European Commission

Copernicus

EUMETSAT

MERCATOR OCEAN

Creating value for our Oceans

Blue Growth is a reality

Stakeholders

Mauro FACCHINI

Head of Unit Copernicus
EC DG Internal Market, Industry, Entrepreneurship and SMEs

Core Ground segment

Mrs Hilary K. WILSON

Sentinel 3
Mission manager

Copernicus services

Pierre BAHUREL

CEO

Copernicus Marine Service entrusted entity

Stakeholders

Mauro FACCHINI

Head of Unit Copernicus
EC DG Internal Market, Industry,
Entrepreneurship and SMEs

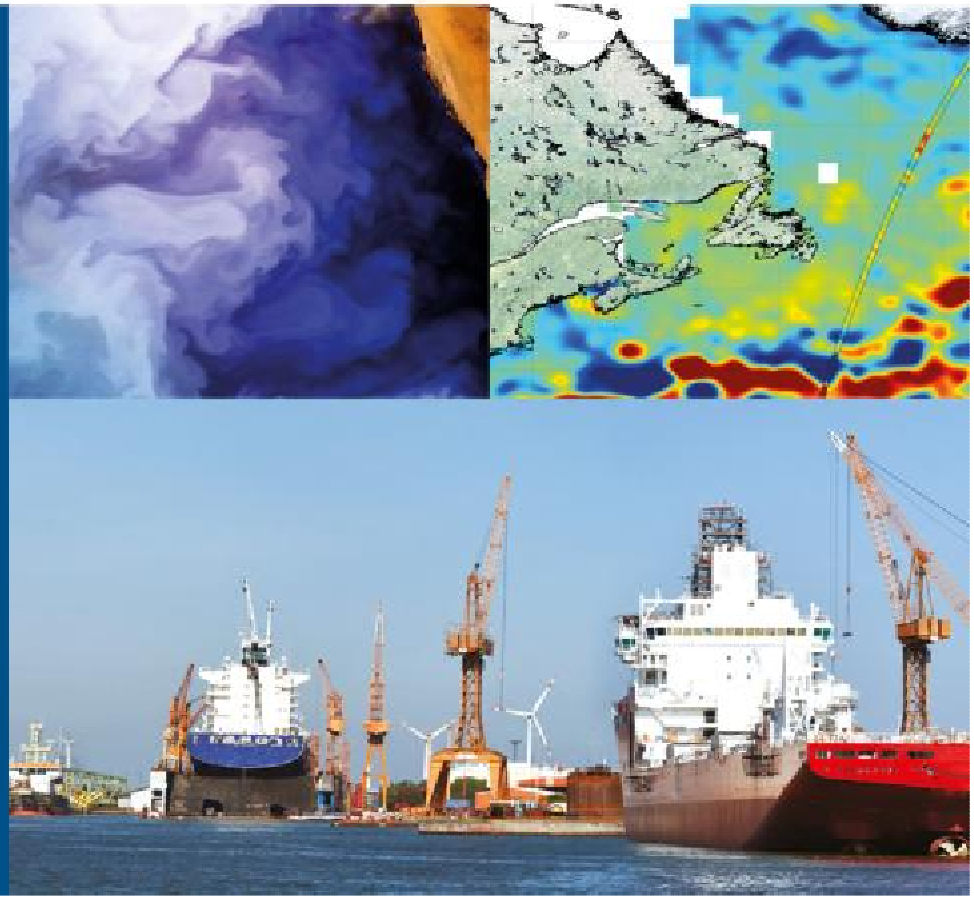
European Commission

Copernicus
Europe's eyes on Earth

The Copernicus programme

Mauro FACCHINI

European Commission
DG GROW



Copernicus in brief

The Copernicus programme is a cornerstone of the European Union's efforts to monitor **the Earth** and its ecosystems, whilst ensuring that its citizens are protected in the face of **crises** and **natural or man-made disasters**.

Copernicus is a driver for **economy**

Copernicus places a world of insight about our planet at the disposal of citizens, public authorities and policy makers, scientists, entrepreneurs and businesses on **a full, free and open basis**.

