→ BALTIC FROM SPACE WORKSHOP

29–31 March 2017 | Helsinki, Finland

Environment data for the Baltic region II
Open Data from SYKE

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Contents

- **SYKE and SYKE's expertice**
- **Open Data at SYKE**
- **Examples**
- **Conclusions, comments**

SYKE

SYKE

- SYKE is an environmental research center under the Ministry of Environment and under the Ministry of Agriculture and Forestry
  - Multidisciplinary research and assessment on the state of the environment
  - Offers professional services for the government, industry, municipalities, companies and communities
  - Monitors the state of the environment in Finland
  - Offers information services and maintains environmental data bases
  - Responsible for certain public authority tasks
- SYKE 2016:
  - 556 person years, 55milj.€
- http://www.syke.fi/en-US

SYKE

SYKE's expertise

STAFF

- Combination of substance experts (Baltic Sea, inland waters, hydrology, nature, …) and EO experts
- Expertice on environmental monitoring, reporting, assesments, …
- SYKE participates in directive reportings like Marine Strategy, Water Framework, Nature, Flood etc. directives
- Long experience on environmental monitoring in complex Nordic areas
- SYKE works also in close cooperation with Helcom and produces and reports data and information (also EO) to Helcom
- Good infrastructure: GIS, EO processing (through NSDC), in-situ data, …
- Access and participation and ownership of Research Infrastructures:
  - FINMARI RI, in Utö (Baltic Sea), in-situ measurements widely, contact Timo Tamminen, SYKE
  - Sodankylä-Pallas cal/val supersite, contact Jouni Pulliainen, FMI
  - Research vessel Aranda, SYKE
  - SYKE is developing (with partners) a RI for GI research in Finland

SYKE

Data Policy in SYKE

- SYKE's interest is to promote the usage of environmental data and information
- Free and open data policy since 2008
- SYKE applies Creative Commons By 4.0 International license = free and open, data source must be mentioned

SYKE

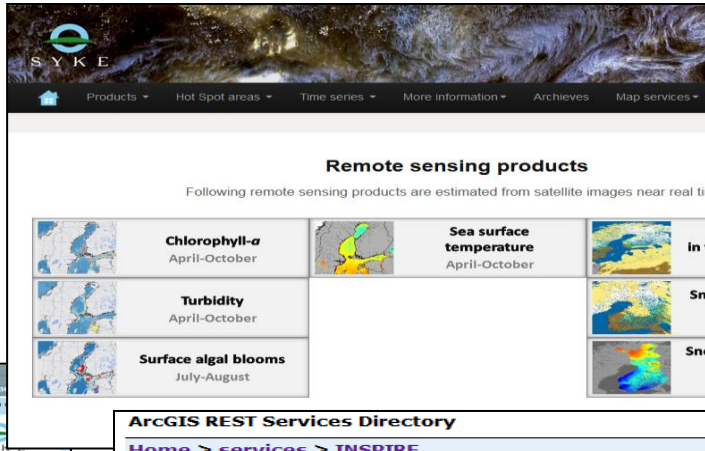
SYKE's Free and Open Data, interfaces, services etc. can be found, used and downloaded from

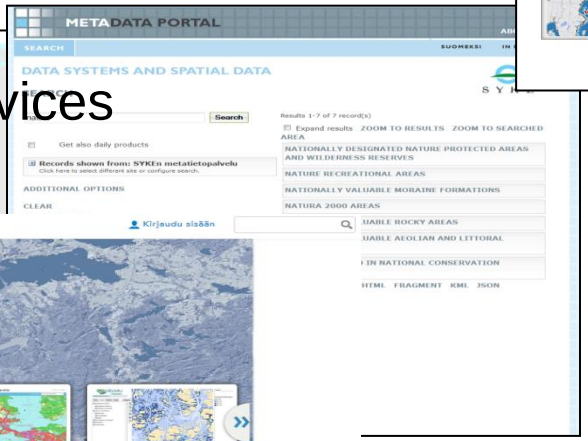
http://www.syke.fi/openinformation

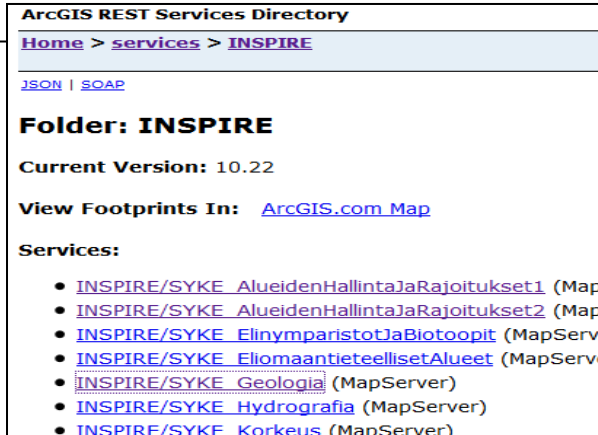
SYKE

SYKE's Open Data Components

- Metadata
- Downloadable spatial datasets
- Network services
- Earth Observation products
- Environmental information systems (in-situ data)
- Web map services



