WP4: Review of ocean and coastal information products and services

Review of European products and services

- Introduction to EU and international programs:
  - GODAE, GMES and MERSEA
- EU organisation: Mersea project
  - The data thematic Portal
  - The analysis and forecasting thematic portal
  - Postprocessing and validation
  - Services
- Toward pre-operational Marine Core Service systems with MyOcean
  - Consolidation and pre-operationnal effort
  - Thematic Assembly Centers
  - Monitoring and Forecasting Centers

BEFORE GMES (< 2002)

• GODAE: gathers the international ocean modeling and data assimilation communities around global ocean high resolution forecast system.

• Coordination of the EU operational oceanography in 1995 (EuroGOOS): european regional strategy:

- MOON: Mediterranean sea
- BOOS: Baltic sea
- NOOS: North West Shelfs

→ Conducting research, developping network and capacity.

• GMES: service, integrated and interoperable between regional seas and global ocean (precursor GMES FP5 EU: MERSEA Strand-1)

GMES Scheduling

- GMES initial period (2002-2003):

  Demonstrate the european maturity of oceanography: Mersea Strand-1
  Propose a system based on existing skills and capacity (4 european regioanl seas: arctic, Baltic, NE Atlantic, Med)

→Common quality control protocols for ocean products

- GMES implementation period (2004-2008):

  Building the main component of the GMES system (Mersea-IP for the Marine component)

  Base on the integration of the European core of the existing systems and their networks.

Mersea: the ocean portal for GMES

http://www.mersea.eu.org

Mersea overview
Observational TEPs
Analysis and forcasting TEPs
Postprocessing and validation
Services

MERSEA deals with numerous activities (sea observations, modeling and data assimilation, information management, public information):

• done by **providers** (scientific teams, data centers, model centers, etc…) which work part of their time for MERSEA.

• MERSEA is a federation of existing systems, which are not dedicated to MERSEA purposes but offer services to MERSEA while upgrading them under the MERSEA plan of work.

Mersea activities aim to provide an integrated service for monitoring and forecasting in real time the ocean physics (temperature, salinity, currents) bio-geochemistry (carbon cycle), & eco-systems (chlorophyll, nutritives) at global and regional scales.

Mersea: system of systems

Mersea overview
Observational TEPs
Analysis and forcasting TEPs
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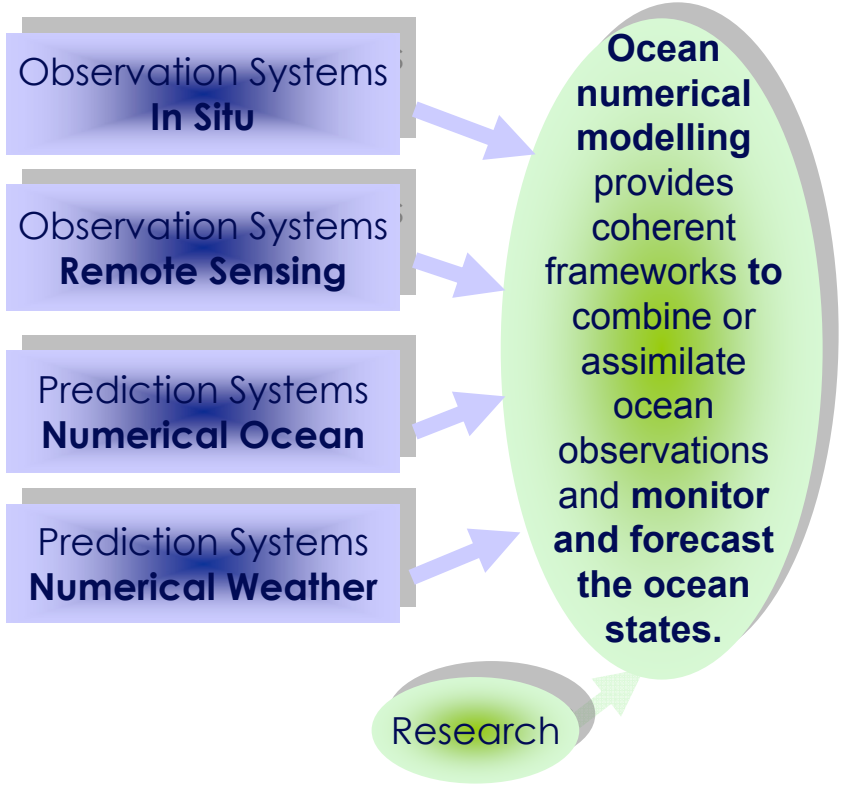
Services

Observational ThEmatic Portal

Analysis and forcasting ThEmatic Portal

Services



Discover …

… individual systems and search for ocean parameters, spatial data sets and services

View …

… display, navigate, zoom in/out, pan or overlay viewable spatial datasets, and retrieve any descriptive information available

Access …

… link to direct access services, download of the spatial datasets, full time series or parts of such sets

Mersea: production practices

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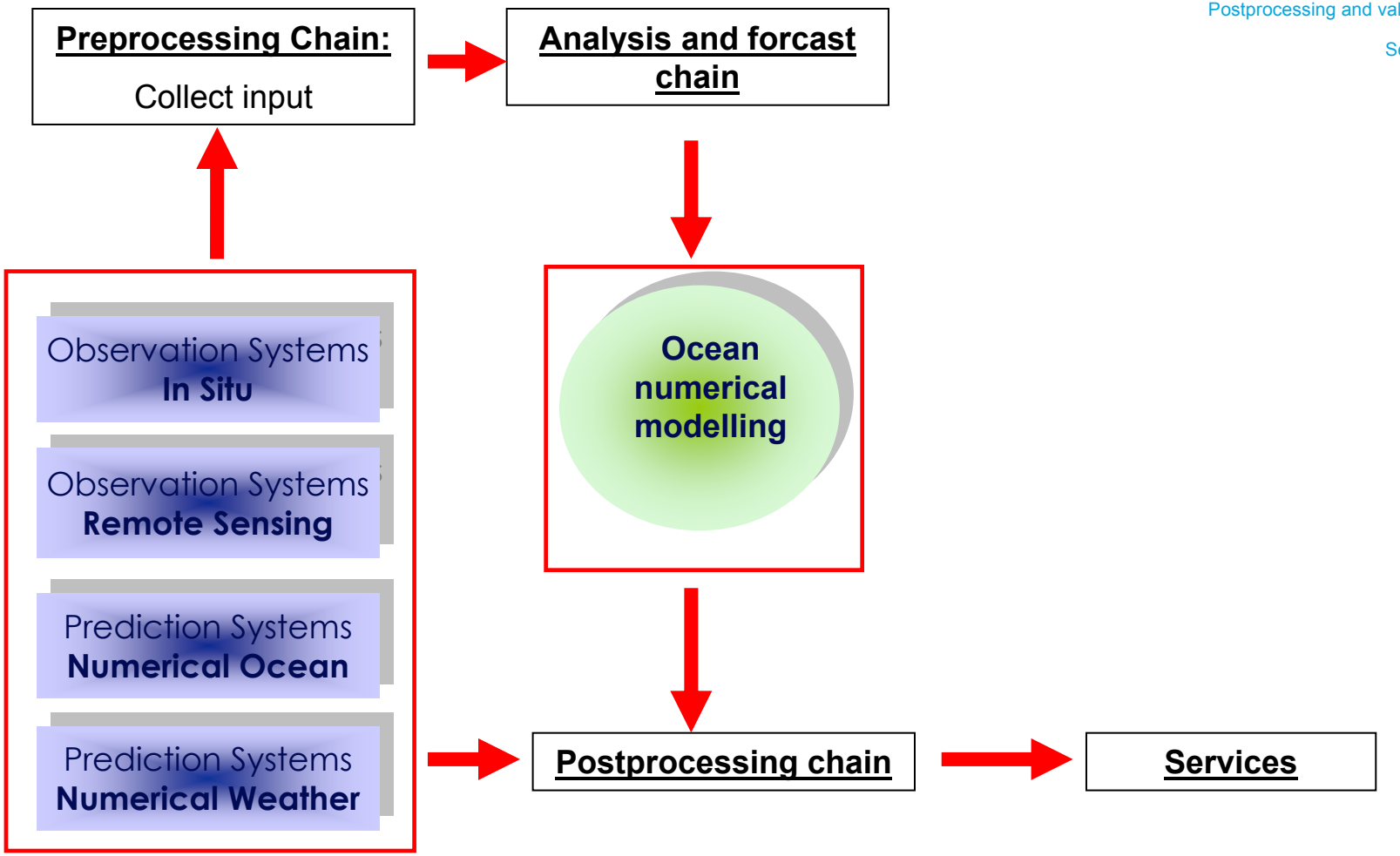

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3 observational TEPs

- In Situ TEP: CORIOLIS
  - global in-situ observation daily delivery
  - Global real time objective analysis
  - Atlantic delayed mode objective analysis
- Remote sensing TEP: (more than 40 products available
  - SLA (SALTO/DUACS)
  - Sea ice concentration in Northern hemisphere (IFREMER)
  - SeaWiFS global sea surface chlorophyll-a concentration
  - GOS HR gridded SST over Med Sea
- Forcing fields TEP:
  - Blended global satellite mean wind field (6 hourly delivery)
  - Surface parameters from ECMWF model 10-day forecast

