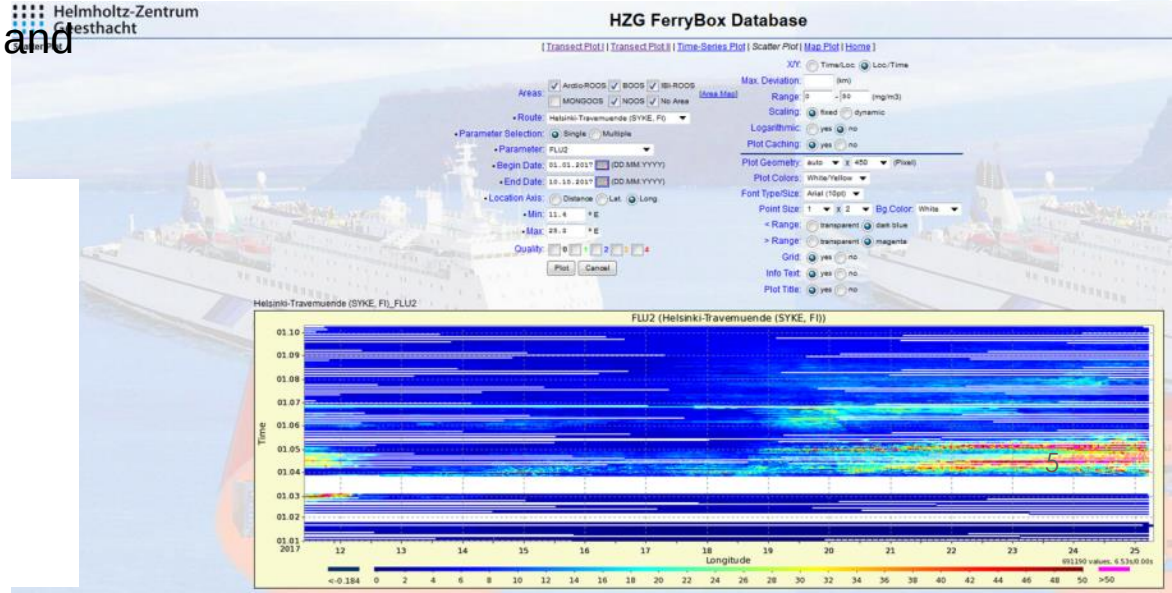
Algaline 2.0: Takes advantage of small computers and open-source electronics; data acquisition and automatic controls done with Raspberry Pi and Arduino

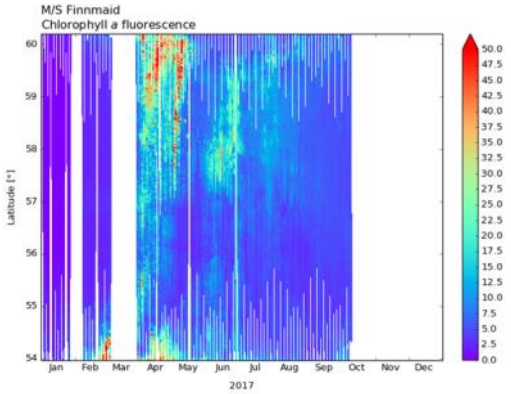
Data QC/validation

Connection to international projects and databases

New instrumentations






SYKE

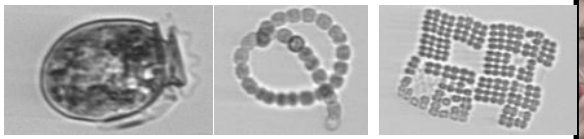
# Utö Atmospheric and Marine Research Station

Utö Atmospheric and Marine Research Station is operated together with Finnish Meteorological Institute and Finnish Environment Insitute.

Observations started in 1881, new continuous automated measurements started in 2014. Measurements include marine biology, chemistry, physics.

# Utö Atmospheric and Marine Research Station

Imaging FlowcytoBot – phytoplankton imaging



Backscattering meter – for ocean color cal/val

Spectral fluorometry – phytoplankton pigments groups

Fast repetition rate fluorometry – primary productivity

Spectral absorption – in-water optical components

FinMARI Finnish Marine Research Infrastructure

SYKE

# Utö Atmospheric and Marine Research Station

## Utön mittaukset, SYKE MK, jatkuvat mittaukset

| Muuttuja | Huom. |
|---|---|
| Lämpötila, suolaisuus | 2015-> |
| Klorofyllin fluoresenssi | 2015-> |
| Sameus | 2015-> |
| Fykosyaniinin fluoresenssi | 2015-> |
| Fykoerytriinin fluoresenssi | 2017 -> |
| CDOM fluoresenssi | 2015-> |
| Spektraalinen fluoresenssi | 2017 -> |
| Absorptiospektri | 2017-> Kampanjaluonteisesti |
| Fluoresenssin induktio | 2015-> |
| Takaisinsironta | 2017-> Kampanjaluonteisesti |
| Happi | 2017 -> |
| pH | 2016-> |
| Levien kuvannus | 2017 -> |
| Valospektri | Pintamittaus |