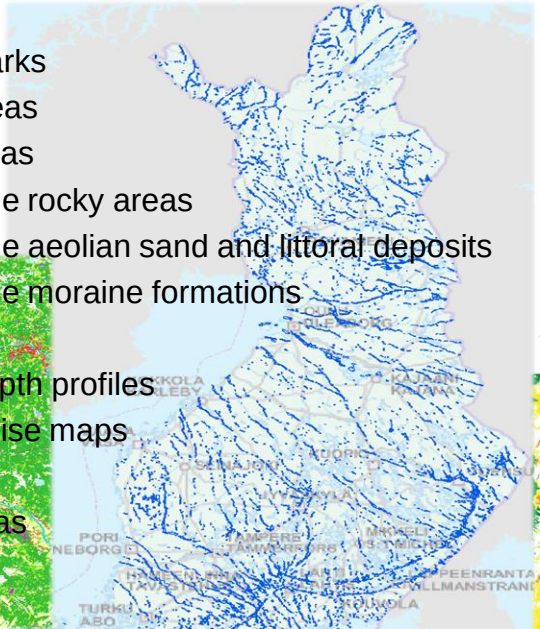
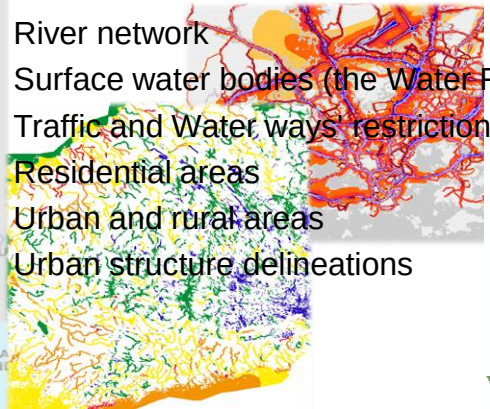
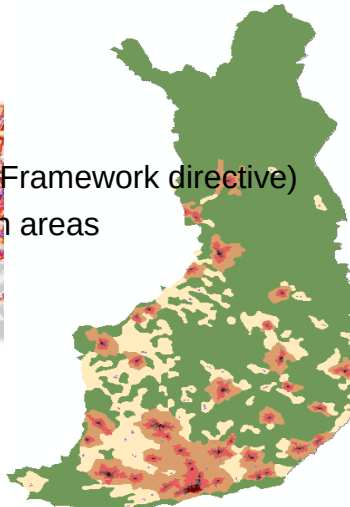




Examples of SYKE's Open Spatial Datasets

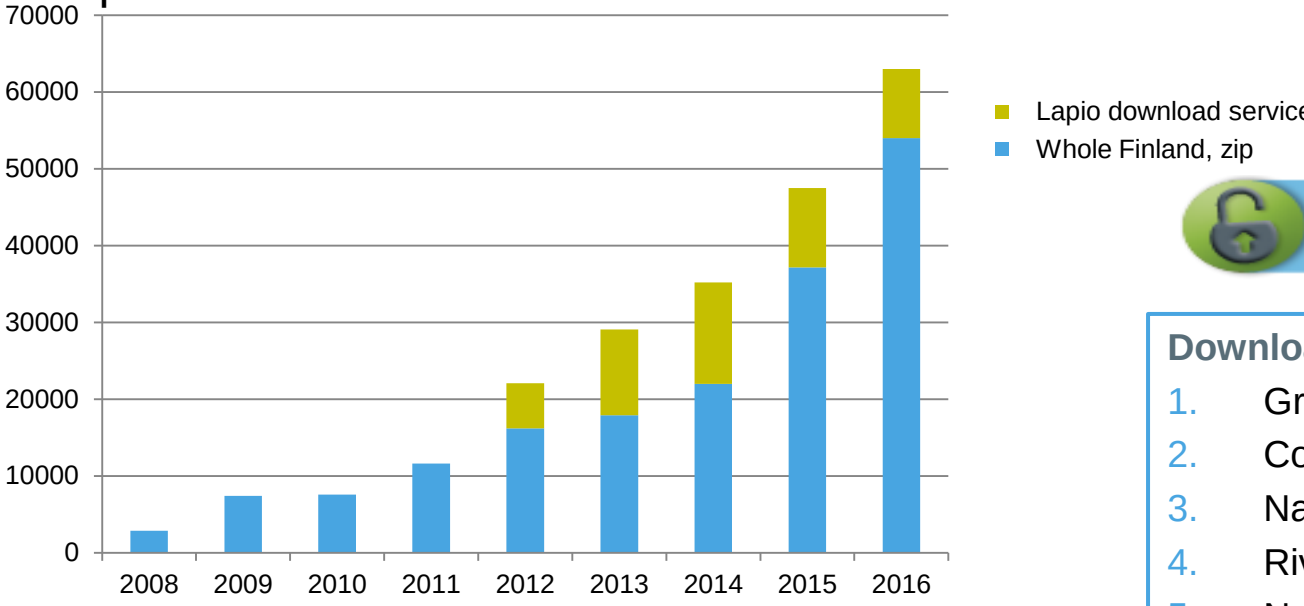
Corine Land Cover 2000, 2006, 2012
National Corine Land Cover 2000, 2006, 2012 (25m or 20m resolution)
Natura 2000 sites
Nationally designated nature protected areas
Conservation programme areas
Protected rapids
National urban parks
Important bird areas
Ground water areas
Nationally valuable rocky areas
Nationally valuable aeolian sand and littoral deposits
Nationally valuable moraine formations
Bathing waters
Lake and river depth profiles
Environmental noise maps
Traffic risk zones
Flood hazard areas

