



Ocean Monitoring and Forecasting core services, *the MyOcean example*

Pierre BAHUREL
MyOcean coordinator
Mercator Ocean, France

Session 5B "The way forward: delivering societal benefits
from the ocean observing system, visions for the coming decade"

Talk Outlines

- What are the challenges of the **existing core services** in ocean monitoring and forecasting for the coming decade ?
- How **MyOcean** prepares the European Marine Core Service ?
- How an **open** oceanography will contribute to a decade of innovation and **societal benefits** ?



1. What are the challenges of the existing Core Services in Ocean Monitoring and Forecasting

Ocean Monitoring and Forecasting

Core Services, definition

Marine Core Service

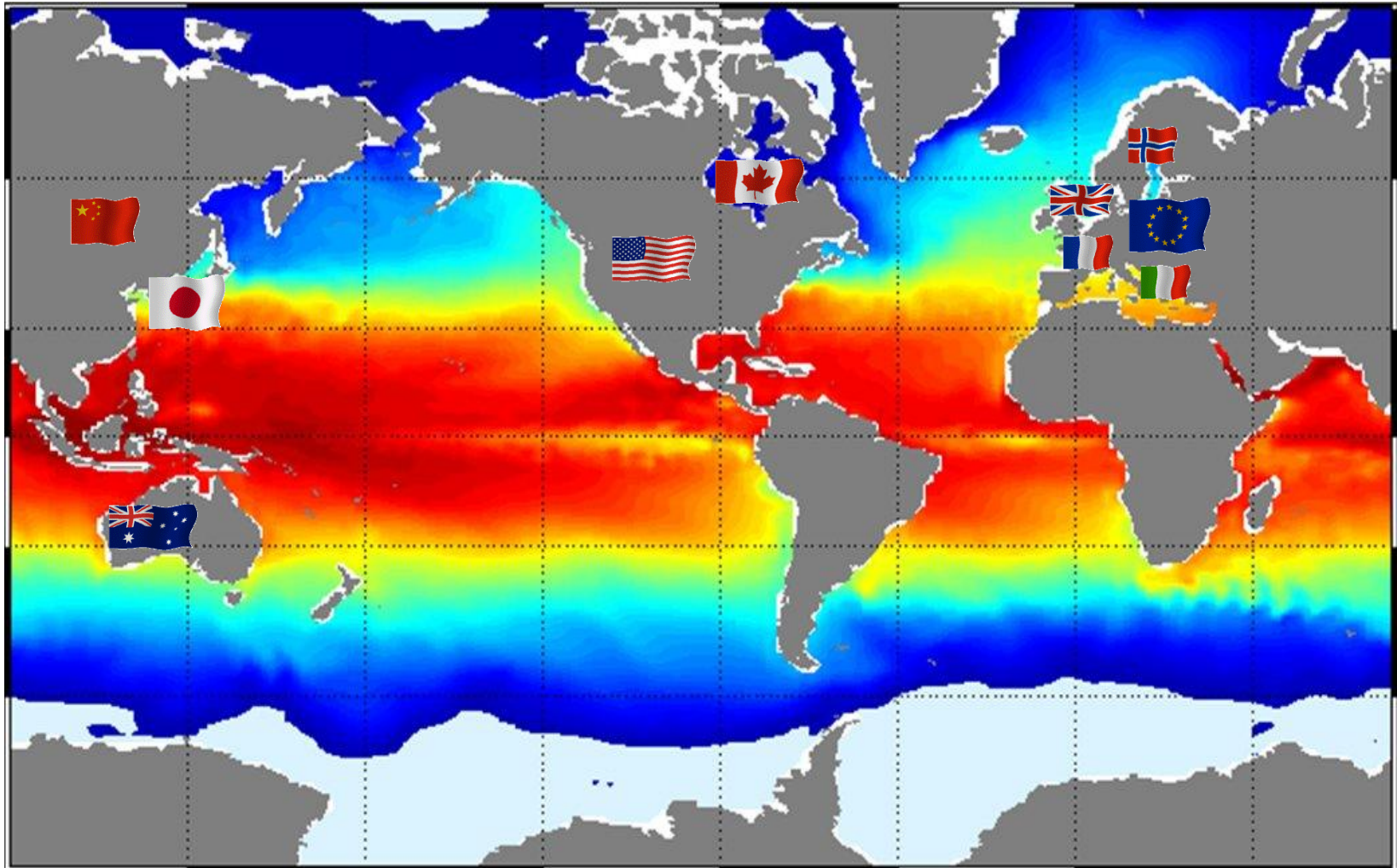


- Role
 - *provide the common denominator data for **all users requesting an information on the ocean**: the information for downstream services.*
- Core information
 - *Describing ocean currents, temperature, salinity, sea level, primary ecosystems, ice coverage ...*
- Adding value through
 - *Data combination and assimilative models, Continuity and consistency, Expertise on the ocean, Information Service*