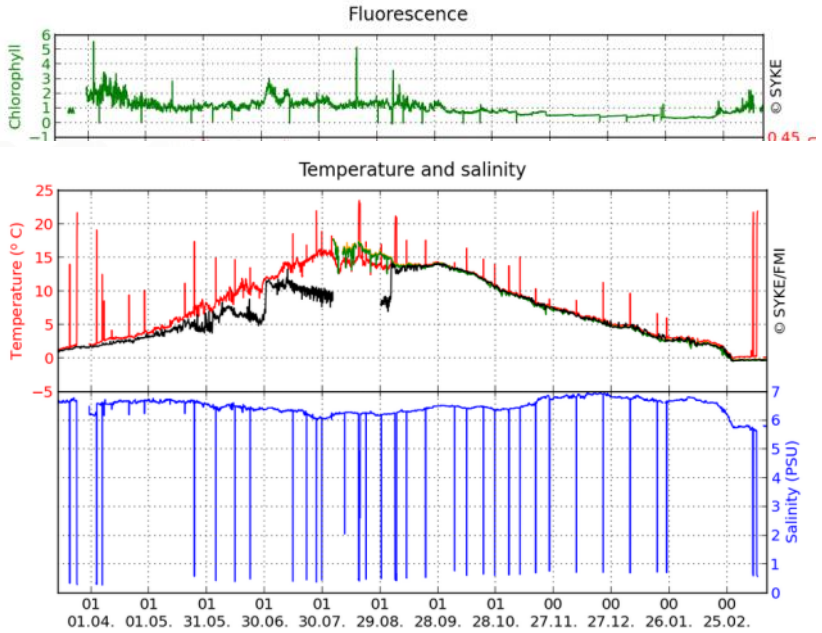
+ mittauskampanjoita jolloin vesinäytteet (3-6 x päivä, 3-7 päivää, 1-6 x vuosi)

- Chl
- Ravinteet (NO3, PO4 SiO4, TN, TP, POC, PON, POP)
- DIC
- Alkaliniteetti
- Spektraalinen absorptio, kokofraktiot
- Spektraalinen fluoresenssi
- Levälajisto
- Perustuotanto

+ IL:n mittaukset
- ADCP, CTD, pCO2, ilmakehä
- Profiloiva poiju 2018

# Utö Atmospheric and Marine Research Station

Data flow to FMI server
QC in process





swell.fmi.fi/Uto/latest.html

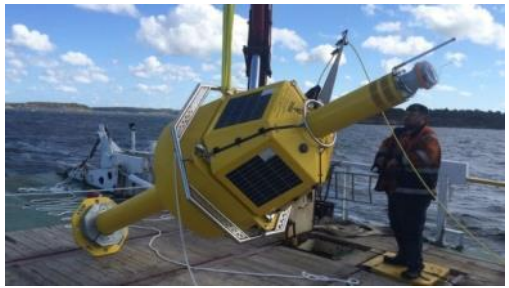
# What is FINMARI?

*http://www.finmari-infrastructure.fi/*

- The distributed infrastructure assembled by FINMARI supports practically all marine research and researcher education in Finland, across a wide variety of environmental disciplines. Coordinated by SYKE.
- In 2014 FINMARI accepted on the *Finland's Strategy and Roadmap for Research Infrastructures 2014-2020*
- FINMARI consortium combines all major components of the national marine RI: the complementary resources of the 3 largest universities and the 4 largest governmental research institutes active in marine research:
  - *Universities of Helsinki, Turku, Åbo Akademi*
  - *Finnish Environment Institute (SYKE)*
  - *Finnish Meteorological Institute (FMI)*
  - *Geological Survey of Finland (GTK)*
  - *Natural Resources Institute Finland (Luke)*

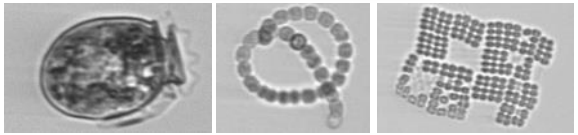
# Main blocks of FINMARI

- **Research vessels**
  - *Aranda, Geomari, Aurelia, Saduria, Saga*: Specific niches (instrumentation, range of operation) for each
- **Alg@line and Utö Station**
  - International forerunners in Autonomous Observation Systems
- **Experimental laboratories and platform development**
  - 5 partners with distinct research profiles
- **Automated buoys and gliders**
  - Wave buoys, drifters, ARGO floats, gliders
- **Field stations**
  - University stations for research and education: Laboratories, field and sampling equipment