Flood risk areas
Detected floods
Forest vegetation zones
Mire vegetation zones
Outlines of joint master plans
Areas with local detailed plans
Regional Plans
Quality classification for surface water bodies
Catchment areas
Sea region division
River basin districts
River network
Surface water bodies (the Water Framework directive)
Traffic and Water ways' restriction areas
Residential areas
Urban and rural areas
Urban structure delineations

Open Data Policy Increases the Usage of Environmental Data

Spatial data packages downloaded from SYKE's Open Data Portal in 2008-2015



AVOIN TIETO
Open data

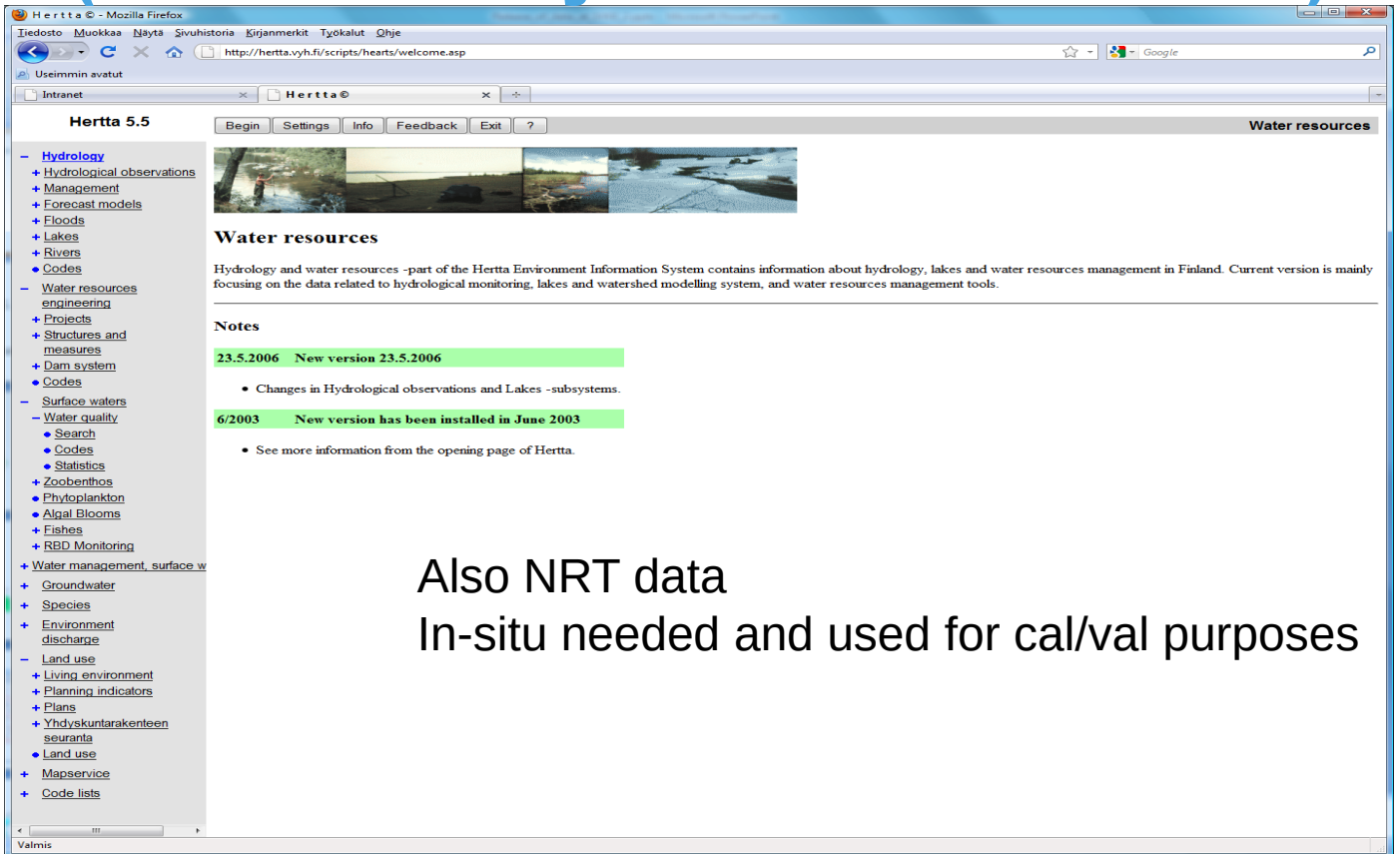
Downloads TOP 5 in 2016

1. Groud Water Areas
2. Corine Land Cover
3. Nature protected areas
4. River Basin Districts
5. Natura areas

Statistics: SYKE/Data and Information Centre/Riikka Repo

Environmental observations

(Information system for in-situ data)