Remote sensing products

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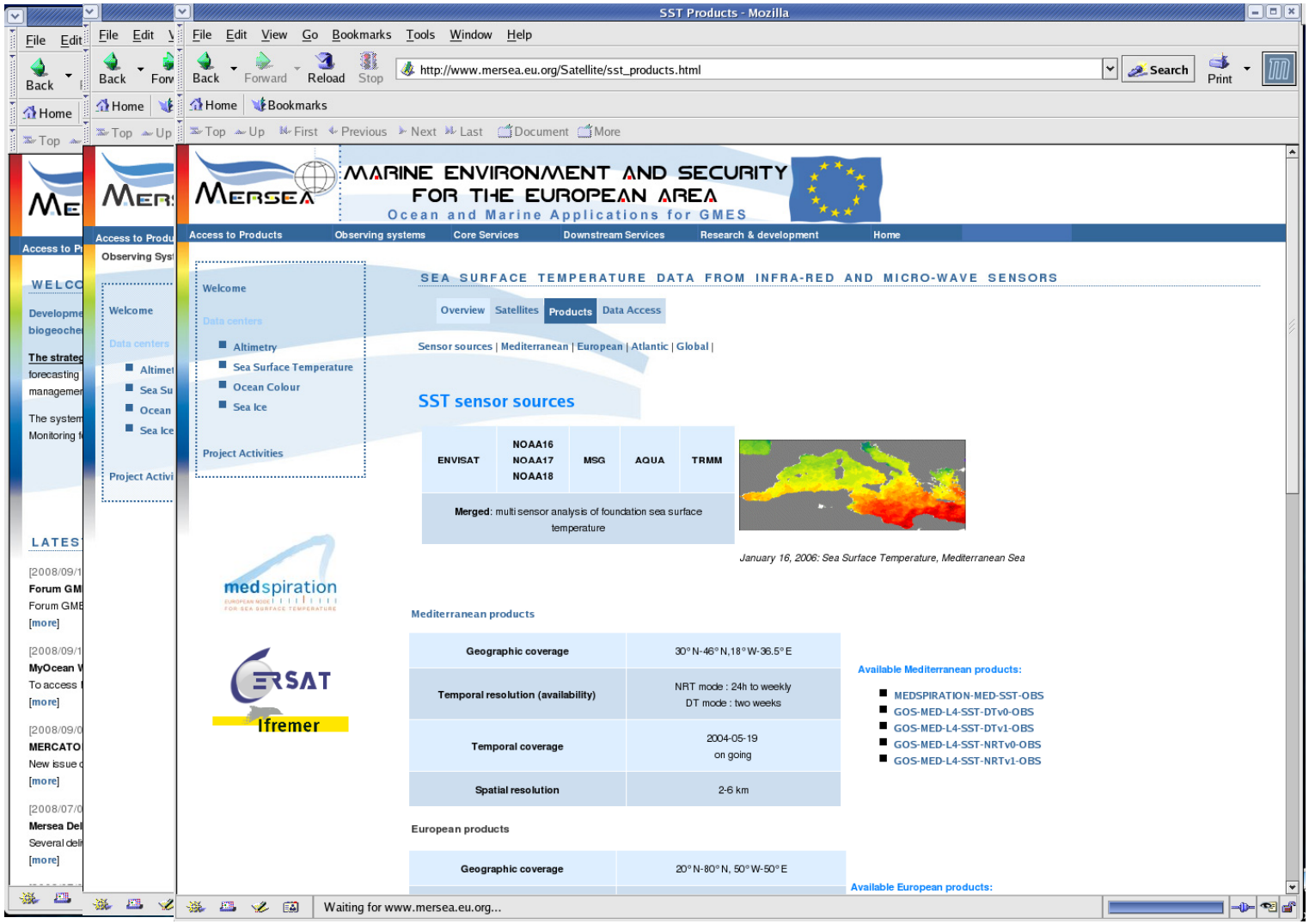

In-situ products

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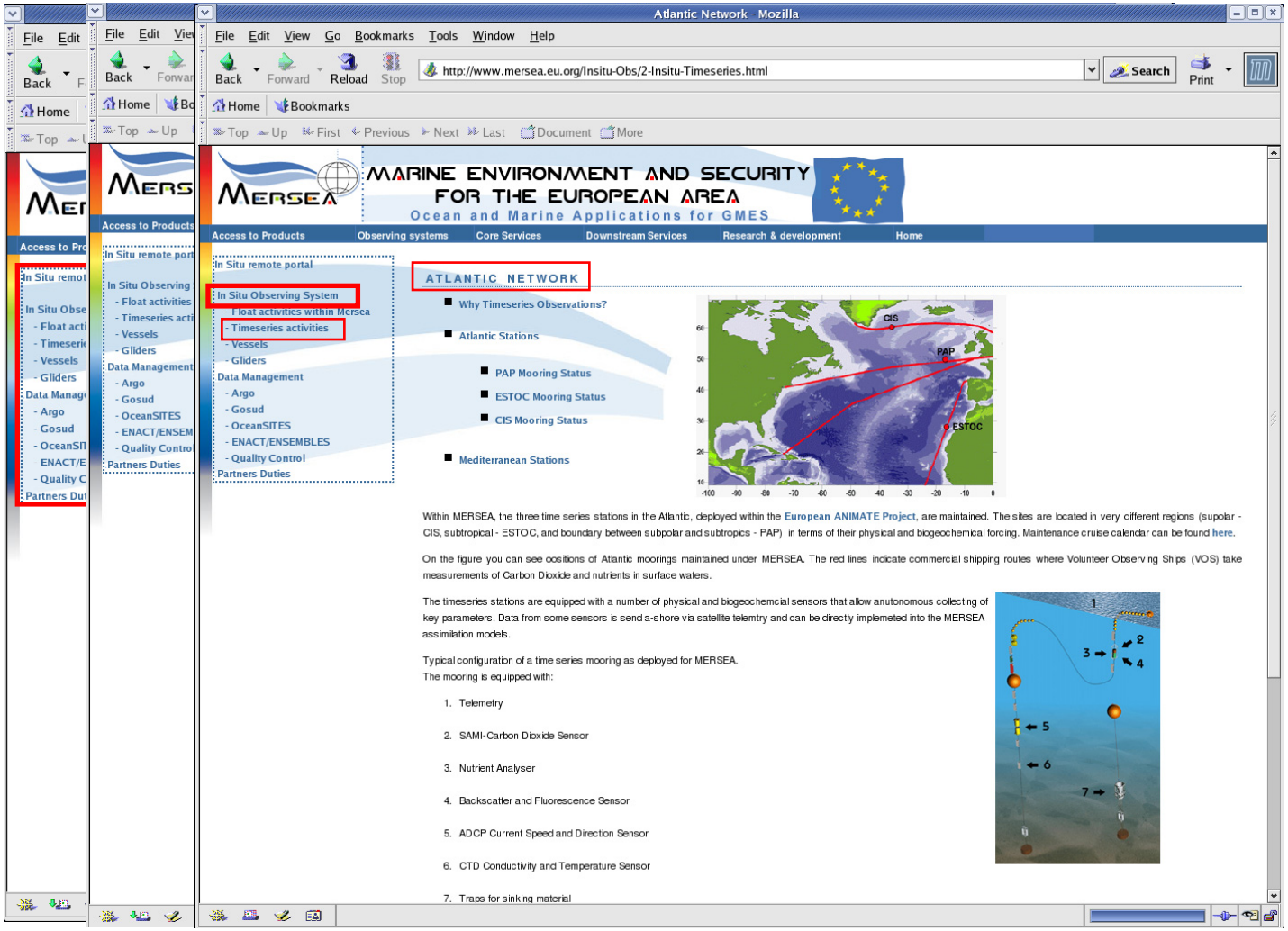

Forcing field products

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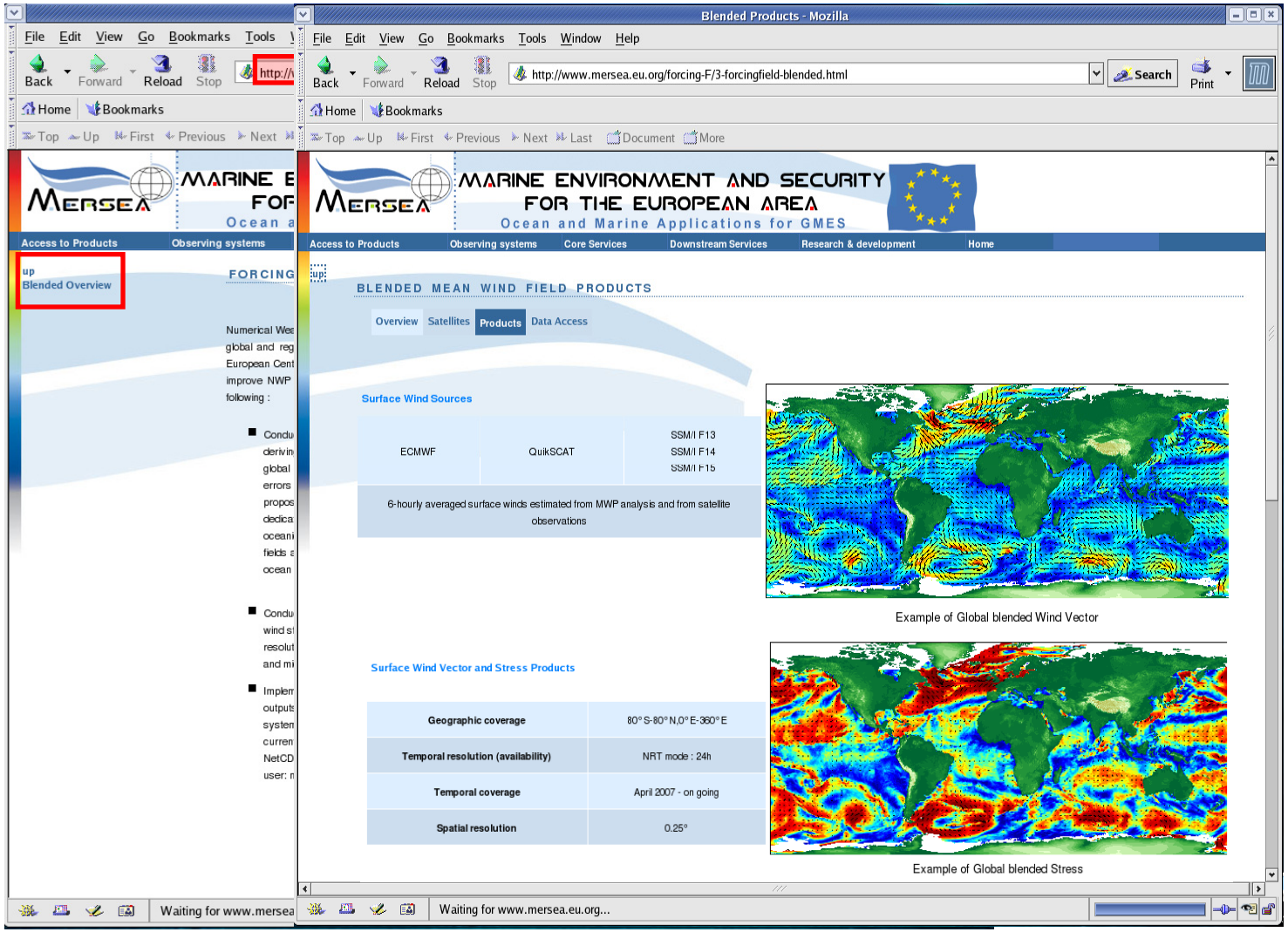