Ocean Monitoring and Forecasting

Core Services

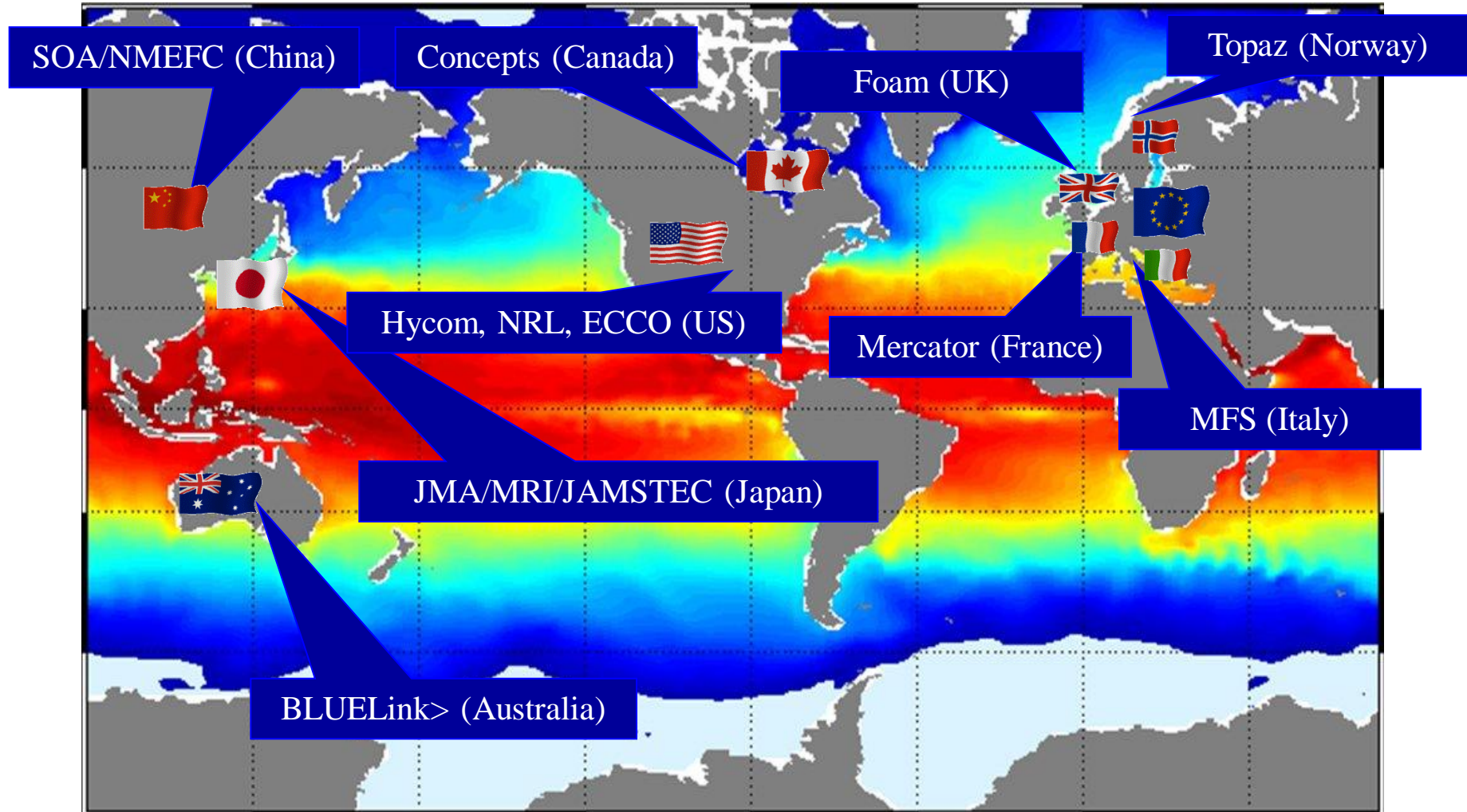
Marine Core Service



Ocean Monitoring and Forecasting

Core Services

Marine Core Service

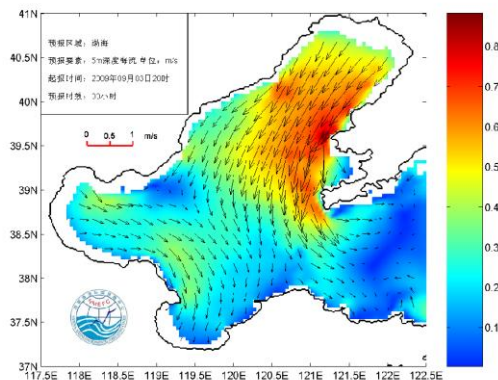
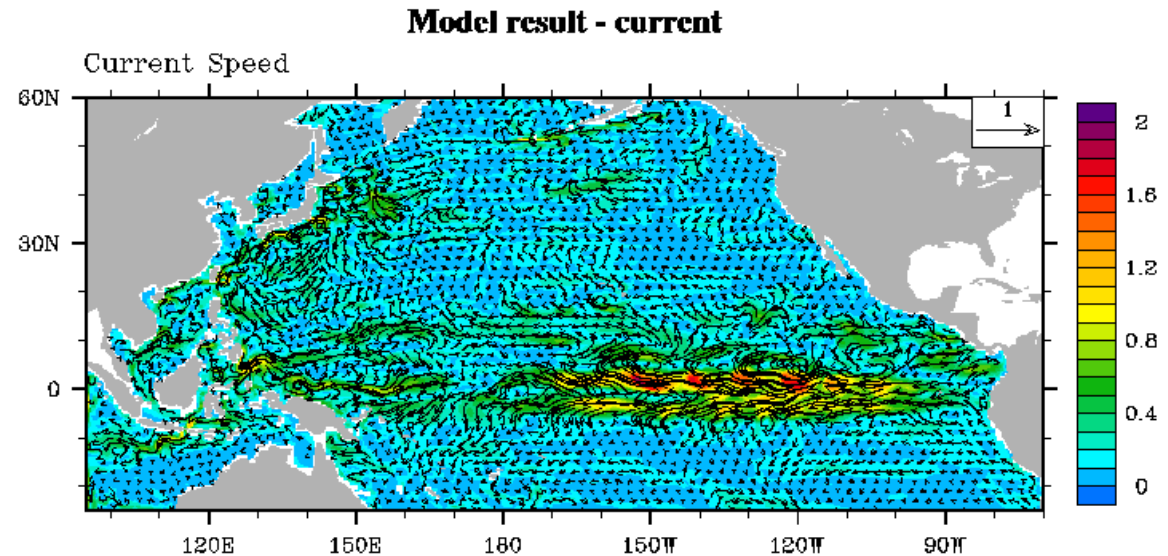


Ocean Monitoring and Forecasting in NMEFC (China)

Marine Core Service

- Sea Temperature
- Ocean Currents
- Ocean Wave
- Storm Surge
- Sea Ice
- Ecosystem
- Tsunami

National Marine Environmental Forecasting Center,
Beijing, China (www.nmefc.gov.cn)

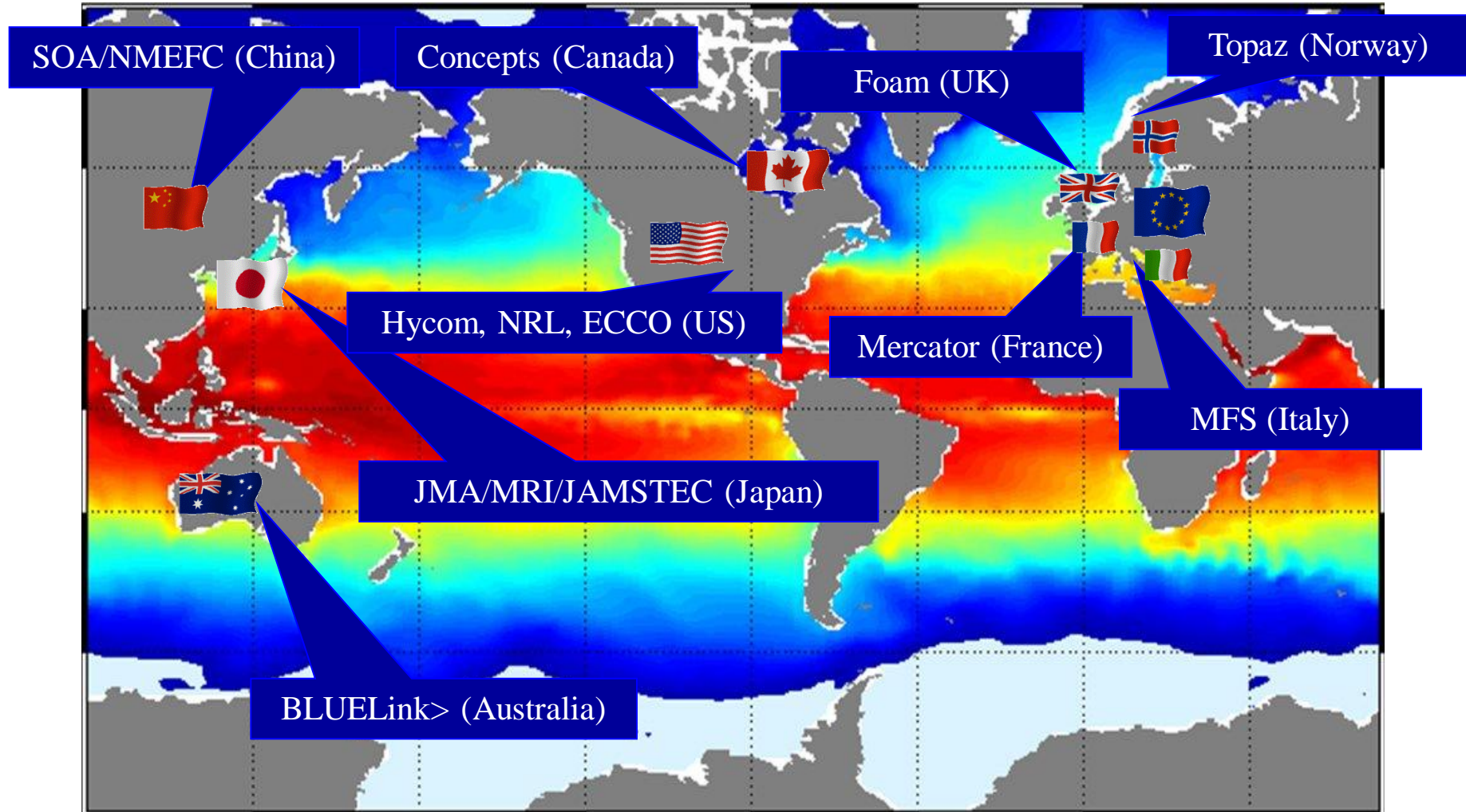


Courtesy of *Liying Wang*, NMEFC, Beijing, China

Ocean Monitoring and Forecasting

Core Services

Marine Core Service





GODAE

Global Ocean Data Assimilation Experiment

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- Towards operational oceanography -

GODAE Special Issue Publication

The GODAE Special Issue has now been published (September 2009) celebrating GODAE's success and providing accessible summaries of the achievements and outcomes from GODAE. Members from the International GODAE Steering Team (IGST) and invited expert scientists have contributed to its completion.

Further information can be found on the [Special Issue page](#).

Working Groups



The initiation of several working groups allows to put focus on particular research areas, e.g. coastal and shelf seas modelling.

[more >](#)

Science



Observational networks, models and estimation tools are the essential elements of GODAE.

[more >](#)

Special Issues



GODAE benefits climate research and supports the Global Ocean...

Data Products



GODAE partners produce distinctive...

What's New

Added: 14-09-2009
Publication of the GODAE Special Issue
[Read More](#)

Added: 13-08-2009
Mercator Ocean Newsletter 34 (July 2009)
[Read More](#)


Added: 21-07-2009
Mercator Ocean Newsletter 33 (April 2009)
[Read More](#)

[More news...](#)

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Ocean Monitoring and Forecasting

Core Services, Challenges

Challenges for
the coming
decade

- Operationality
- Innovation
- Sustainability



2. How **MyOcean** prepares the **European** **Marine Core Service**

What is « MyOcean »