Also NRT data

In-situ needed and used for cal/val purposes

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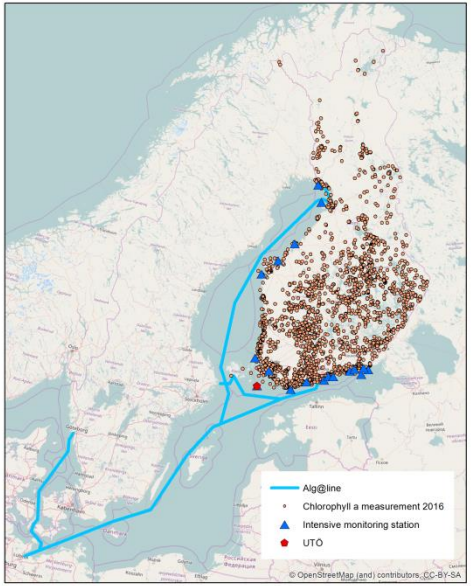
In-situ databases (timeseries) at SYKE

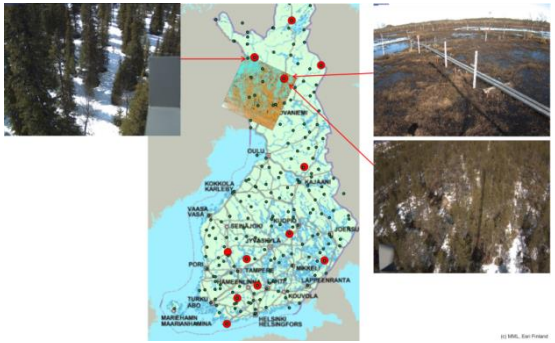
- Hydrology
  - Hydrological observations
  - Forecast models
  - Management
  - Floods
  - Lakes
  - Rivers
- Water resources engineering
  - Projects
  - Structures and measures
  - Dam system
- Surface waters
  - Water quality
  - Zoo benthos
  - RBD Monitoring
  - Water bodies
- Groundwater
  - Groundwater areas
  - Observation sites
  - Groundwater sites
  - EU reporting
- Species
  - Monitoring of threatened species
  - Species info
  - References
  - Statutes
  - Monitoring of nocturnal butterflies
- Environmental discharges
  - Air emissions
  - Estimated water load
  - Environmental properties of chemicals
  - Accumulations of hazardous substances
- Compliance Monitoring Data System - VAHTI
- Land use
  - Monitoring of living environment
  - Planning indicators
  - Monitoring of planning processes
  - Monitoring of spatial structure
  - Land use statistics
- Map service

SYKE

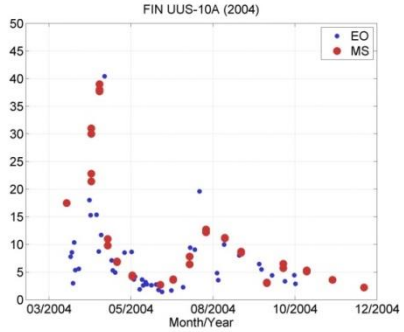
Examples of in-situ networks



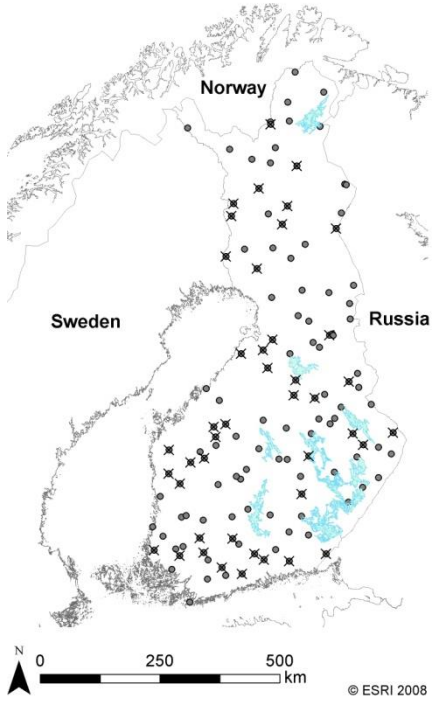
- Traditional monitoring station measurements since 1960/70
- Alg@line –ferrybox - since 1993
- Utö Atmospheric and Marine Research Infrastructure