Started in 2008 under GMES, Copernicus is operational since 2014, weighting 4,3 Bn€ until 2020

With 6 operational services and 12 satellites until 2020

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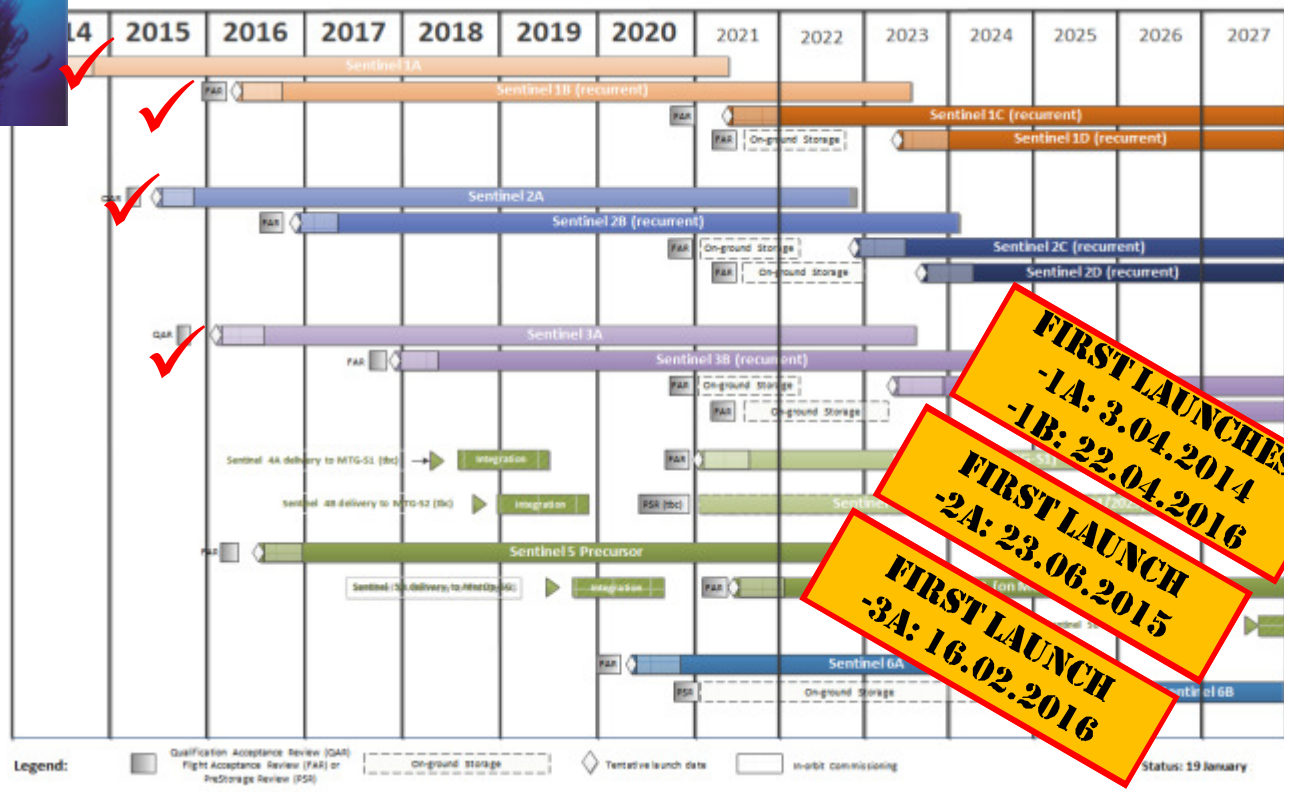
The space and service components



Data is there Let's create value

Copernicus collects, processes, and archives **massive amounts of data** (almost 3 Petabyte/year When Sentinels-1, -2 and -3 are Fully operational).

Dedicated **Sentinel-data** and **Copernicus information** are being made available on a **full, open and free-of-charge** basis.

Jason3 Jan 2016
Sentinel3A Feb 2016

Sentinel 3B
planned end 2017

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Economic and Societal value added

Copernicus constitutes a **cornerstone of the broader EU space and industrial policy**, and will generate **significant economic and social benefits.**

Driver for research, innovation and the creation of highly skilled jobs, with direct and indirect **benefits for the EU economy.** Marine Service directly supporting **Blue Growth**.

The bottom-line can be summarised as follows:

- Cost per EU citizen = ~€1,07/year;
- Every €1 spent generates a return of ~€3,2;
- Expected minimum financial benefits by 2030 of ~€30 bn. on Europe's GDP;
- An estimated 50.000 jobs will be maintained or created over the next 15 years.

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User Uptake is our next Challenge

Europe's industry – with support from European political decision-makers – should concentrate on those sectors where there is already considerable potential for growth and innovation **now**.