Marine Core Service

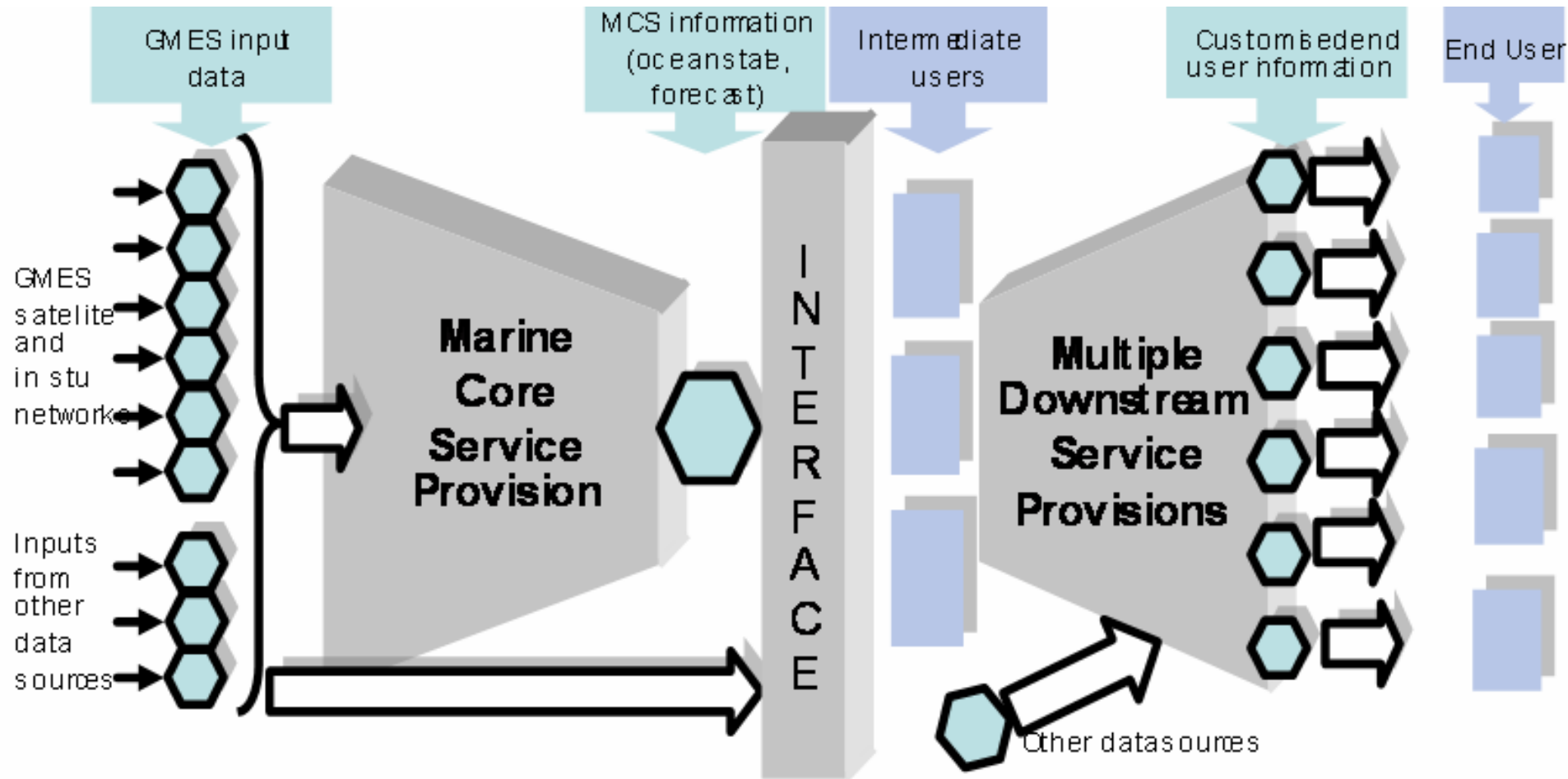
- **Objective:** pan-European service for ocean monitoring and forecasting
- **Targetted users:** specialized service providers
- **Challenge:** a sustained European Marine Core Service
- **Framework:** European Union « GMES » program
- **Budget:** 55 M€ ; **Funding:** European Commission 33 M€ / Partners 22 M€
- **Duration:** 3 years ; **Start:** April 2009; **End:** March 2012
- **Consortium:** 61 partners, 29 countries; **Lead:** Mercator Ocean + Eur. Board
- **Organization:** a pan-European system composed of 12 « centres », 5 for observations, 7 for assimilation/modelling, and shared facilities
- *In other words: the ocean monitoring and forecasting centres in Europe, working together to provide a single pan-European service, reducing unnecessary redundancies, increasing the service value*