Web cameras



Satellite products vs in-situ



Snow courses in Finland

SYKE

Additional in-situ data

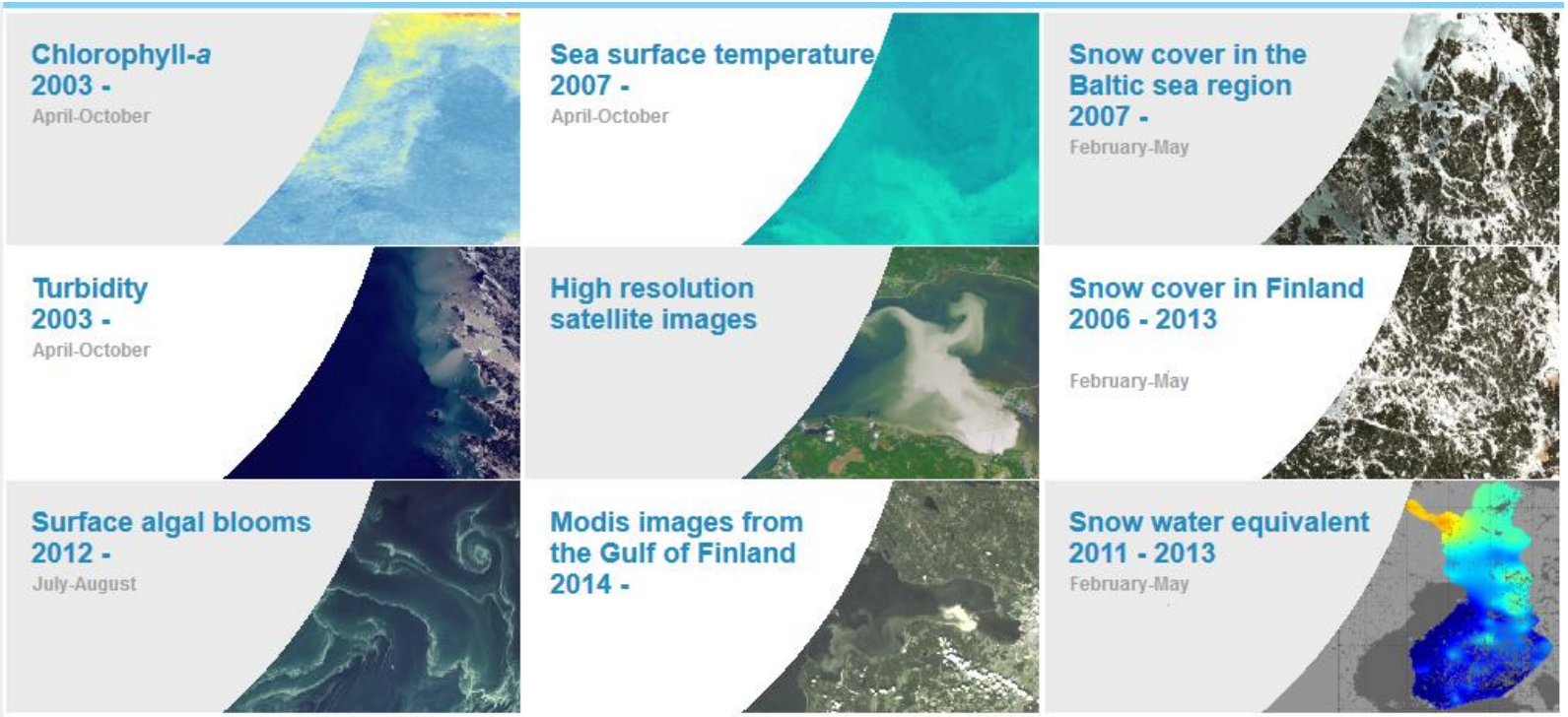
- Data from campaigns and different studies
  - SYKE has developed (standardised) metadatasystem and database for these for open use
- Citizen observations
  - SYKE has developed standardised design-production-storage-use chain for these. Focus has been on parameters valid for environmental monitoring
- Open infrastructure for these developed in Envibase project: http://www.ymparisto.fi/download/noname/%7B2517DCE3-FA9D-49F0-95B6-7EFBF1480CFA%7D/113809

ENVIBASE

SYKE

EO data and products

- SYKE produces EO derived products for a wide range of environmental applications (free and open data)



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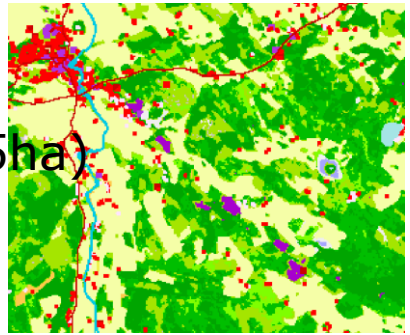
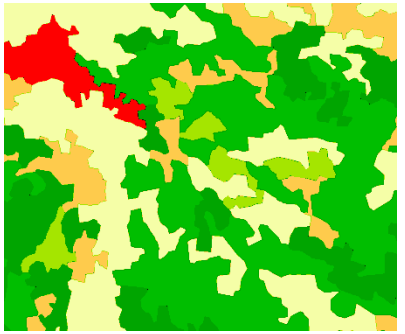
Examples of SYKE's EO products. LAND