5 analysis and forecasting TEPs

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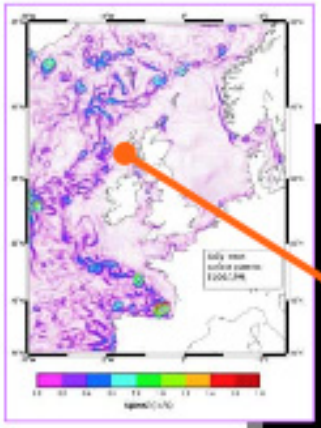
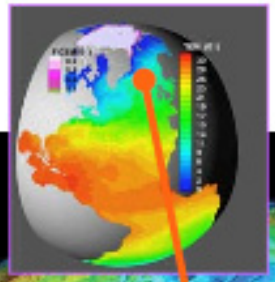
NCOF, UK

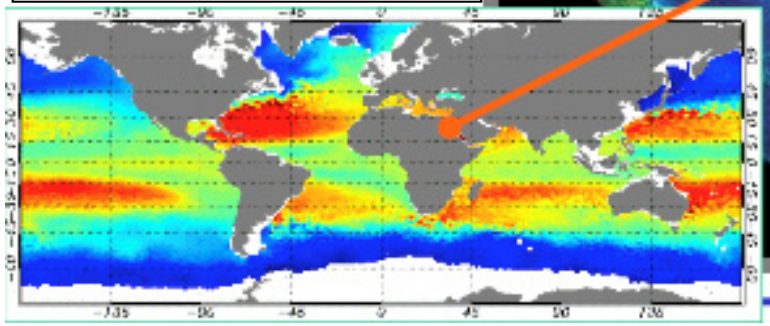


NERSC, Norway

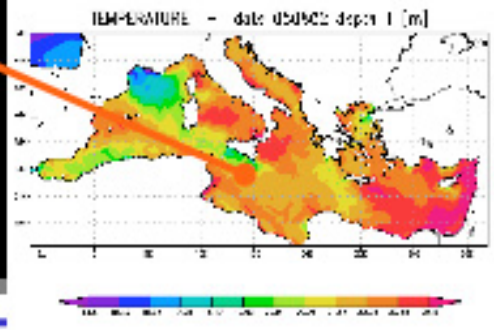


DMI, Denmark

Mercator Océan, France



INGV, Italy



Mersea website

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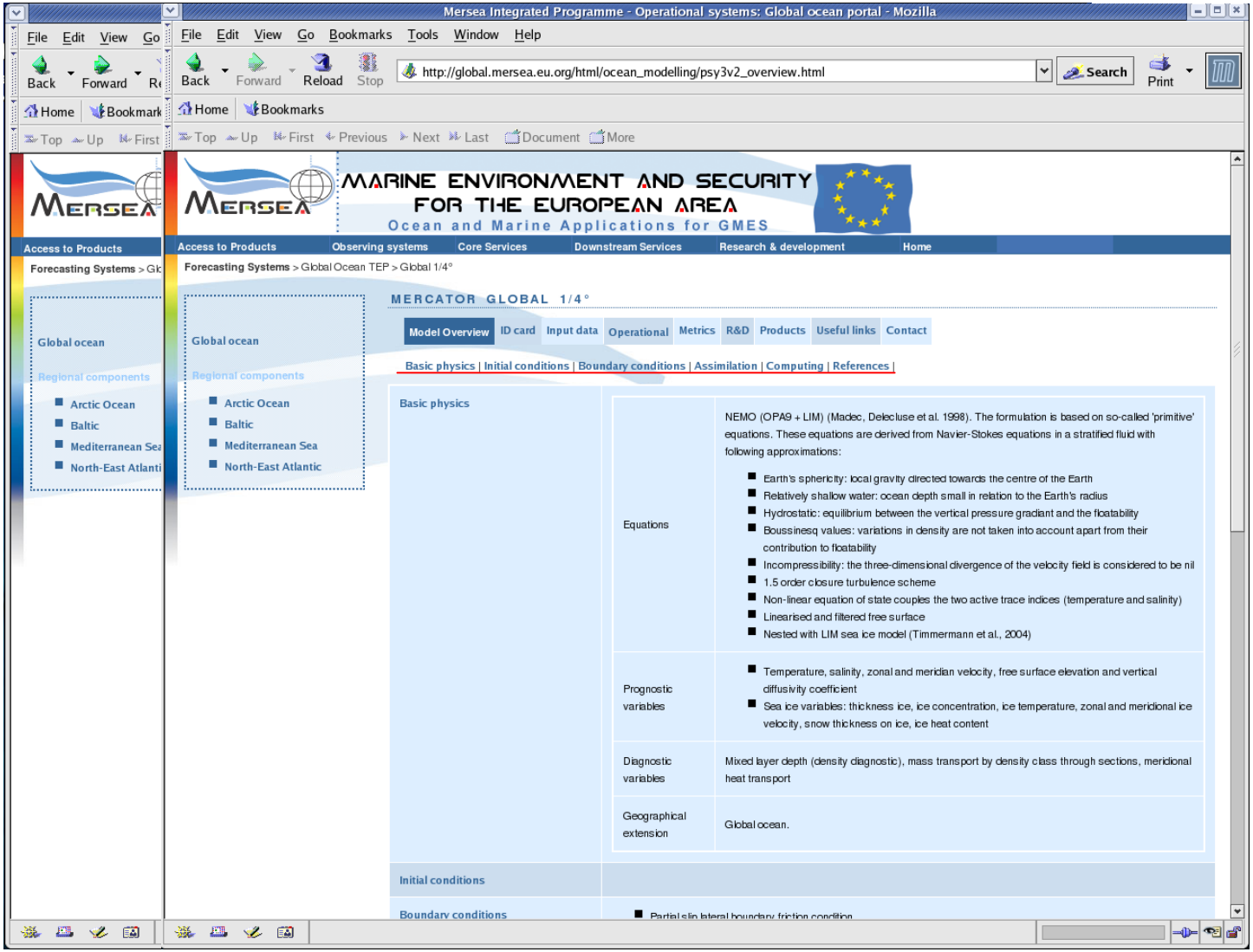

Dedicated website

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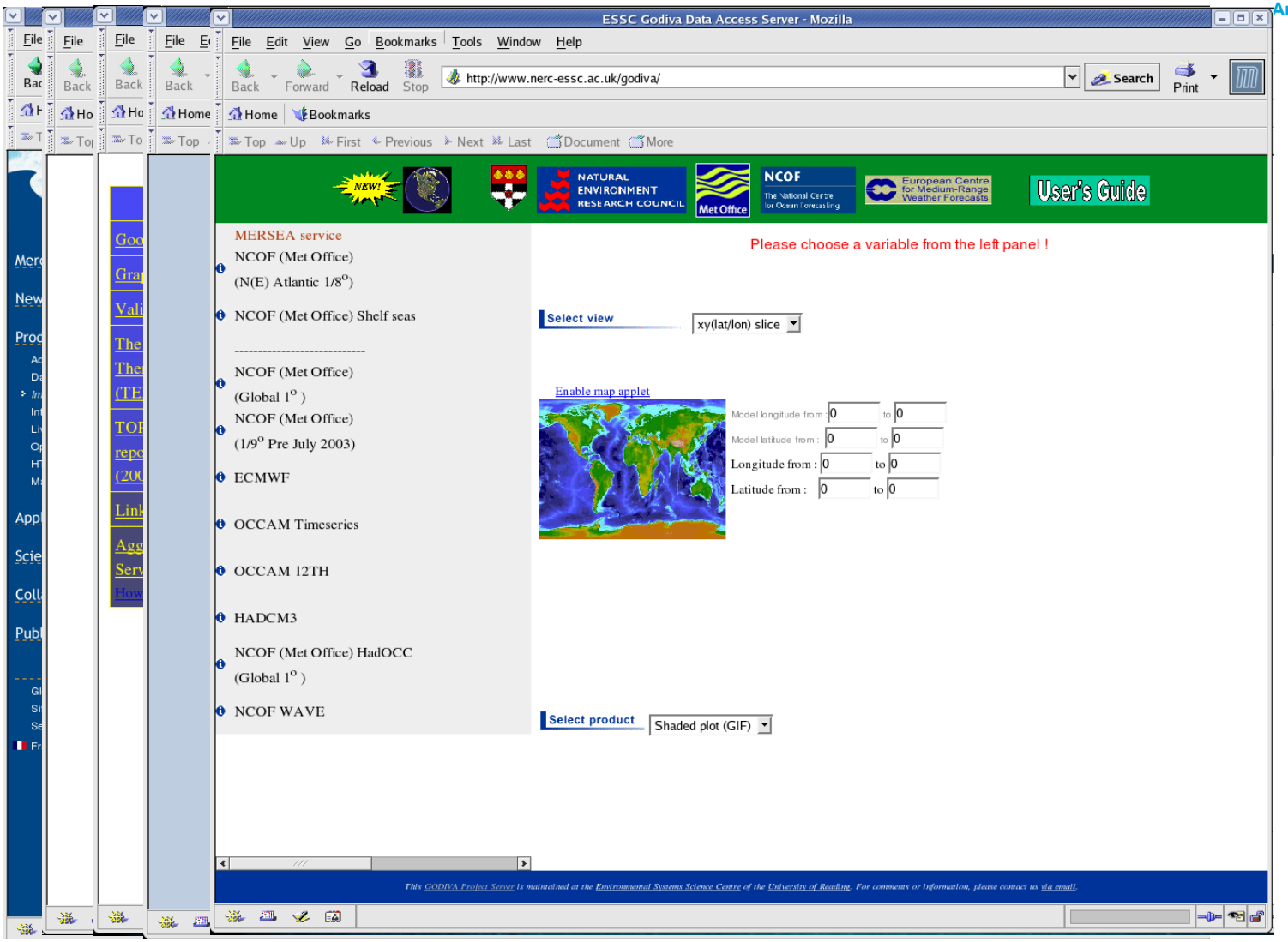