The next generation of satellites and instruments must take account of the evolution of **user needs**, of the technological progress, and of the lessons learned from the first operational period.
Need to define already in 2017/2018 the user requirements for new Earth Observation satellites that will be flying in the 2020's and 2030's.

Greater coordination between space activities of the EU, the European Space Agency (ESA) and the Member States will be encouraged in order to avoid duplication of structures and to achieve synergies.

Conclusion

The Copernicus programme brings together the key prerequisites to serve the Marine community:

- A fully operational Copernicus Marine Environment Monitoring Service
- Dedicated space infrastructure (Sentinel-3 family, Jason 3)
- A Proven data, information and product distribution network (Eumetcast, Web-based tools, use of Géant infrastructure)
- Data of high quality, building on several decades of European oceanography know-how and data calibration-validation of remarkable quality
- Sustainability of data provision (Copernicus funding through to 2020 with Sentinels expected to deliver data through to 2030 timeframe)

Thank you for your attention

Copernicus EU

CopernicusEU

www.copernicus.eu

European Commission

Copernicus

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Core Ground segment

Mrs Hilary K. WILSON

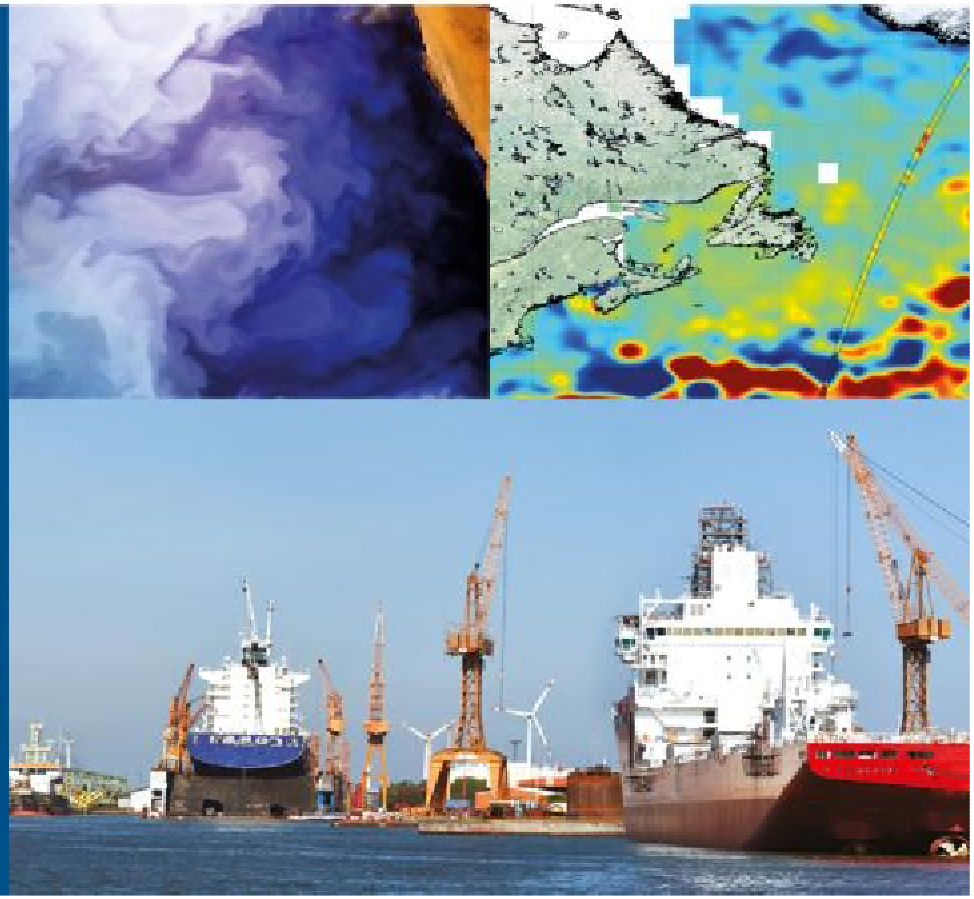
Sentinel 3
Mission manager

EUMETSAT

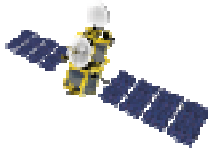
Operating Copernicus Satellites & delivering the Marine Mission