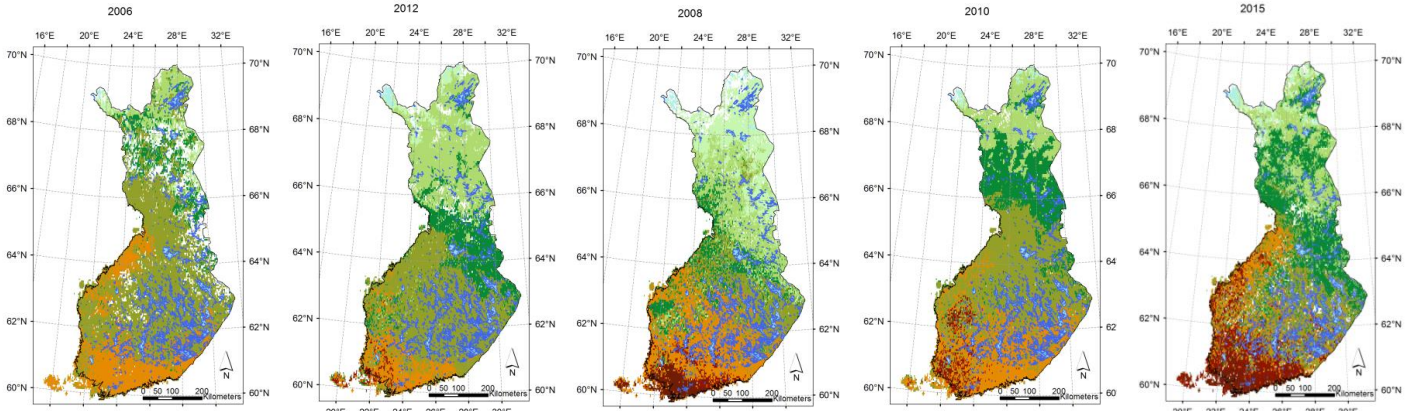
Land Cover 2000, 2006, 2012, 2018?…

- National (20m) and EU Corine (25ha)
- Image mosaics
- Changes





Phenology, time series



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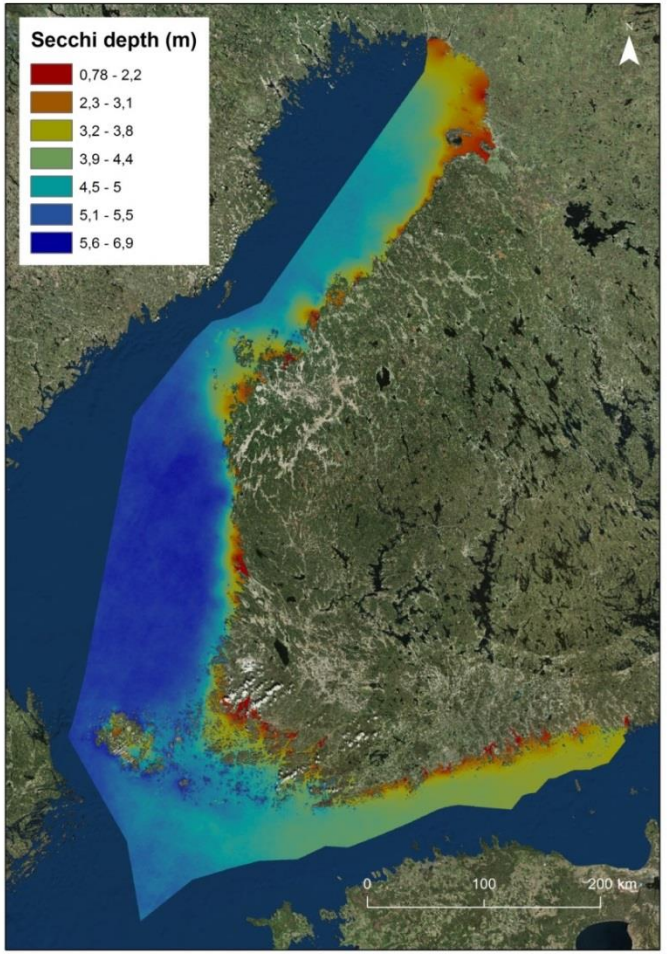
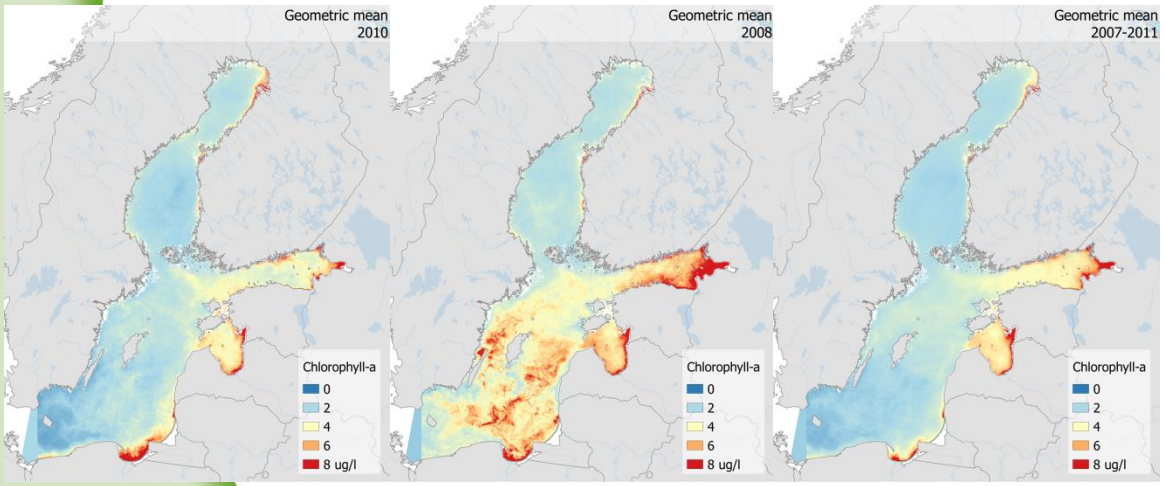
Examples of SYKE's EO products, WATER Quality