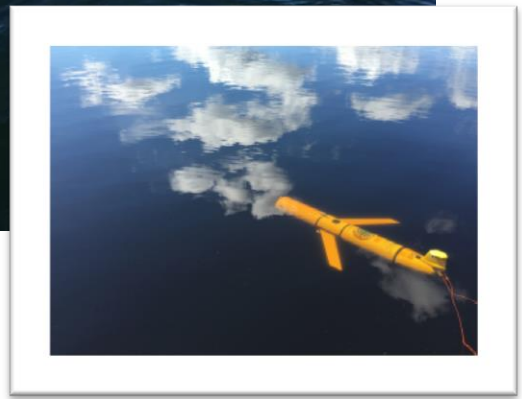


# Some FINMARI purchases

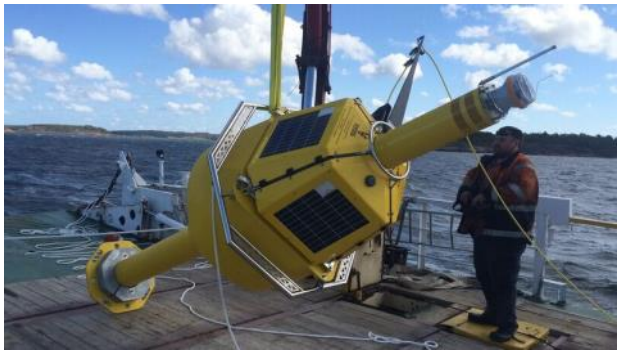
Imaging FlowCytobot (SYKE)



Glider (FMI)

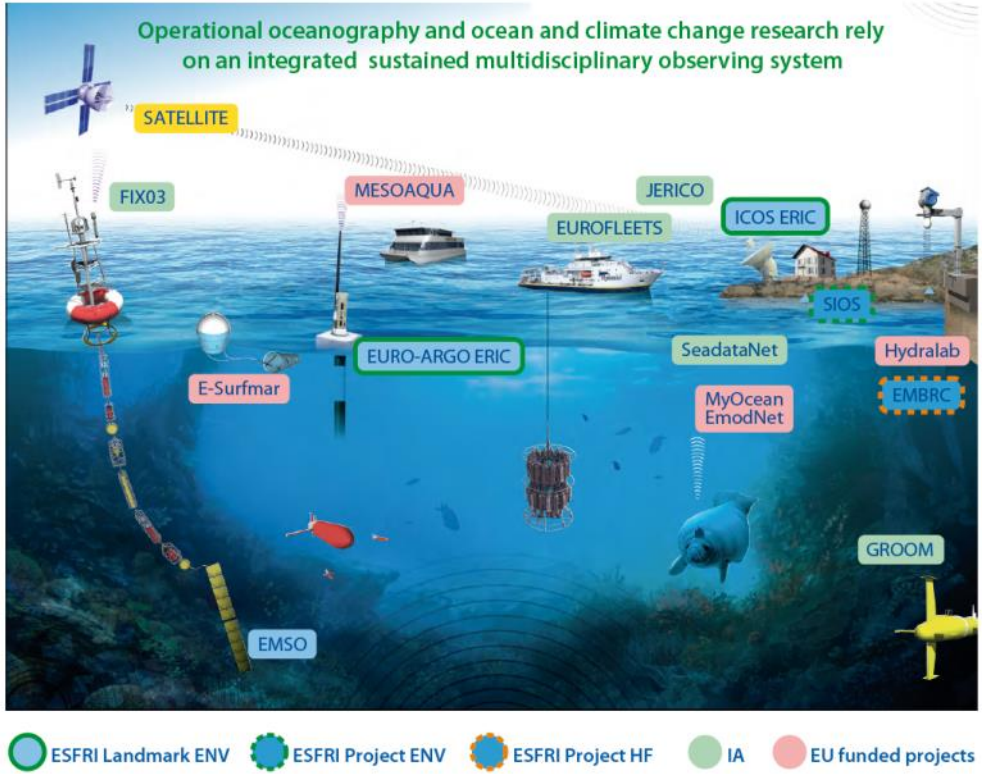


Profiling buoy (ÅA, FMI…)



Hovercraft (HY, TZS)

- FINMARI RI exists, and is developed for **research** – Open Access for the community, both to gear and data
- Connection to European Research Infrastructures




FINMARI represent Finnish RI in a wide variety of European marine and coastal networks: **Euro-Argo ERIC**, **EMBRC**, **JERICO-NEXT**, **GROOM**, **Copernicus MyOcean**, **EMODnet**; H2020 INFRAIA projects **AQUACOSM** (previous MESOAQUA), **SeaDataCloud** (previous SeaDataNet), **ASSEMBLE Plus** (joint proposal by EMBRC and previous ASSEMBLE), and coupling to **ICOS-ERIC** Ocean Thematic Centre (Utö Atmospheric and Marine Station, Alg@line ferry routes).