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Product portfolio

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- Central
- Model b … on the model nat
- Model s … simple geographi
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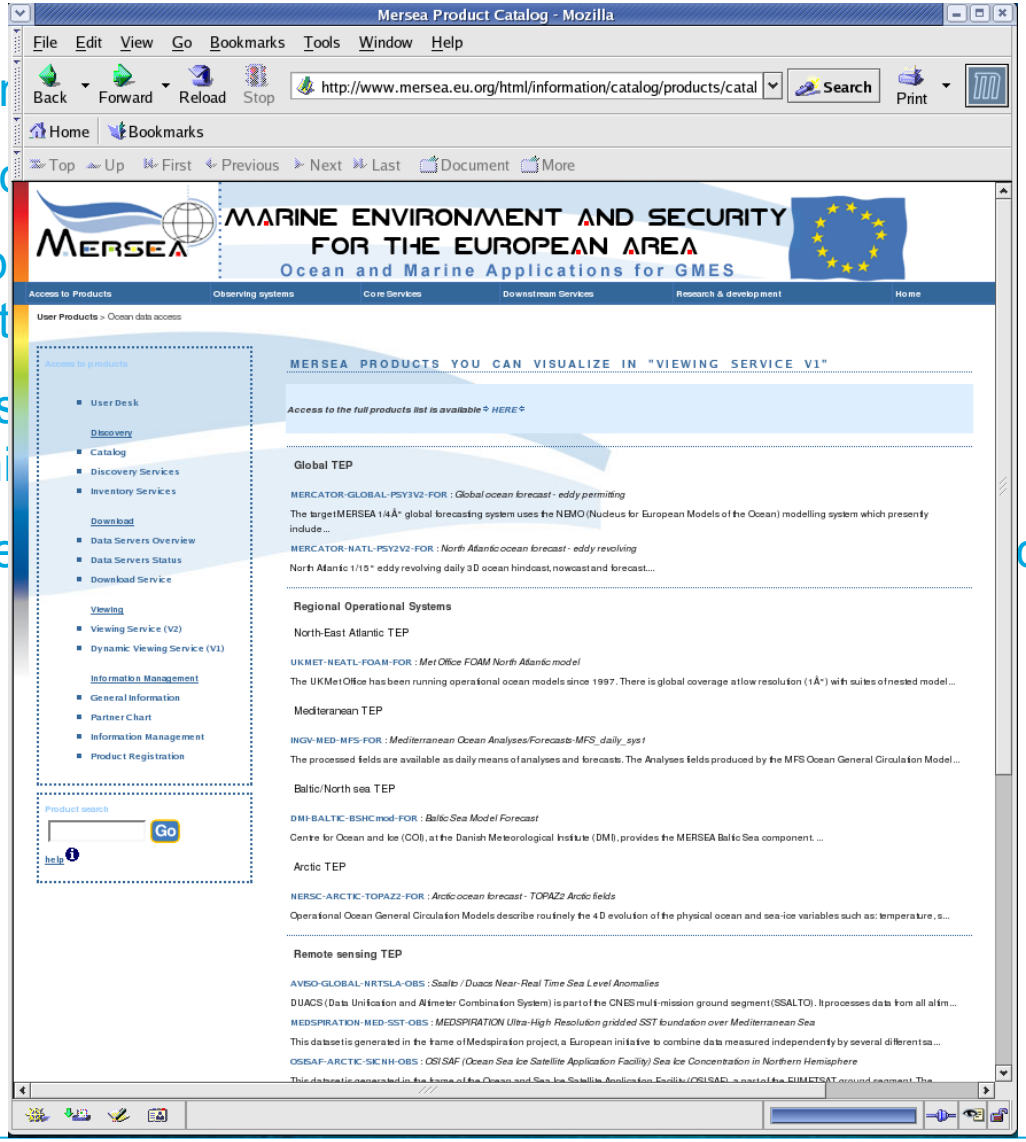
- Product



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Validation at forecasting center level

- Quality assesment of the operational system by comparison with observations:
  - In line diagnostics
  - systematic analysis of some case studies, phenomenological studies
- Comparison with climatology
- Monitoring the data assimilation statistics
- Comparison between forecast and analysis fields
- Monitoring of integrated oceanic quantities produced by he model

Common procedures: Mersea metrics

• Forecasting TEPs have obligation to provide normelized metrics to assess product quality (class 1,2,3) and system performence (class 4):

→ Elaboration of a common european approach for validation (equivalent quantities extracted out of the different systems for the same geographic locations.)

• Perform an overall assessment of the full integreated aspects and component

• Identify quality and drawbacks of the systems involved for each basin of the world ocean (intercomparison exercice)

The goal is to:

- Identify major errors and problems in each system

- overall assessment over a 6 month period

- evaluation of regional relative quality of each system

- definition of rules and shared methods for common assessment.

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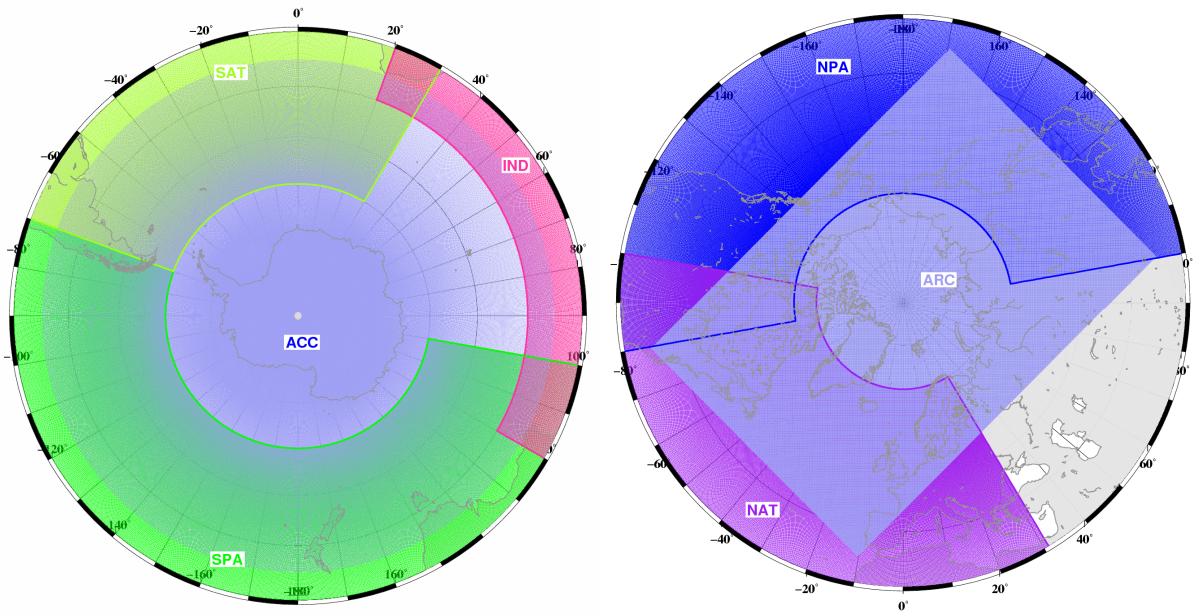
Class 1 metrics

- Provide general overview of the ocean and sea ice dynamics:

Interpolation on the GODAE grids and daily average of 2D and 3D outputs

→ Designed for consistency assessment and comparison to climatology.



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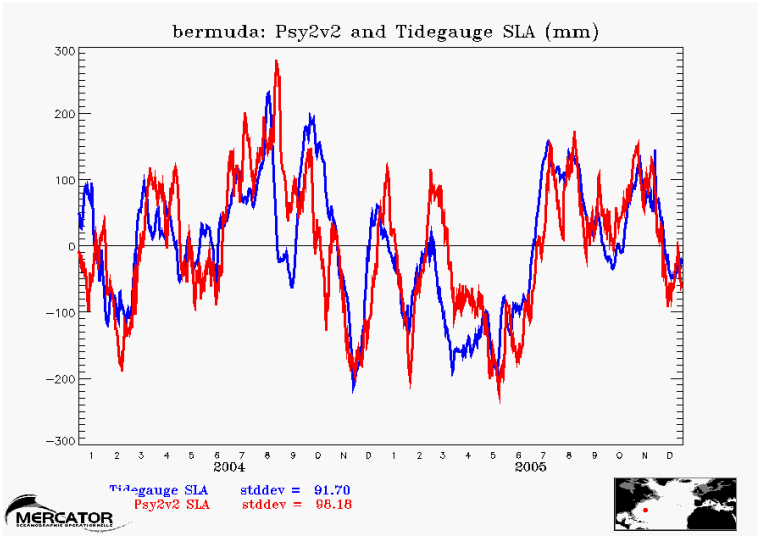
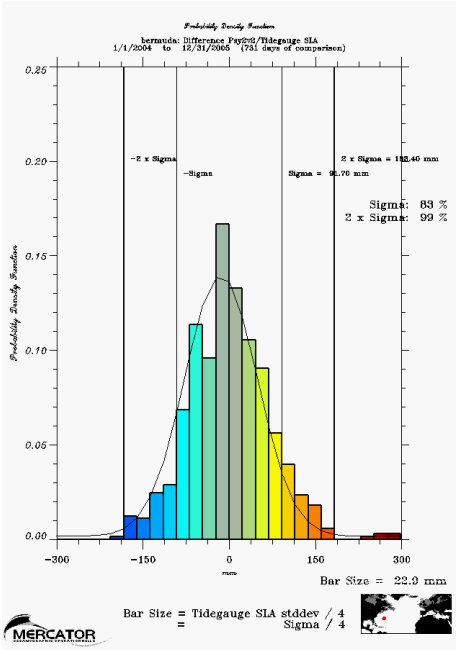
Class 2 metrics

- Designed to monitor system outputs:

Virtual mooring and sections into the model domain computed every 10 km for global metrics, 15 km for arctic metrics

Some of the tracks coincide with oceanographic or ship of opportunity tracks, repeating survey or glider tracks.