Secchi disk depth (2003-2011, June-August)

- MERIS turbidity, chl-a and average CDOM
- CDOM: station measurements and data by Ylöstalo P.
- Optical model by K. Kallio, SYKE

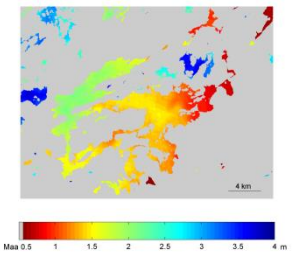


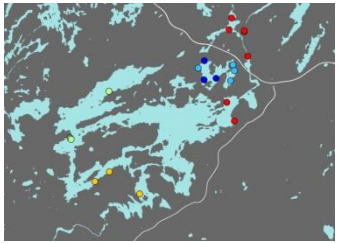
Annual and assessment period chl-a maps for the Baltic Sea



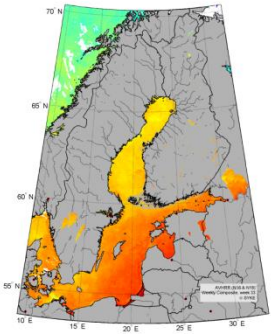
Examples of SYKE's EO products, WATER Quality

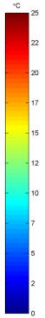
Secchi depth (trained by volunteer observations)