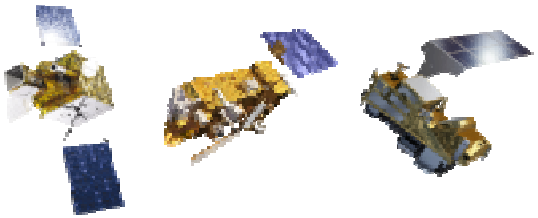
Mrs Hilary K. WILSON

EUMETSAT
Sentinel3
Mission manager



EUMETSAT activities in support of Copernicus





Operate ocean-related missions and disseminate data

Sentinel 3, Jason series

COPERNICUS MARINE ENVIRONMENT MONITORING SERVICE

Operations atmosphere-related missions and disseminate data

Sentinel-4, Sentinel-5 part of MTG &EPS-SG

opernicus Atmosphere Monitoring Service

Deliver selected Third Party data from EUMETSAT international cooperation

Further support EC on request for :

- The Copernicus climate service
- User Requirements

opernicus Climate Change Service

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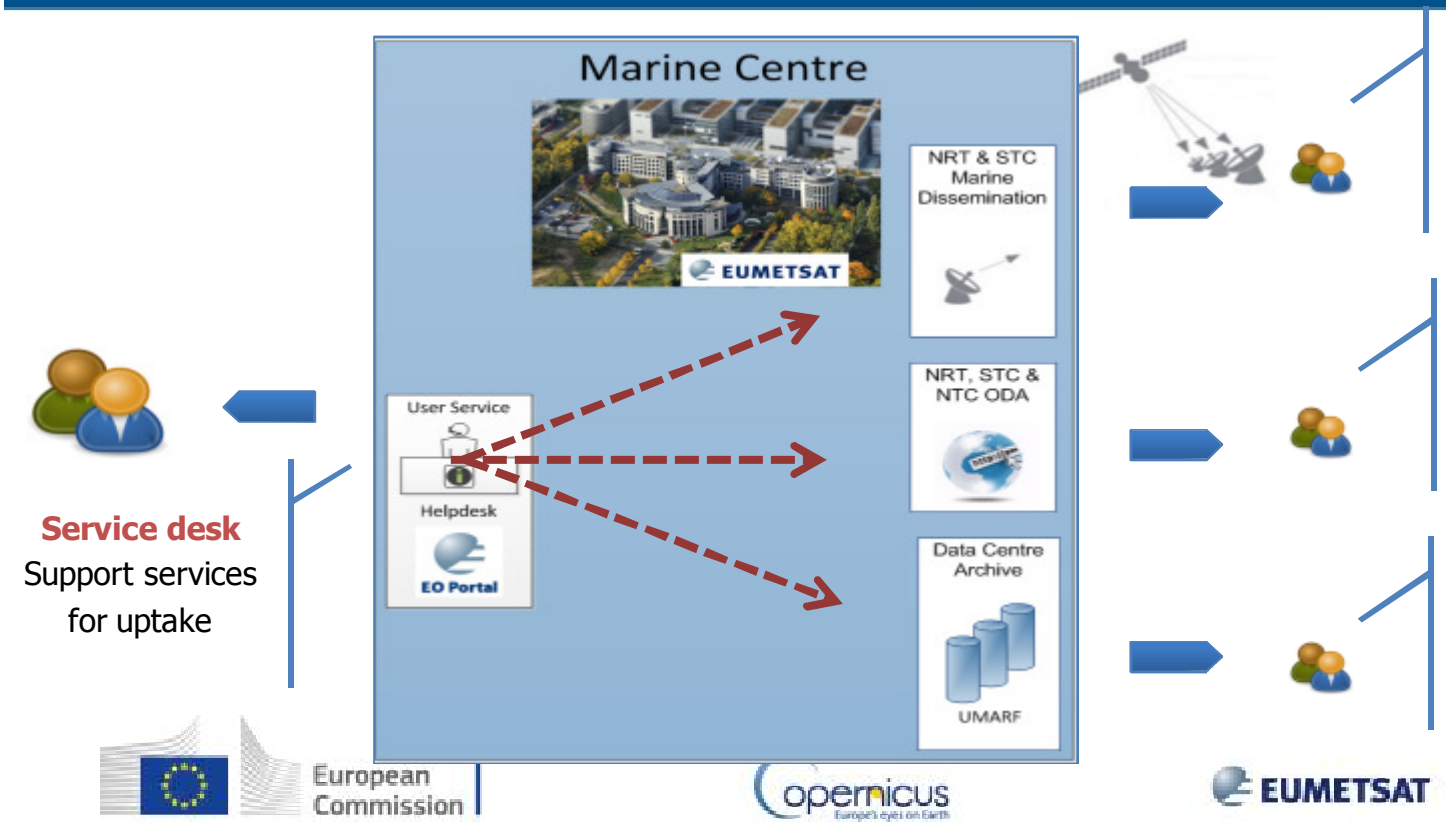
Data Access capabilities – Sentinel-3 &others