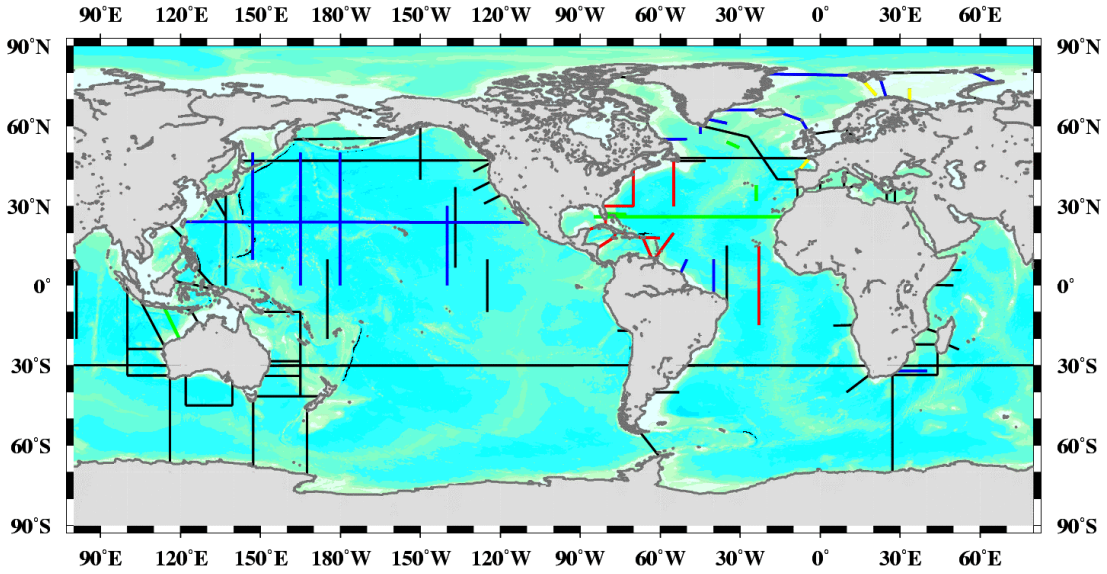
Class 3 metrics

- Physical quantities computed using the model variables:

→Need to be computed in line during the model run on the native grid every time step

They are integrated quantities such as daily volume transport through chosen sections.

They are designed to check model behaviour through physical point of view



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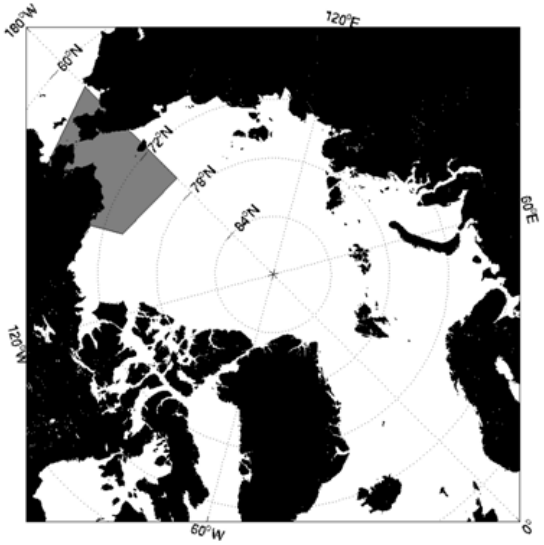
Class 4 metrics

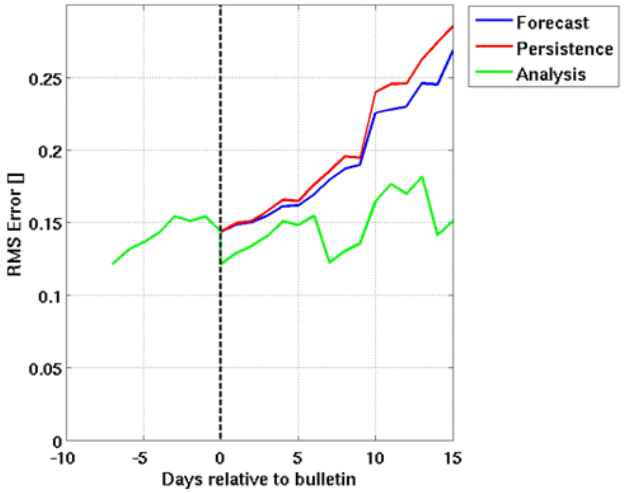
- Aims to mesure the performance of the forecasting system:

Capability to describe the ocean (hindcast mode)

Forecasting skill (analysis and forecast mode)

→ All fields are evaluated using identical criteria (for a given day, hindcast, forecast, analysis, persistence and climatology are compared.)



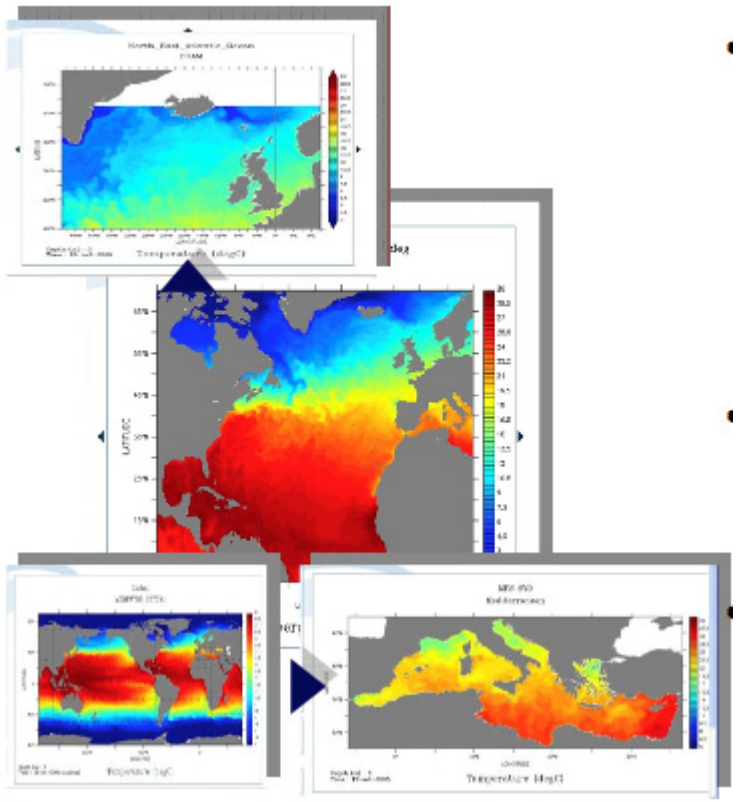


3 kind of services at Mersea level

- A cenral catalog to support the **discovery** function

- Common format and tools for data management to support the **downloading** function (Netcdf, openDAP)

- Shared **viewing** systems (Live Access Server, Web service, google-earth…)



Discovery

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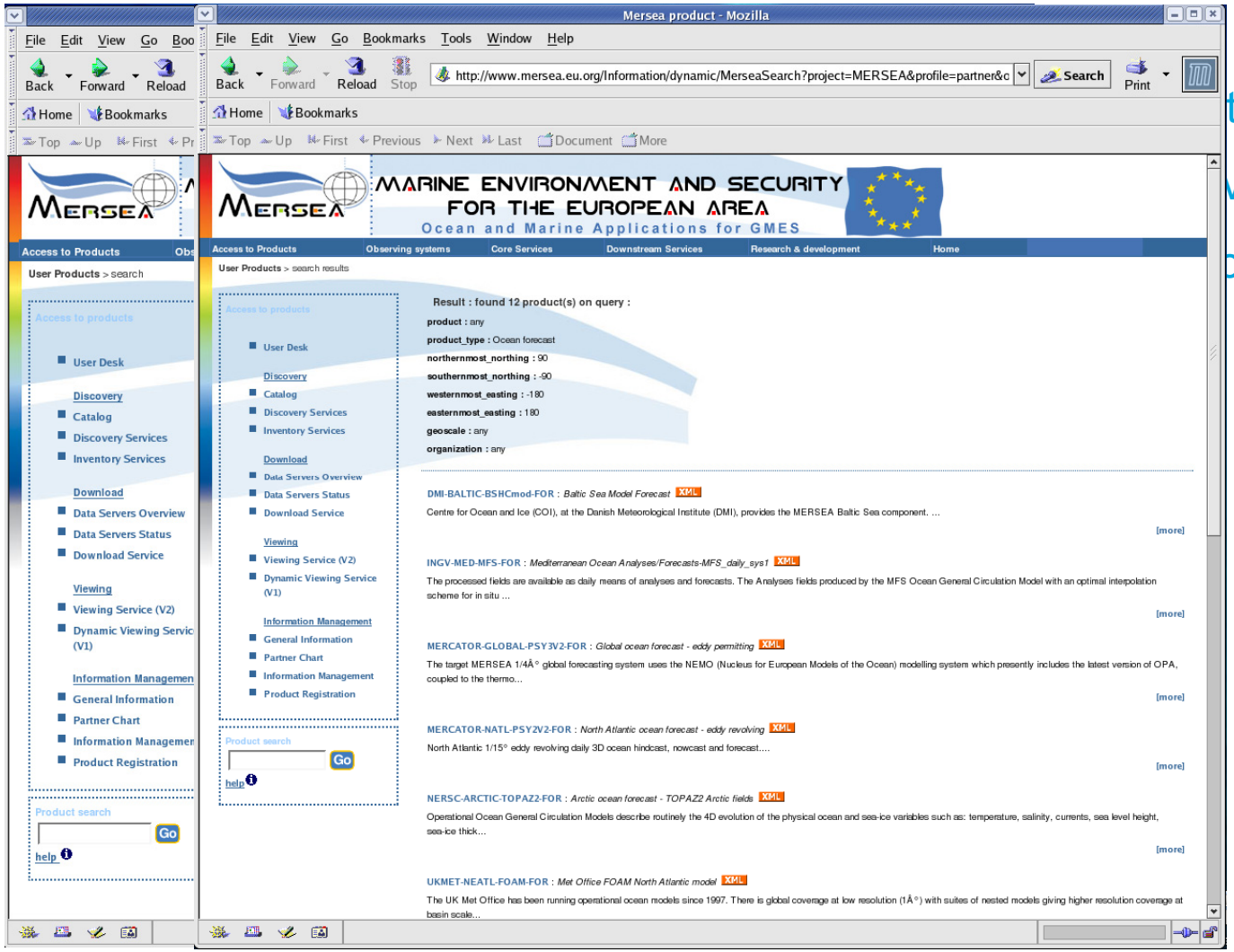