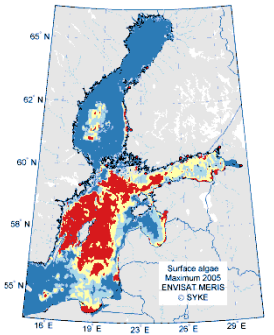


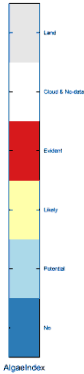
SST



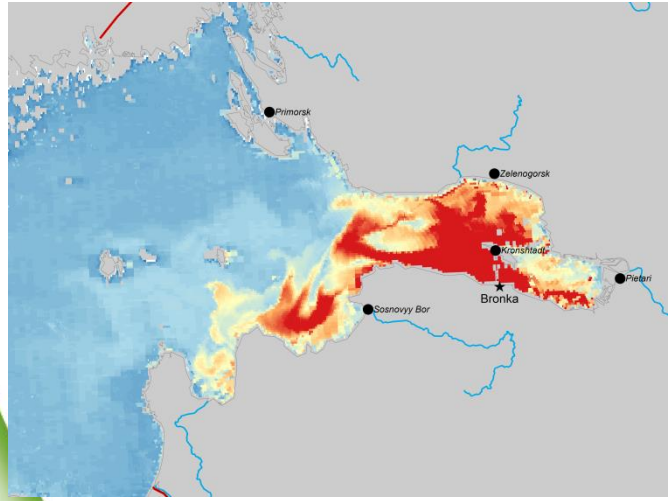


Algae blooms





Impact area of dredging works



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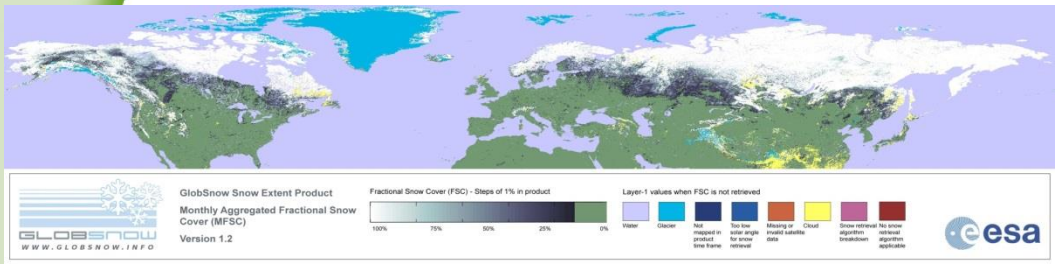
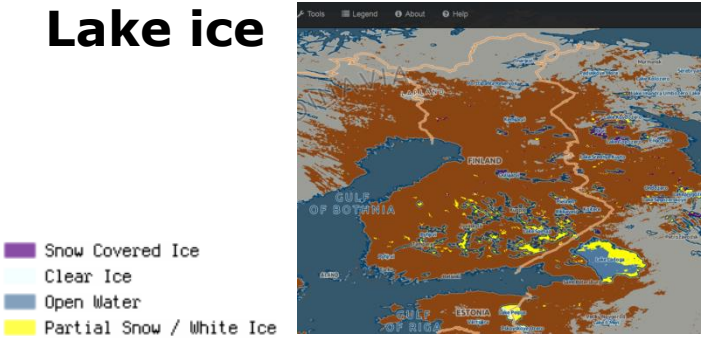
Examples of SYKE's EO products, CRYOSPHERE

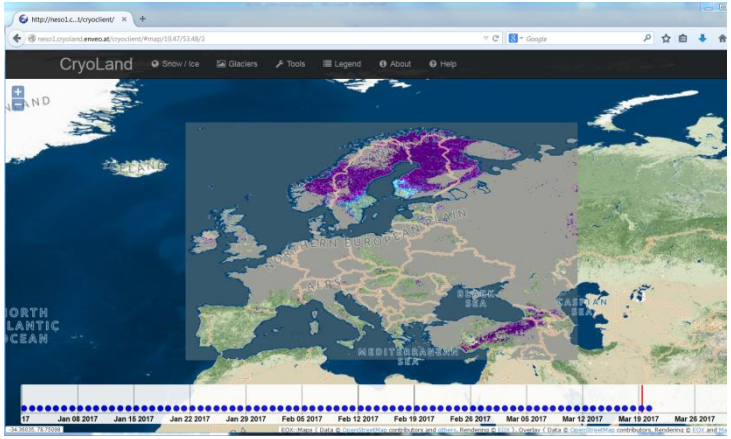
Fractional snow cover



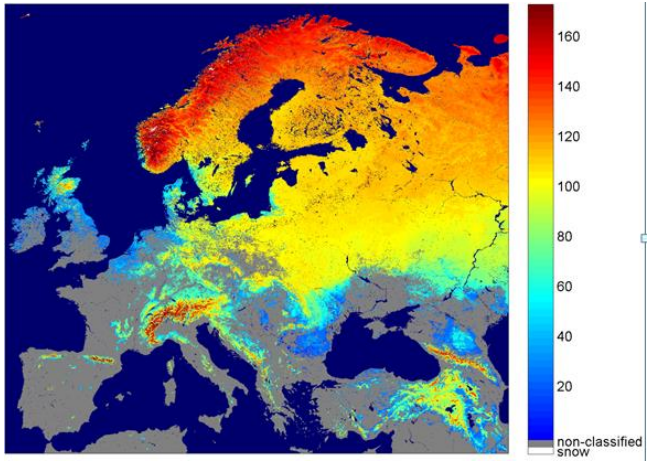
Lake ice



Fractional snow cover



Snow melt-off day



SYKE

Conclusions, comments

Cooperation needed around Baltic (infrastructures, research and operational) because

- With the Copernicus programme and Sentinel satellites the amount of EO data will increase dramatically → ”BigData” solutions needed, duplicating data and ”efforts” should be avoided, **network (cluster) of processing centres around Baltic with one central node?**
- Basic pre-processing for EO data should be done only once
- Services for different (level) users should be developed: raw data, products, processing facilities, …
- Specific EO algorithms needed for Baltic Sea and its drainage basin → algorithm and product development for these conditions is important as well as continuous
  - Common R&D projects

SYKE

Conclusions, comments

Making data freely available is only the first step, **interoperability** and **maximizing the use of data** should be the goal

- Easy access to EO, in-situ, and GIS data without any need for extra resources
- Commonly agreed standards (OGC) should be used for data services (download, view, metadata search, …)
- Data quality/uncertainty information must be known and follow the data
- Data harmonisation is important and makes the use of data and products easier
- SYKE's vision is to develop "multi source" environmental monitoring

How can SYKE contribute (with partners)

- Infrastructure available for R&D and operational processing (funded by several ministries)
  - National Satellite Data Centre's Calvalus processing environment,
  - GI infrastructure under development
  - Citizen observation and research data
  - Lot of in situ data
- Scientific expertise: SYKE is and has been developing EO algorithms and products for "Nordic conditions" (water quality, land cover, cryosphere, hydrology,…)
- Experience in user oriented service development

SYKE