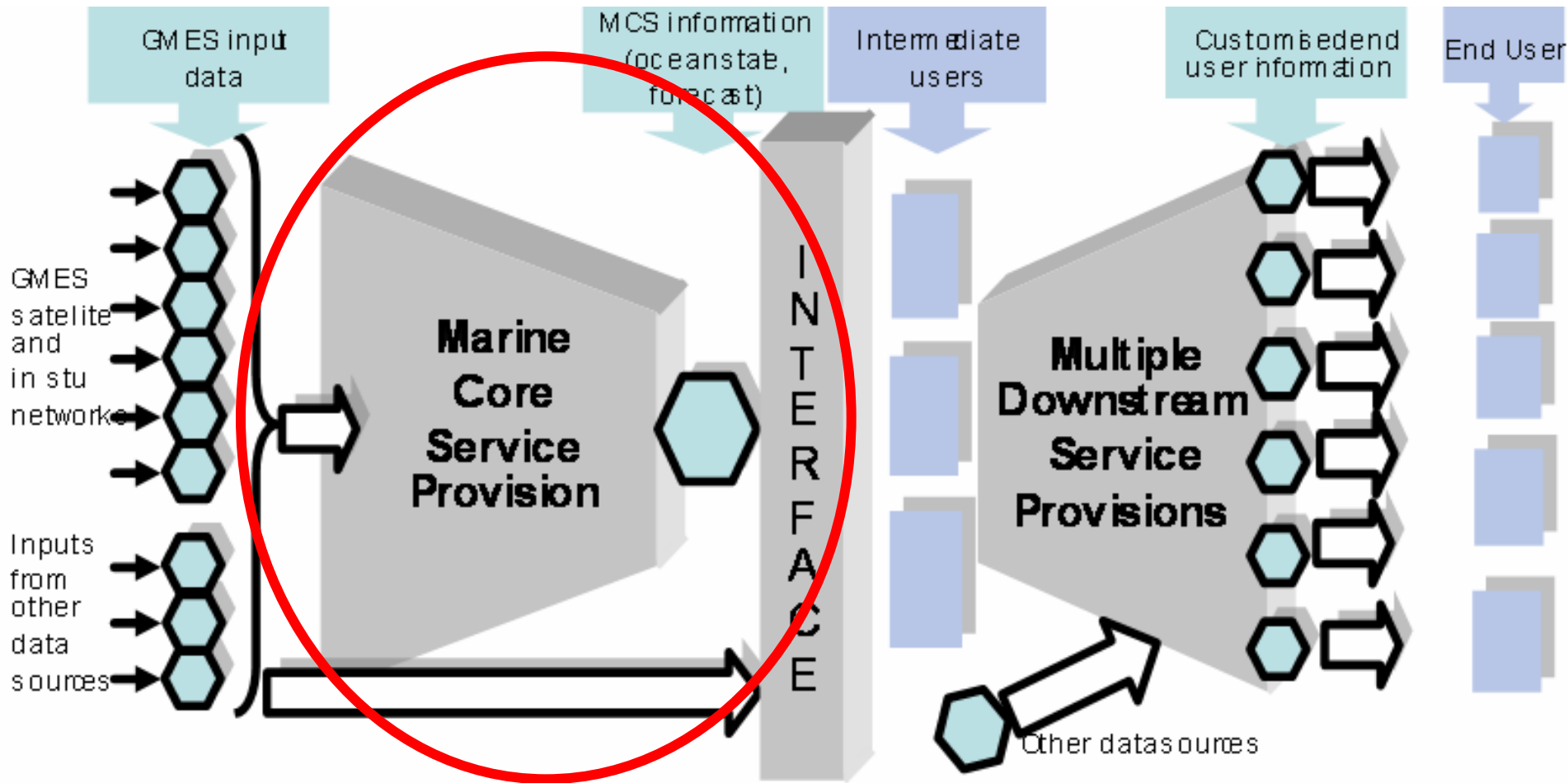


The mission

A clear (and limited) role in the value chain



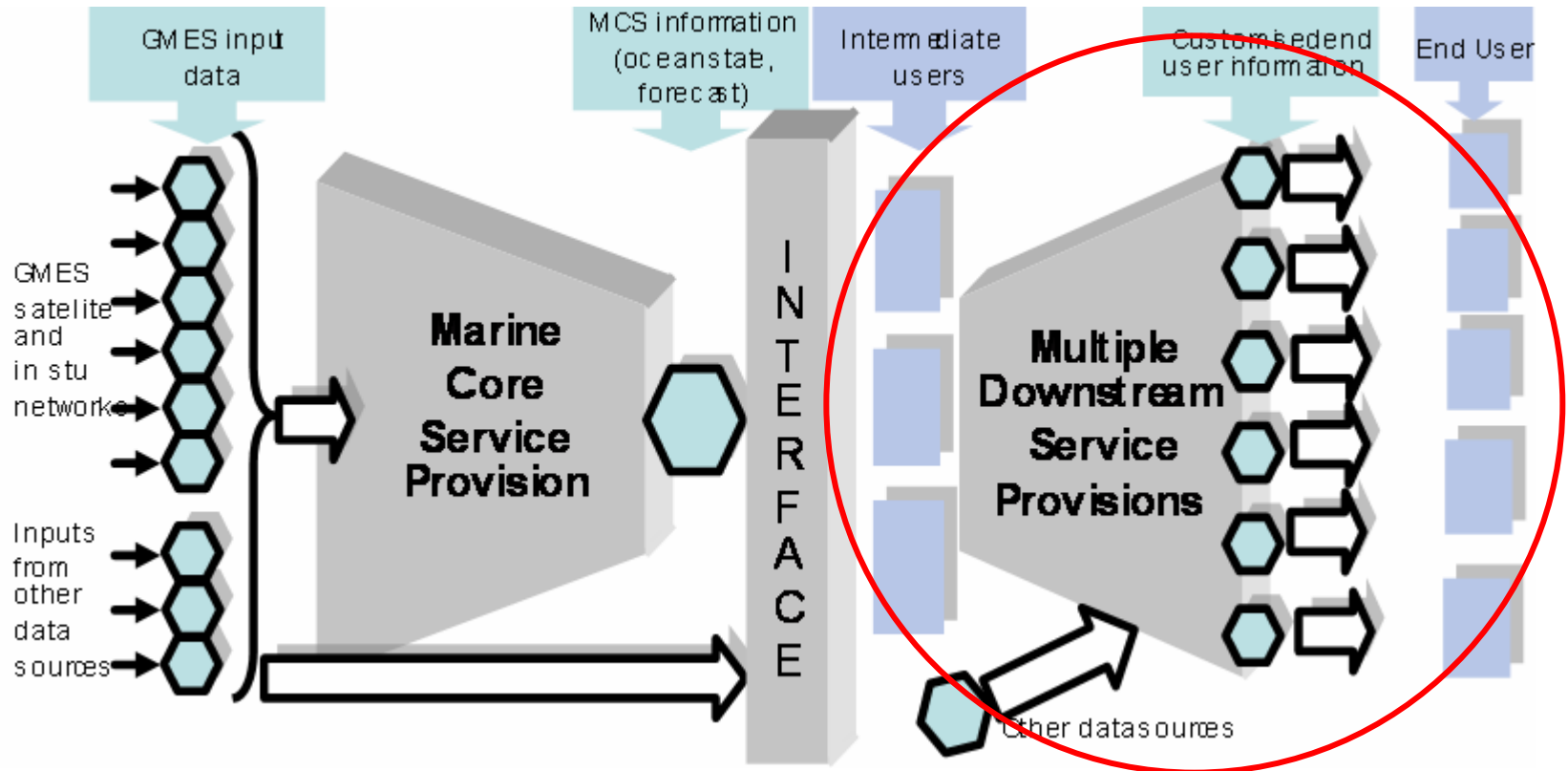
A clear (and limited) role in the value chain





The market

Intermediate users



Users of the MyOcean core service are specialized **service providers** of the downstream sector.

Market Segmentation

- The users, their requirements, their assessment

Area 1

« MARINE SAFETY »

(marine operations,
oil spill combat, ship routing,
defense, search & rescue, ...)

Area 3

« MARINE AND 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, ..)

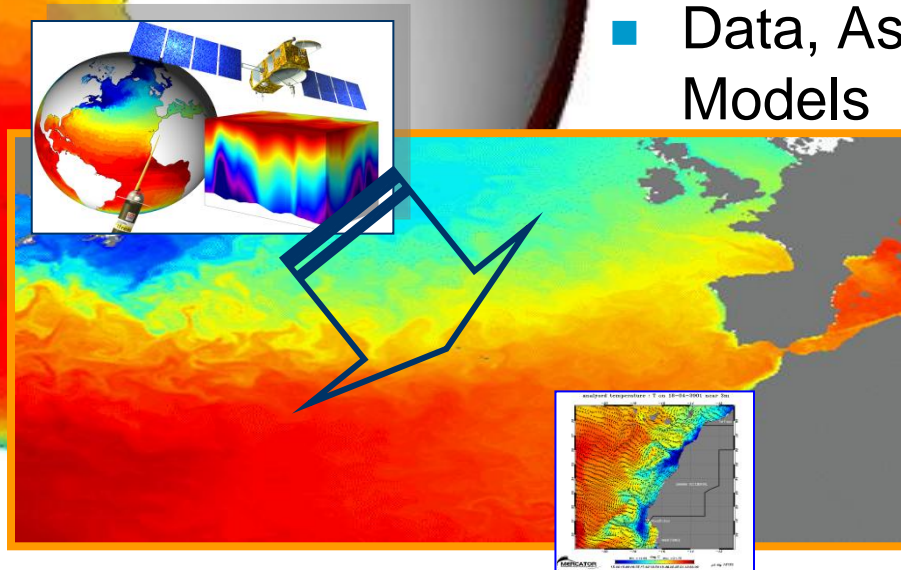
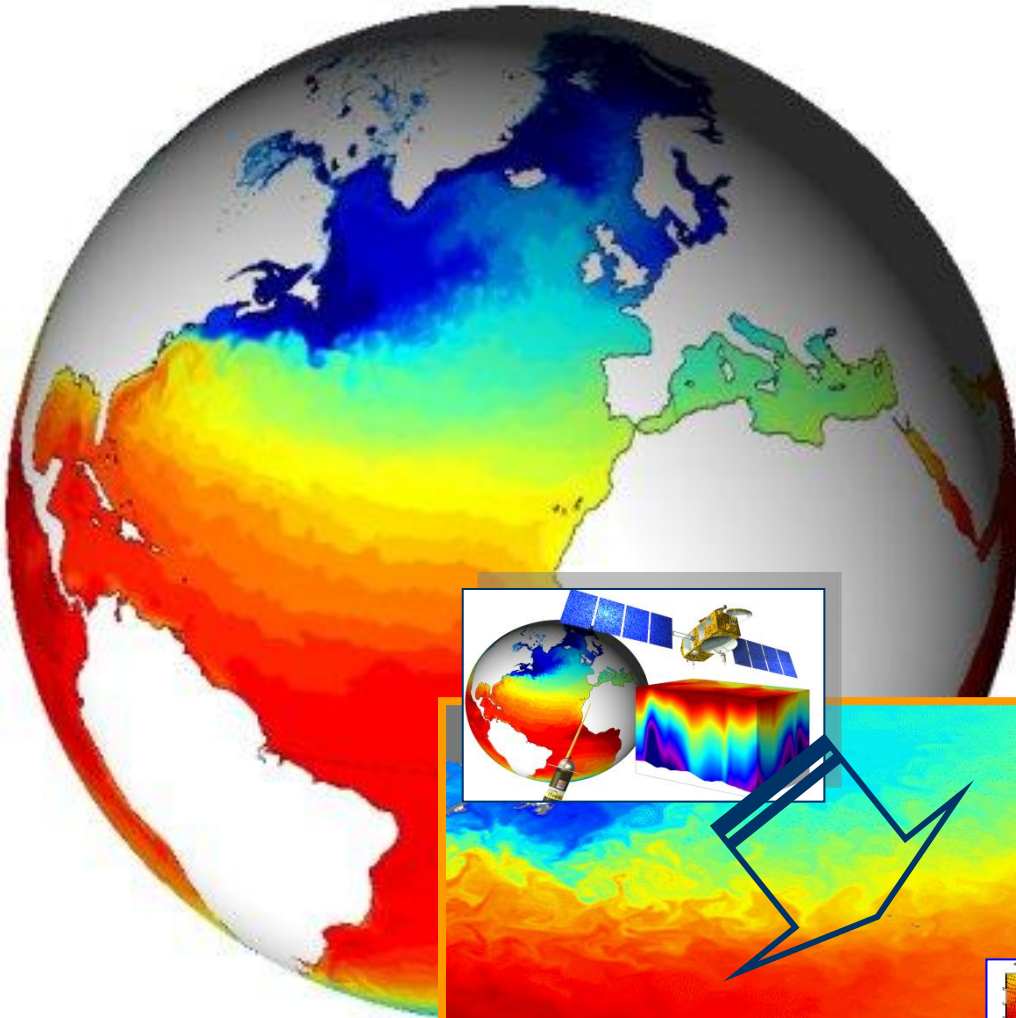