Downloading

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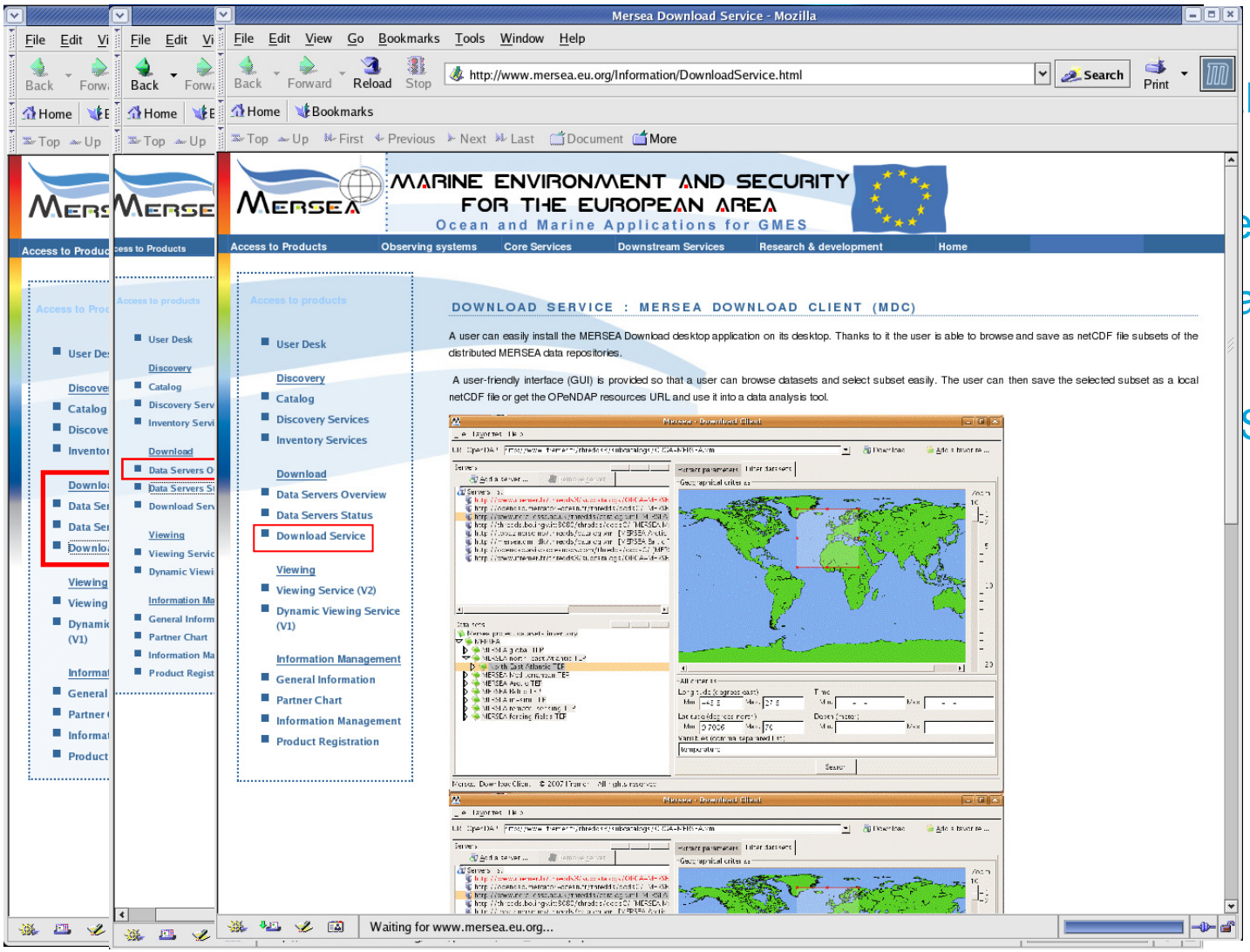

Viewing

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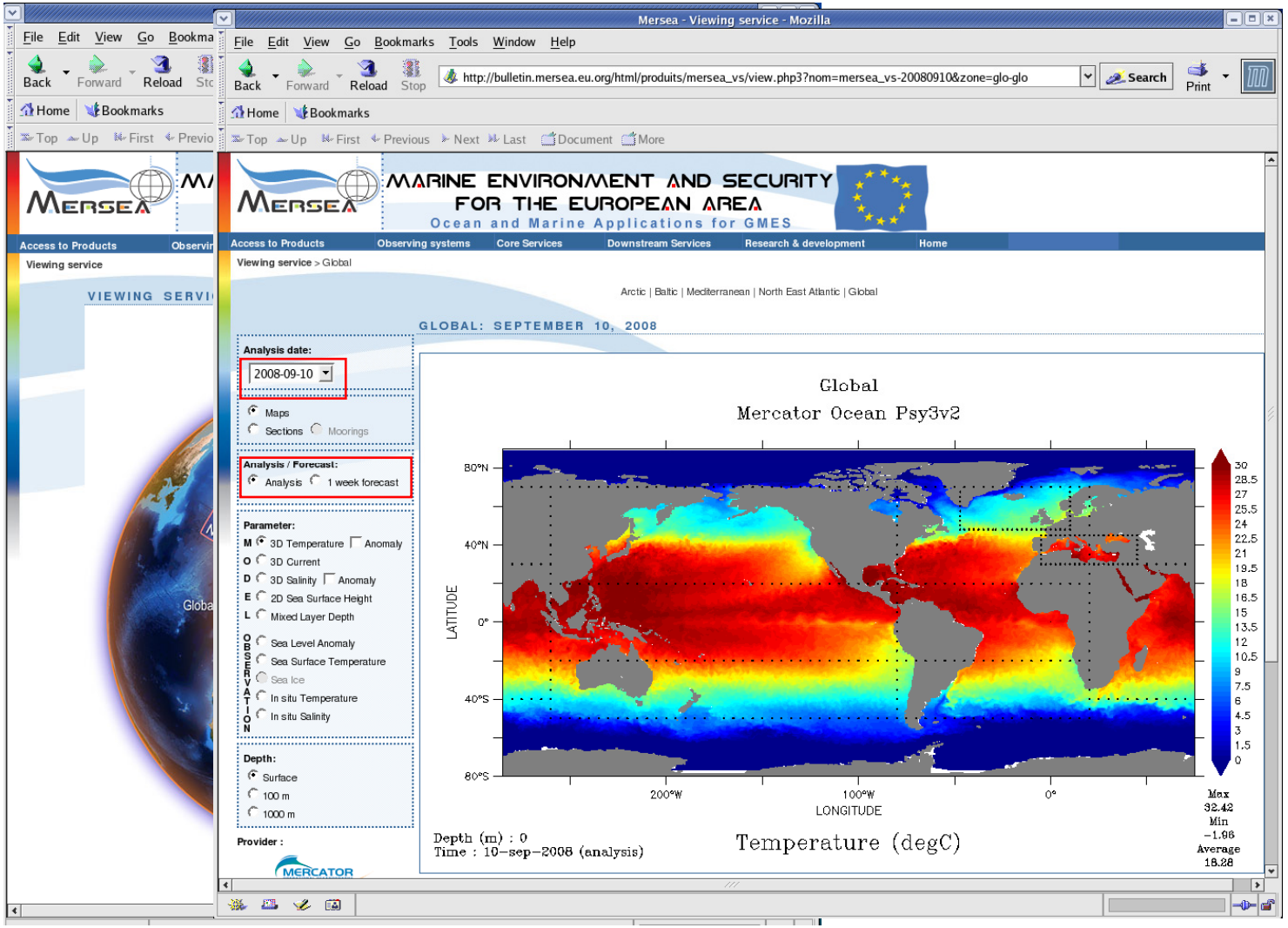
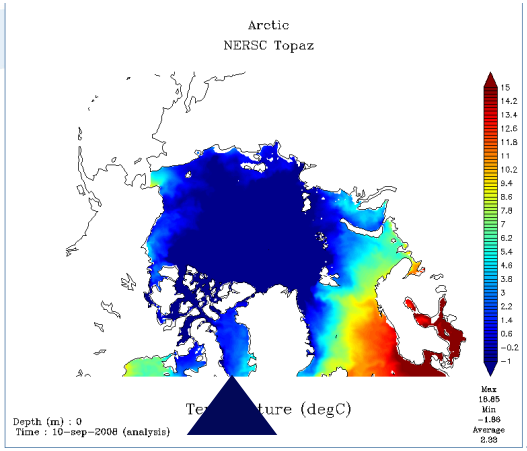
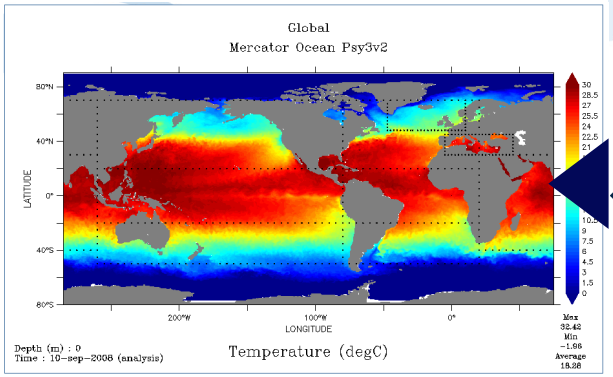
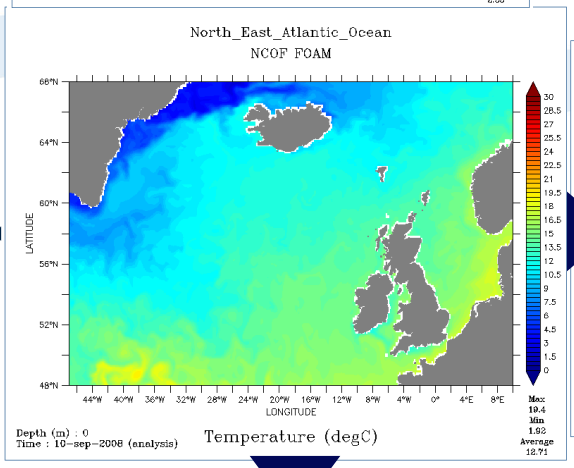