The offer

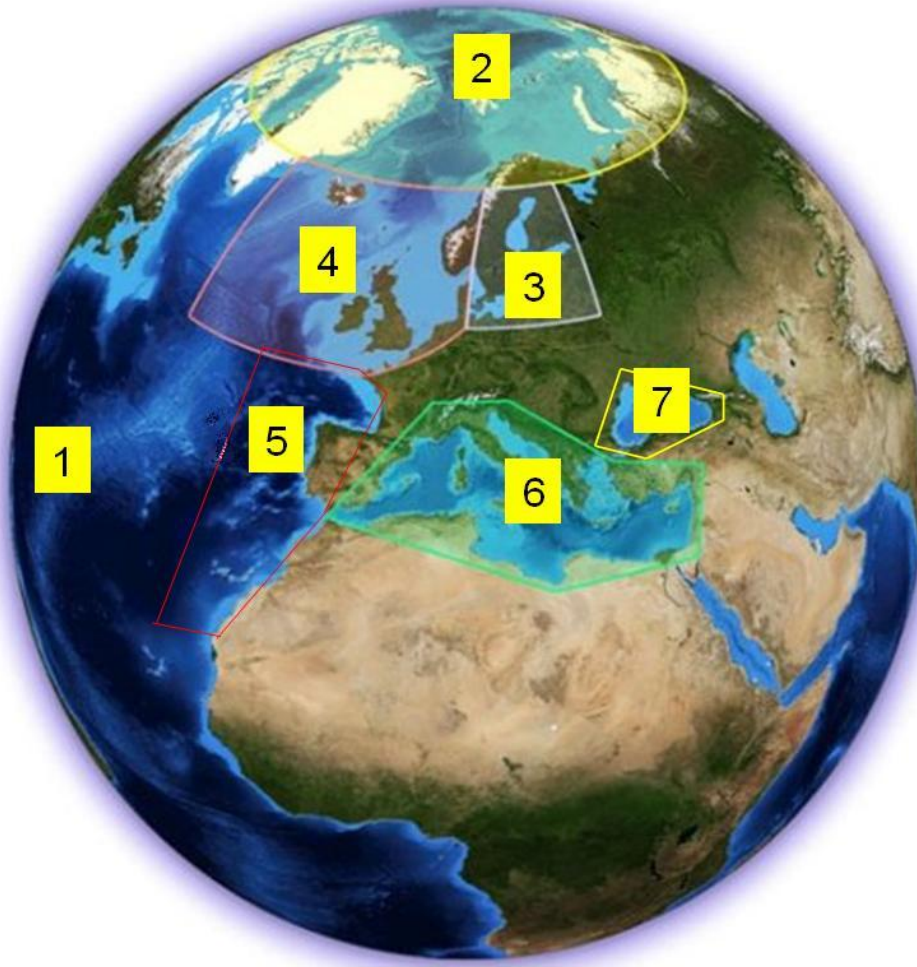
The MyOcean offer

A core information on the ocean

- Physical state of the ocean, primary ecosystem
- Global ocean, and main European basins and seas
- Large and basin scale, mesoscale physics
- Hindcast, Nowcast, Forecast
- Data, Assimilation and Models



The Global Ocean + 6 European Seas



- (1) Global Ocean
- (2) Arctic Ocean
- (3) Baltic Sea
- (4) Atlantic North-West Shelves (**NWS**)
- (5) Atlantic Irish-Biscay-Iberic (**IBI**) area
- (6) Mediterranean Sea
- (7) Black Sea



The production

The Consortium



The Production Units



TAC

- Sea Level
- Ocean Color
- Sea Ice & Wind
- In situ
- Sea Surface Temperature

MFC

- MFC Global
- Artic
- Baltic
- NW Shelves
- IBI
- Med Sea
- Black Sea

The Production Units

5 Thematic Assembly Centres

Observations

Sea Level

Ocean Color

Sea Surface Temp.

Sea Ice & Wind

In Situ

7 Monitoring and Forecasting Centres

Models

Global Ocean

Arctic Ocean

Baltic Sea

Atlantic NWS

Atlantic IBI

Mediterranean Sea

Black Sea

Service Desk

TAC

- Sea Level
- Ocean Color
- Sea Ice & Wind
- In situ
- Sea Surface Temperature

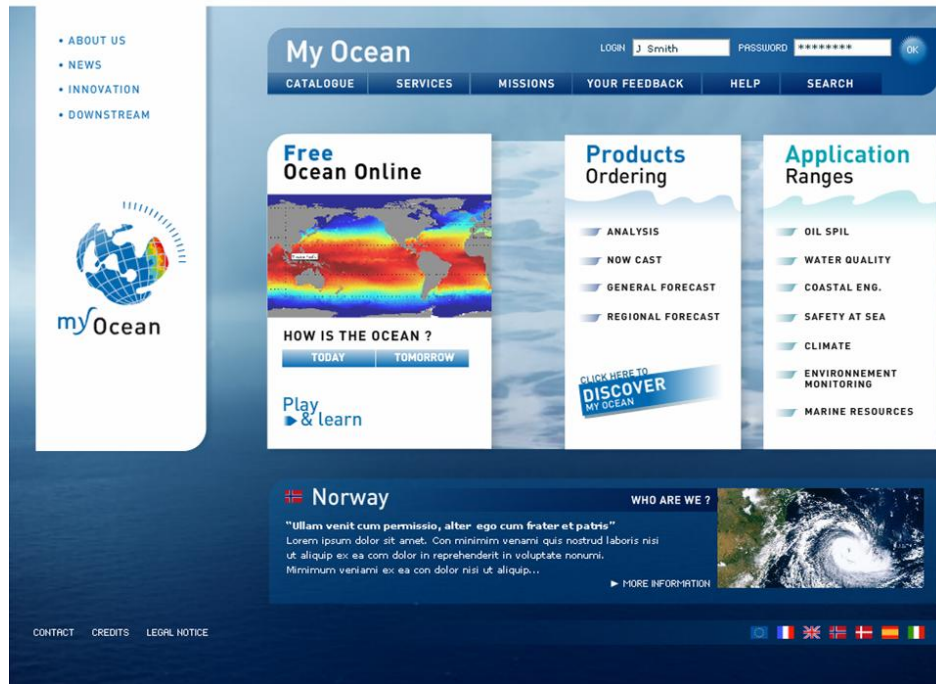
MFC

- MFC Global
- Artic
- Baltic
- NW Shelves
- IBI
- Med Sea
- Black Sea



The service

The MyOcean choice ... in the service to users



- One **single** service desk
- One entry point to the MyOcean pan-european information
- Connected to all production units in Europe

- Open and free **data policy**
- **Open** access, **Free** access

- Commitments through **Service Level Agreements (SLA)**



- Project
- Products & Services
- User's Feedback

MyOcean

www.myocean.eu



Project
Products
& Services
User's
Feedback

MyOcean Products & Services

[SERVICE](#)[ONLINE CATALOGUE](#)[SERVICE DESK](#)[DATA POLICY](#)

MYOCEAN INTERACTIVE CATALOGUE

Search mode: multi-criteria or full catalogue

Full
Catalog

GO >>

SELECT AN AREA

SELECT A PHYSICAL PARAMETER

SELECT A PRODUCT



- 2
- ☒ Temperature
 - ☐ Wind
 - ☐ Sea ice
 - ☐ Salinity
 - ☐ Current
 - ☐ Sea level
 - ☐ Biogeochemistry

3

☐ Observation

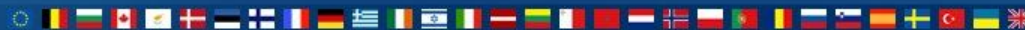


☒ Analysis and forecast



SEARCH

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[Project](#)[Products & Services](#)[User's Feedback](#)

MyOcean Products & Services

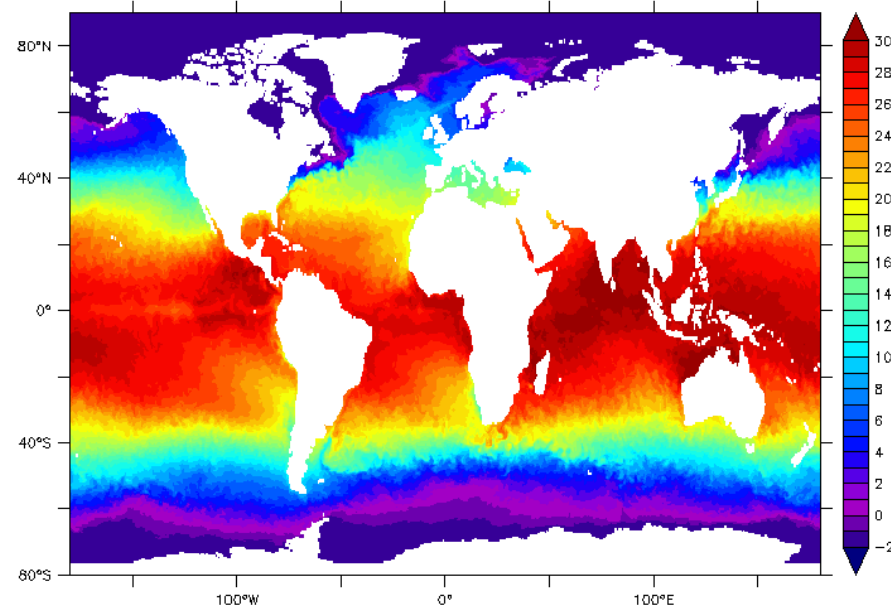
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MYOCEAN INTERACTIVE CATALOGUE

Search mode: multi-criteria or full catalogue

[Full Catalog](#)[GO >>](#)[SELECT AN AREA](#)[SELECT A PHYSICAL PARAMETER](#)[SELECT A PRODUCT](#)

Surface Temperature (Global)



07/04/2009, Temperature 0m (degC)

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- Project
- Products & Services
- User's Feedback

MyOcean Products & Services

SERVICE

ONLINE CATALOGUE

SERVICE DESK

DATA POLICY

MYOCEAN INTERACTIVE CATALOGUE

Search mode: multi-criteria or full catalogue

Full Catalog

GO >>

SELECT AN AREA

SELECT A PHYSICAL PARAMETER

SELECT A PRODUCT



- ☐ Temperature
- ☐ Wind
- ☒ Sea ice
- ☐ Salinity

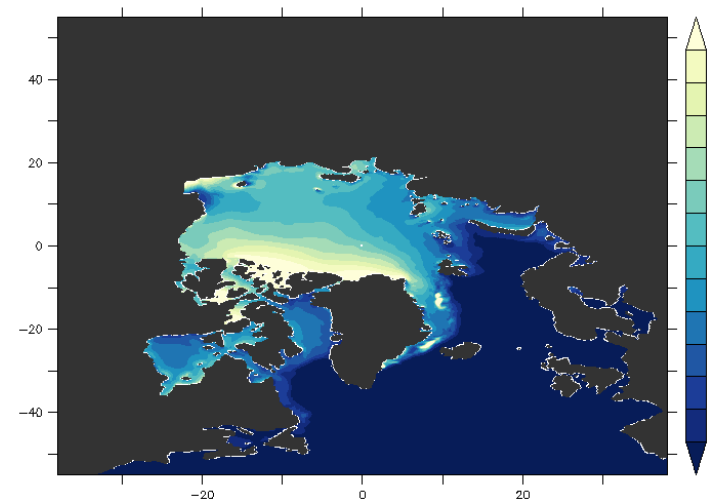
☐ Observation



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Ice Thickness (Arctic)



01/04/2009, Ice thickness

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MyOcean Products & Services

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SELECT AN AREA

SELECT A PHYSICAL PARAMETER

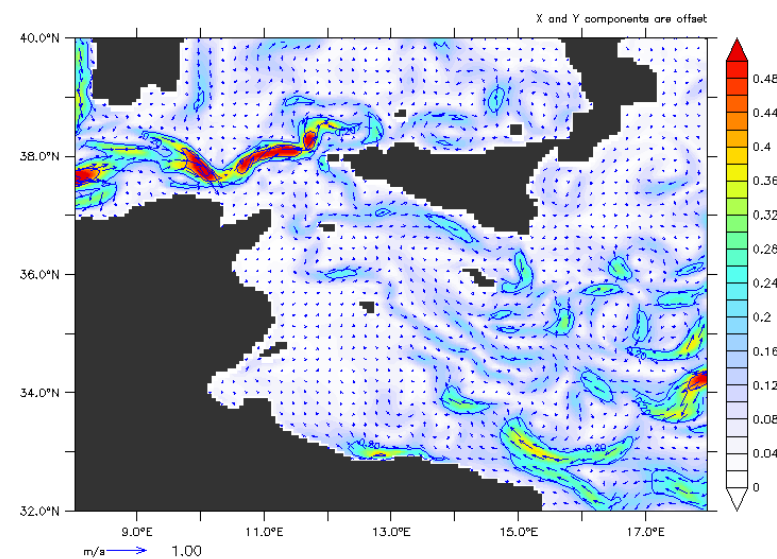
SELECT A PRODUCT



- ☐ Temperature
- ☐ Wind
- ☐ Sea ice
- ☐ Salinity
- ☒ Current

☐ Observation

Surface Currents (Med Sea)



04/04/2009, Currents 0m (m/s) WEST MED SEA

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MyOcean key principles

Some MyOcean principles

- Clear mission and roles, and corresponding Commitments
- Permanent link with Users
- Open and participative

Challenges for the coming decade

- Operationality
- Innovation
- Sustainability



3. How an **open** oceanography prepares a decade of **innovation** and societal **benefits**

A growing community, Societal benefits and innovation

Application Area
« **MARINE SAFETY** »

Application Area
« **MARINE AND
COASTAL ENVIRONMENT** »

Application Area
« **MARINE RESSOURCES** »

Application Area
« **CLIMATE &
SEASONAL FORECASTING** »

A growing community, Societal benefits and innovation

Application Area
« **MARINE SAFETY** »



Application Area
« **MARINE AND
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Application Area
« **MARINE RESSOURCES** »



Application Area
« **CLIMATE &
SEASONAL FORECASTING** »



Marine Safety

Application Area
« **MARINE SAFETY** »



Application Area
« **MARINE AND
COASTAL ENVIRONMENT** »



Application Area
« **MARINE RESSOURCES** »



Application Area
« **CLIMATE &
SEASONAL FORECASTING** »





Brazil

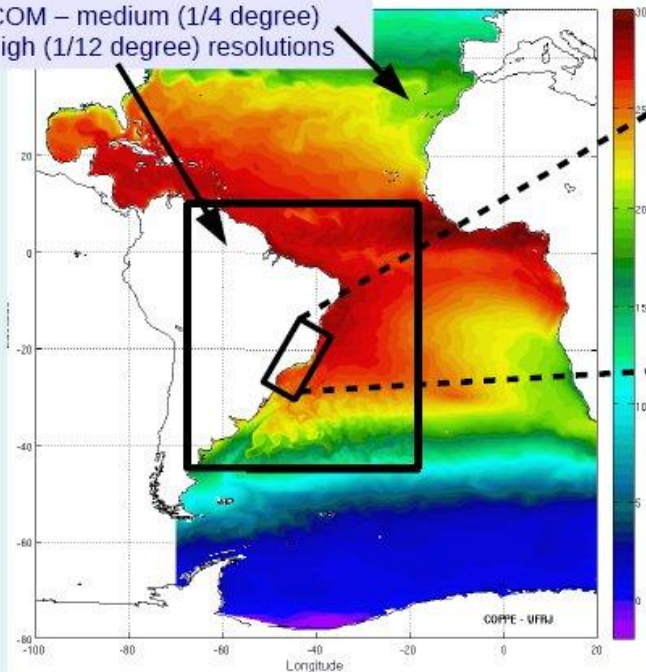
search & rescue, offshore, navy

Marine Core Service

REMO - Rede de Modelagem e Observação Oceanográfica
("Brazilian Network for Ocean Modeling and Observations")

Our present approach:

HYCOM – medium (1/4 degree)
to high (1/12 degree) resolutions



HYCOM/ROMS/POM
regional modeling

- Atlantic basin, long-term eddy-resolving modeling
- Regional configurations with detailed bathymetry and forcing, for studying ocean-shelf interactions and tidal dynamics
- Initial and boundary conditions from the [Global HYCOM Ocean Prediction System](#)



courtesy:

Afonso de Moraes
(UFRJ, Rio de Janeiro)
Cder Ana Claudia
(Brazilian navy)





Argentina

Storm surges, Coastal Cyclones

Marine Core Service



courtesy:
Claudia Campetella
(Universidade de
Buenos Aires)

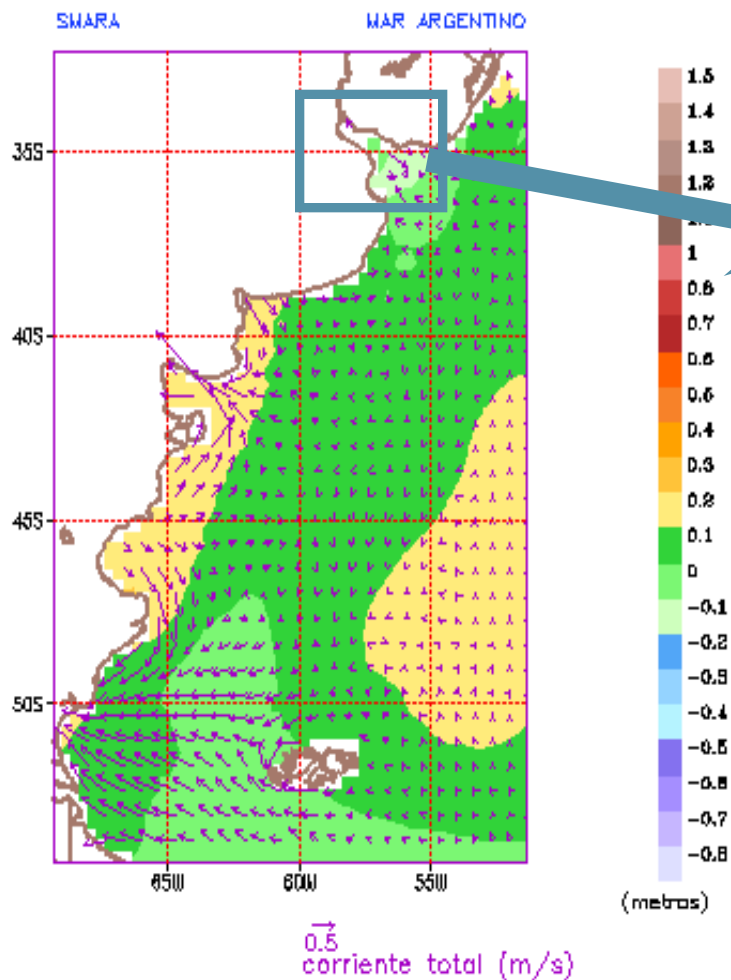


Argentina

Storm surges, Coastal Cyclones

Marine Core Service

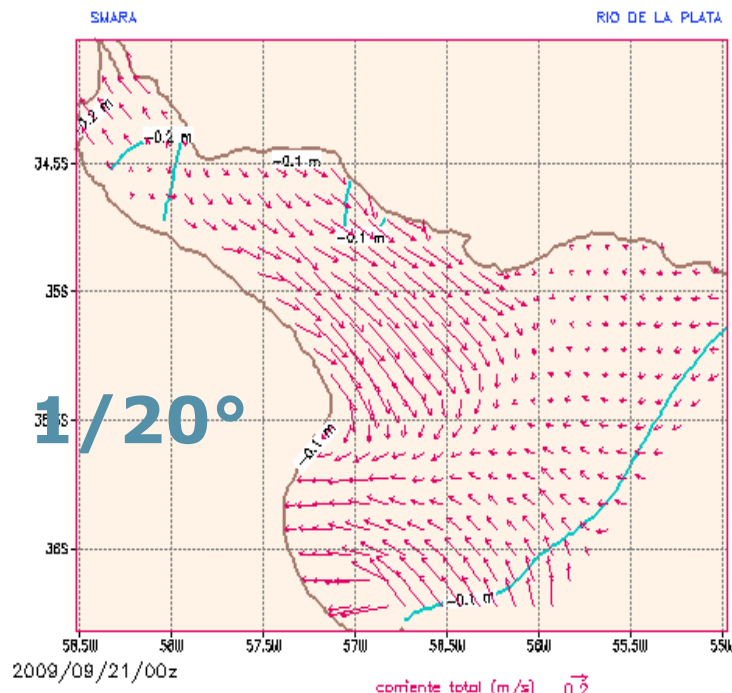
MODIFICACION AL NIVEL DEL AGUA POR EFECTO METEOROLOGICO