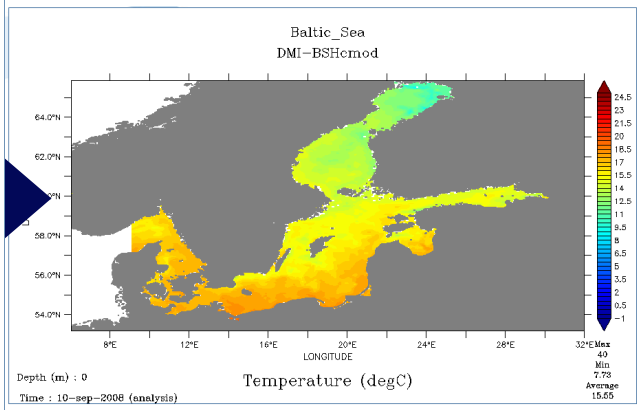
Viewing

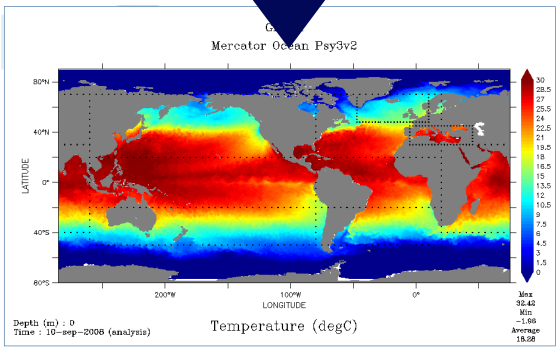
From global to regional











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Viewing observations

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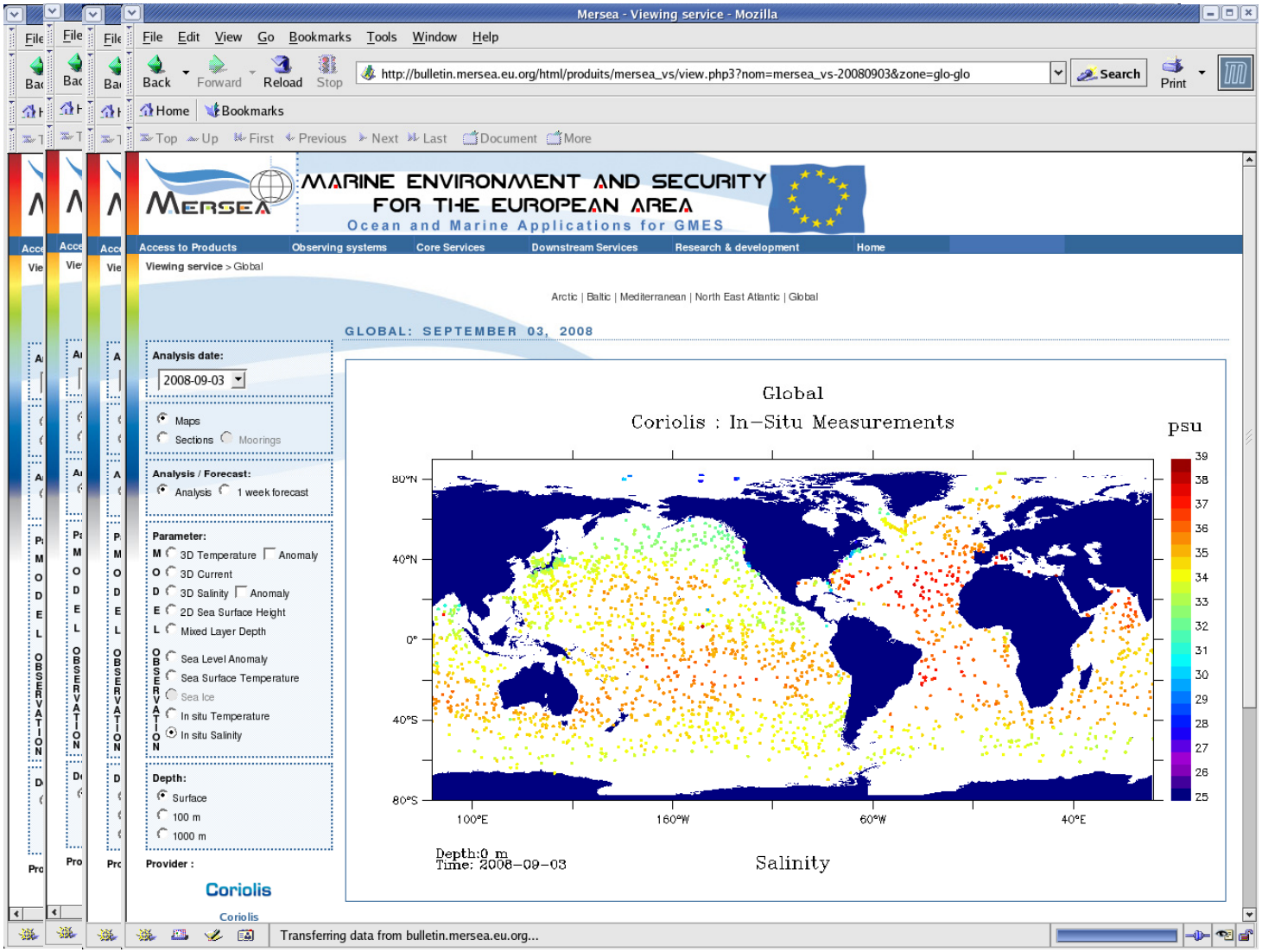

Ocean indicators

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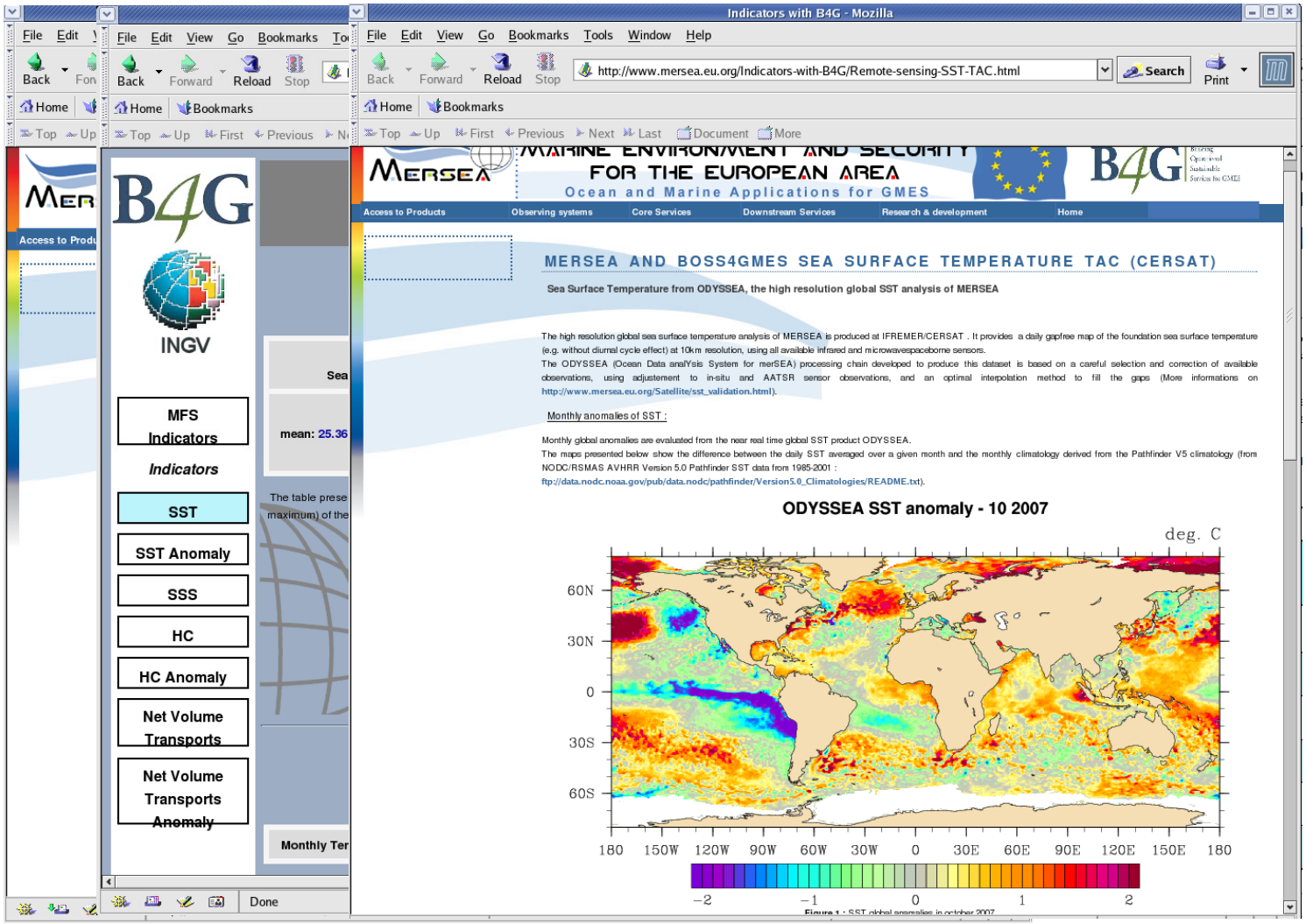


Next step: MyOcean

- Consolidating previous effort in pre-operational ocean monitoring and forecasting
- Move from science-push to **user**-pull
- Move from demonstration to full scale operations
- We have different definitions of operationality for our operational oceanography systems
- The ocean community has multiple faces (Ocean Centers, Research & operational, Public & private, data only & model only …

→Work on common approach for developpement and operations of the different components

→ Strenghten the internal links between component

Organisation:

• TEPs have openend the route to the TACs (data) and MFCs (models):

- Moving from portal to full production systems

- MFC: improve mappping of the production areas (7 areas)