9/21/00z

Forced with NCEP forecasts, 6H forcing

MODIFICACION AL NIVEL DEL AGUA POR EFECTO METEOROLOGICO



1/20°

Two nested models to
analyse & forecasts storm
surges and currents in Rio
de La Plata
**Servicio Meteorológico
Nacional
+ Servicio de Hidrografía
Naval**

courtesy:
Claudia Campetella
(Universidade de
Buenos Aires)

Marine and Coastal Environment

Marine Core Service

Application Area 1 « **MARINE SAFETY** »



Application Area 3 « **MARINE AND COASTAL ENVIRONMENT** »



Application Area 2 « **MARINE RESSOURCES** »



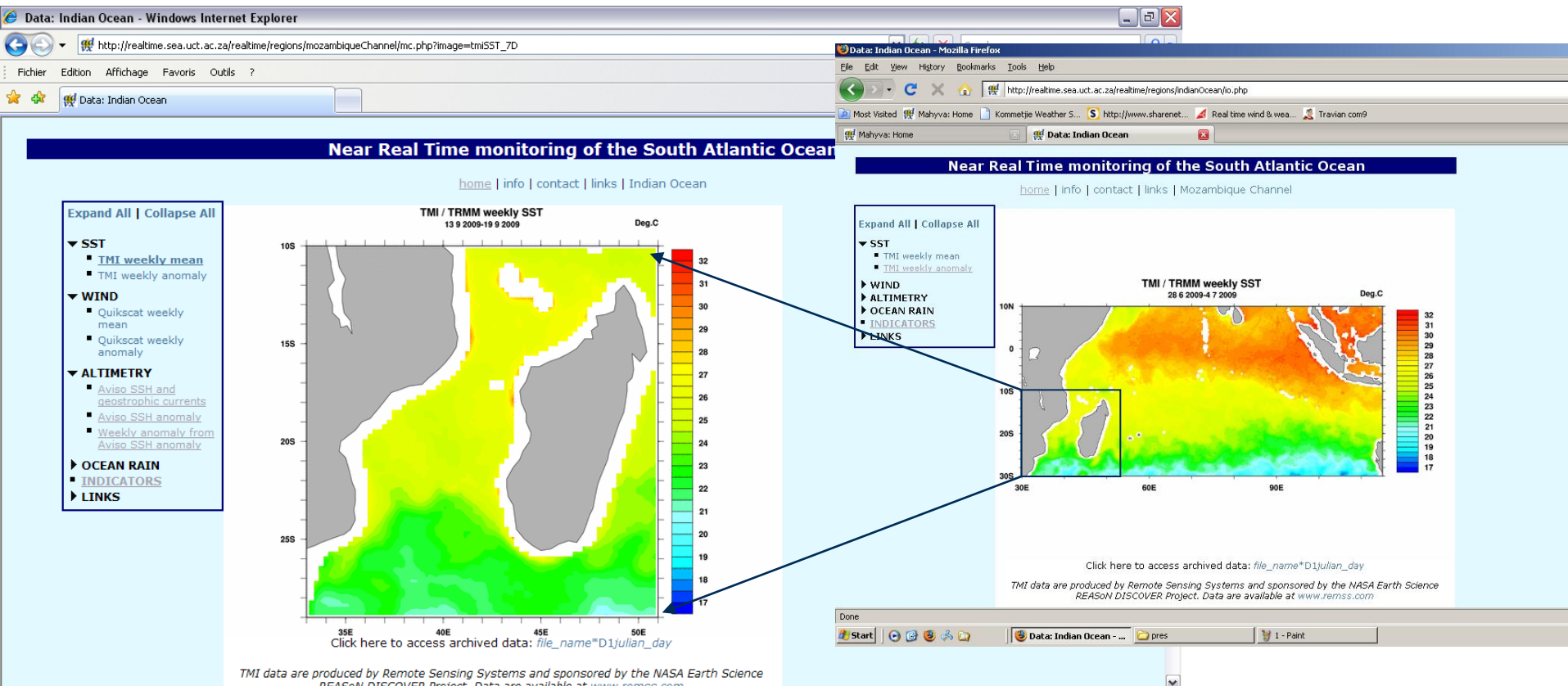
Application Area 4 « **CLIMATE & SEASONAL FORECASTING** »





South Africa Coastal monitoring

Marine Core Service



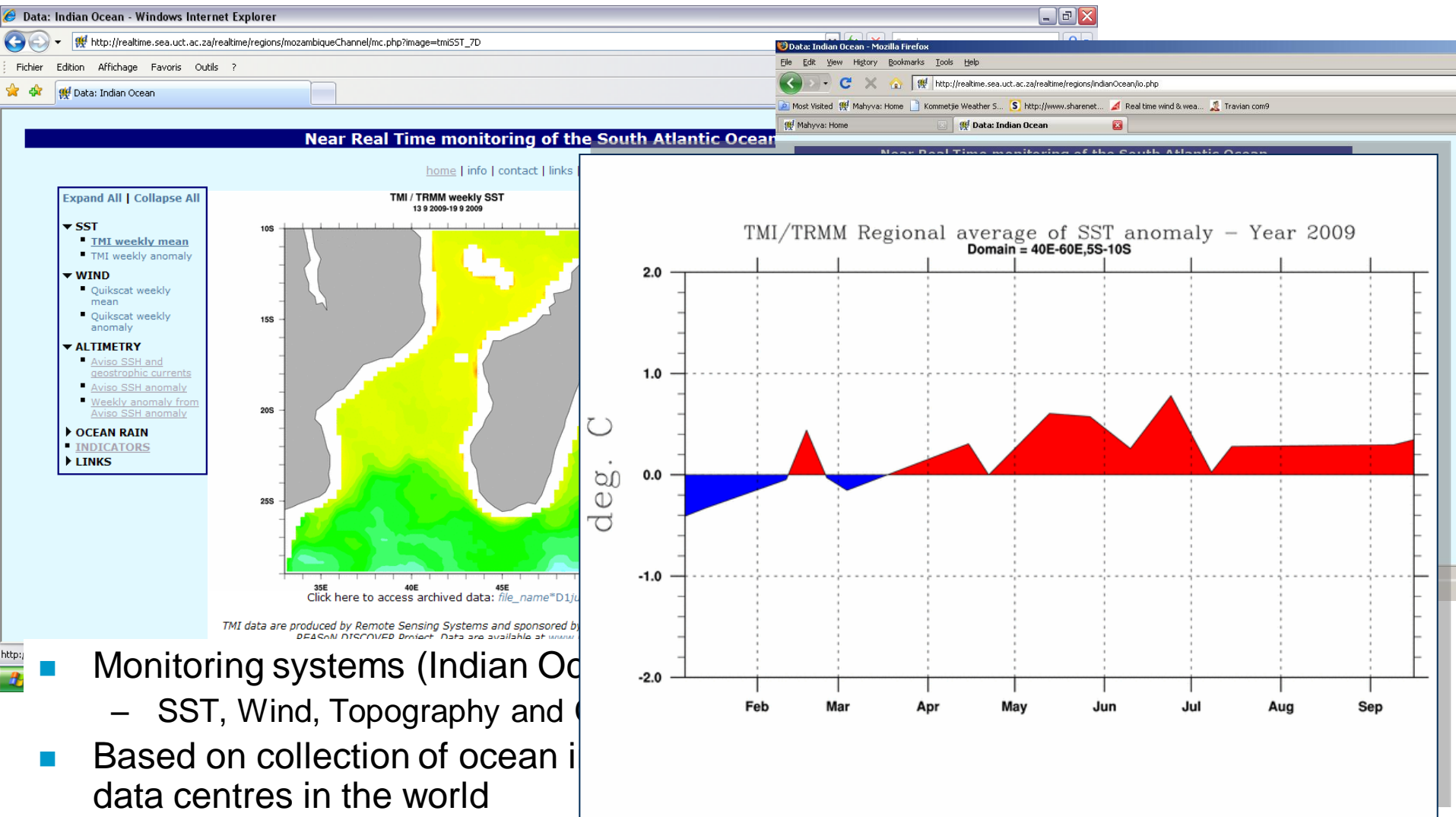
- Monitoring systems (Indian Ocean, Mozambique Channel)
 - SST, Wind, Topography and Currents
- Based on collection of ocean information available from different data centres in the world
- Charts, Anomaly fields, time series

courtesy:
Mathieu Roualt
(Cape Town University)



South Africa Coastal monitoring

Marine Core Service



- Monitoring systems (Indian Ocean)
 - SST, Wind, Topography and
- Based on collection of ocean data centres in the world
- Charts, Anomaly fields, time series

Marine Ressources

Application Area
« **MARINE SAFETY** »



Application Area
« **MARINE AND
COASTAL ENVIRONMENT** »



Application Area
« **MARINE RESSOURCES** »



Application Area
« **CLIMATE &
SEASONAL FORECASTING** »

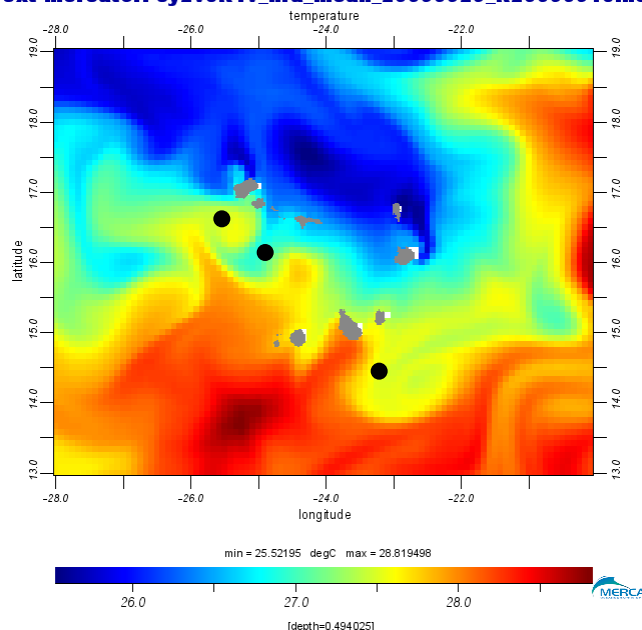




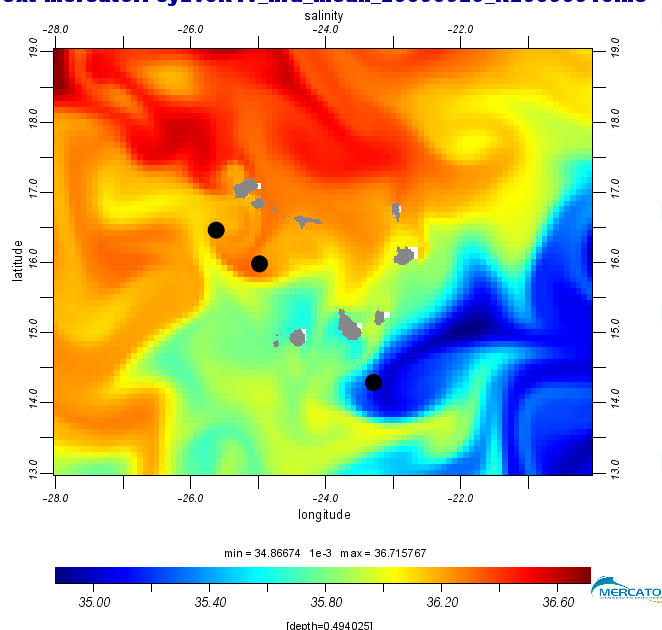
Cape Verde Fishery management

Marine Core Service

ext-mercatorPsy2v3R1v_hra_mean_20090929_R20090916.nc



ext-mercatorPsy2v3R1v_hra_mean_20090929_R20090916.nc



- Temperature (left) and Salinity(right) fronts
- 16-21 Septembre 2009
- Based on Mercator Ocean outputs
- Impacts on traditional Fisheries areas (black dots)

- Ocean circulation model for the Cape Verde islands area
- Better understanding of Larvae drift trajectories
- Evolution towards an Information Centre to support local and sustainable fisheries

courtesy:
Anibal Medina
(Fisheries Nat.Inst,
Cape Verde)

Climate and Seasonal Forecasting

Marine Core Service

Application Area
« **MARINE SAFETY** »



Application Area
« **MARINE AND
COASTAL ENVIRONMENT** »



Application Area
« **MARINE RESSOURCES** »



Application Area
« **CLIMATE &
SEASONAL FORECASTING** »

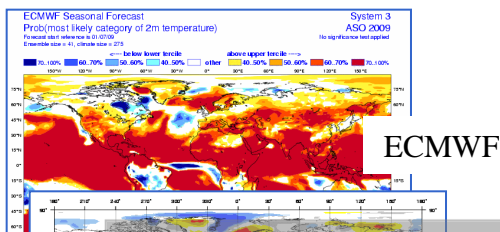




Morocco

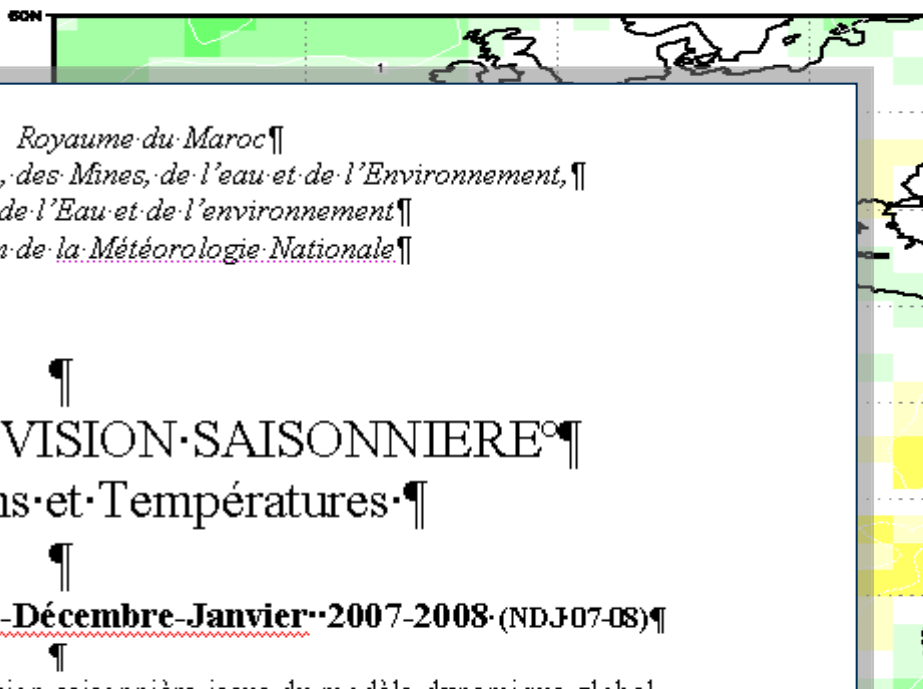
Seasonal Forecasting

Marine Core Service



Normalized anomalies of precipitation
(ARPEGE-Climat model, base=September 2007)

season: NDJ 2007



Royaume du Maroc
Ministère de l'Energie, des Mines, de l'eau et de l'Environnement,
Chargé de l'Eau et de l'environnement
Direction de la Météorologie Nationale

BULLETIN DE PREVISION SAISONNIERE ..Précipitations et Températures..

Issu le: 20/10/2007 Echéance: Novembre-Décembre-Janvier 2007-2008 (NDJ07-08)

.....Nous présentons ci-après la prévision saisonnière issue du modèle dynamique global ARPEGE-Climat (de Météo-France) en mode couplé opérationnel à la Direction de la Météorologie Nationale et tourné chaque mois pour produire des prévisions d'ensemble de 9-membres. Les analyses océaniques sont issues de MERCATOR-Océan.

A l'instar de ce qui se fait à l'échelle internationale et pour plus de comparaisons, nous joignons à notre prévision un ensemble de prévisions saisonnières de centres météorologiques mondiaux de bonne renommée, toutes élaborées à titre expérimental. Les évaluations faites sur nos régions sont encourageantes. Cependant, elles ne donnent pas à ce jour des scores comparables à ceux des régions tropicales, où le signal de prévisibilité est

courtesy:
Dir. Nat.
Météorologie
(Morocco)



- The ocean monitoring and forecasting « core services » are excellent vehicles to foster societal benefits from ocean observing system. They rely on the existence of ocean observations.
- In the coming decade, they're confronted to 3 major challenges : operationality, innovation and sustainability
- MyOcean is the European initiative for a sustained Marine Core Service. Its strategy to meet this challenge is based on committed operators, permanent link with users, and an open data policy
- For the coming decade, an open circulation of skills, data, information is a key factor for innovation, societal benefits and sustainability.



Contact point

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URL: [//www.myocean.eu.org](http://www.myocean.eu.org)

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Le Traon in their help to collect information for this talk.