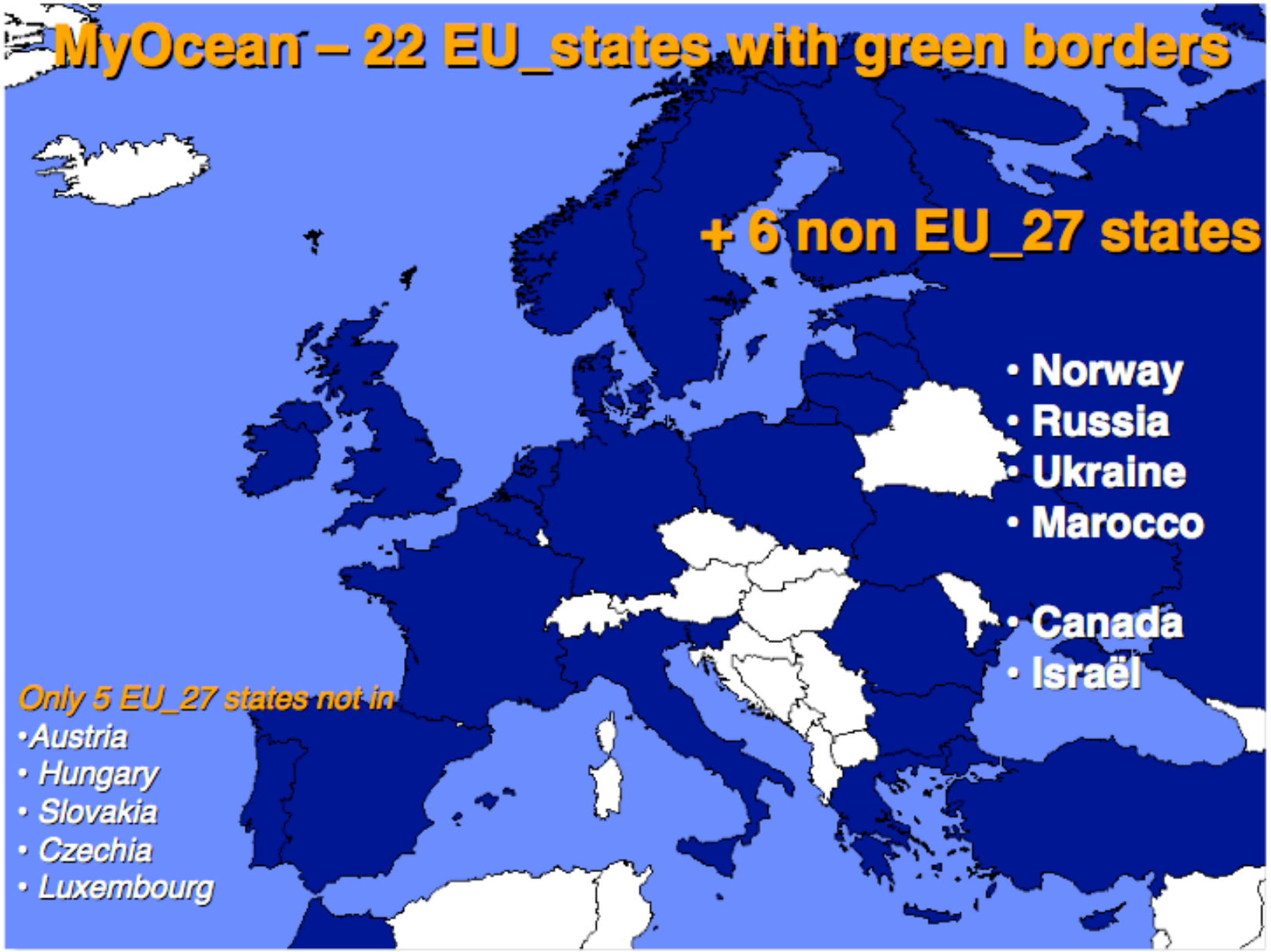
- TAC: new finer descritption per type of observations (5 centres)

• MyOcean will serve as the European focal point for ocean monitoring and forecasting capacity for

- the EU agencies (EEA, EMSA, EDA…)

- member states legally mandated agencies (Navies, coast-guards, research centers...)

- intergovernmental bodies (OSPAR, ICES, HELCOM …)

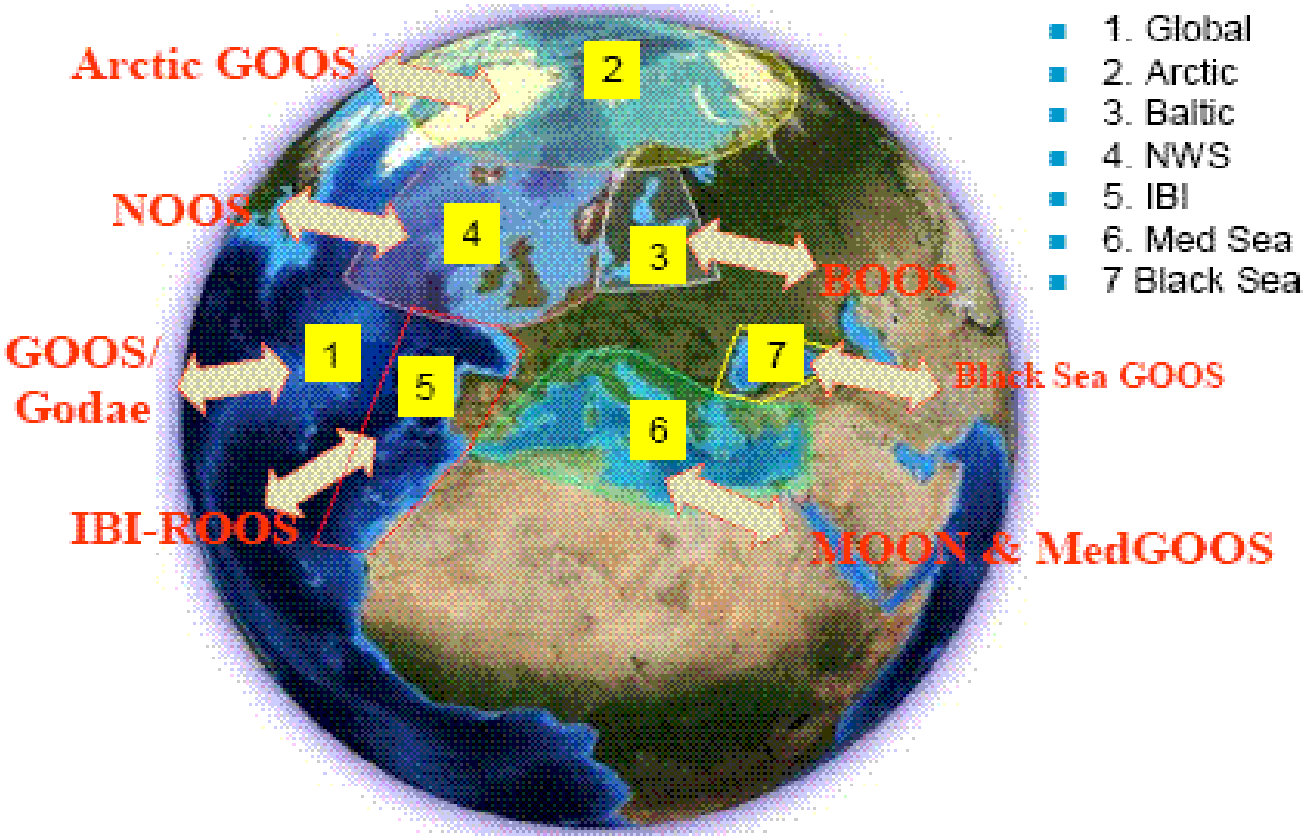

MyOcean – 22 EU_states with green borders
+ 6 non EU_27 states
• Norway
• Russia
• Ukraine
• Marocco
• Canada
• Israël
Only 5 EU_27 states not in
•Austria
• Hungary
• Slovakia
• Czechia
• Luxembourg

TAC and MFC:

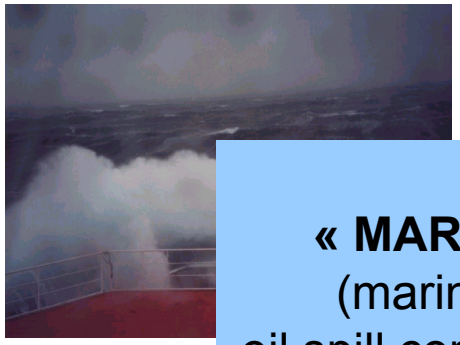
5 TACs

- Sea level
- Color
- SST
- Ice & Wind
- In Situ

7 MFCs

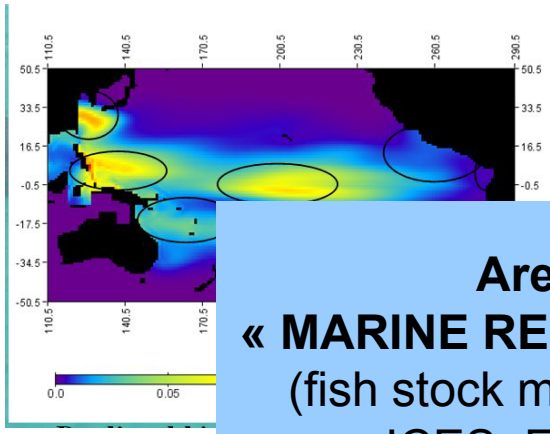


Areas of benefit:

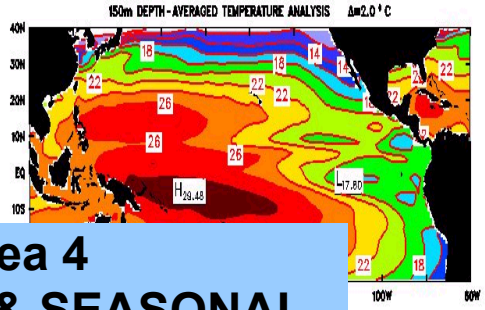


Area 1
« MARINE SAFETY »
(marine operations,
oil spill combat, ship routing,
defense, search & rescue, …)

Area 3
« MARINE & COASTAL ENVIRONMENT »
(water quality, pollution,
coastal activities, …)



Area 2
« MARINE RESSOURCES »
(fish stock management,
ICES, FAO, …)



Area 4
« CLIMATE & SEASONAL FORECASTING »
(climate monitoring, ice,
seasonal forecasting, ..)