Service desk
Support services for uptake

EUMETCast
Operational dissemination of NRT data -Terrestrial & Satellite

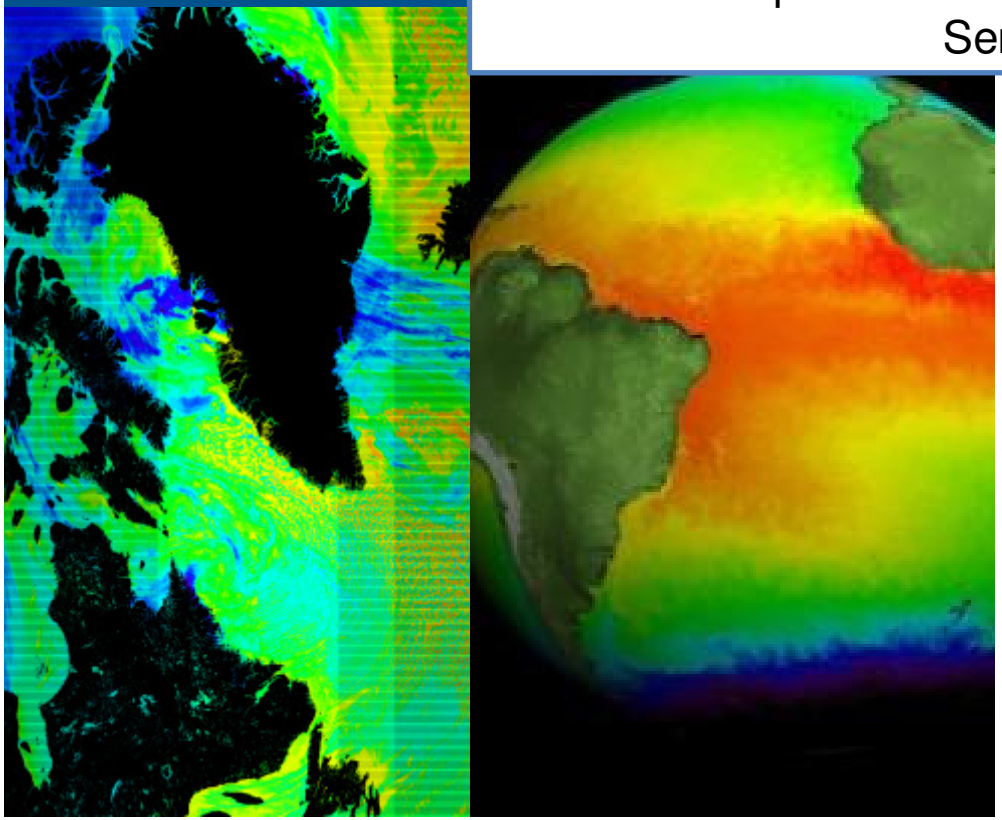
Online Data Access
Rolling archive
12 month of data

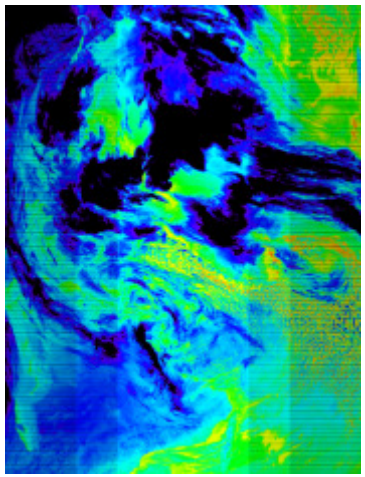
EUMETSAT Data Centre
Complete archive of all EUMETSAT data
And Sentinel 3

A whole set of data delivered for Marine Environment Monitoring

El Niño story - Value of Sentinel-3 with Third Party Data

Sea water temperature at 1 m depth from NASA Suomi NPP Sentinel 3 SLSTR





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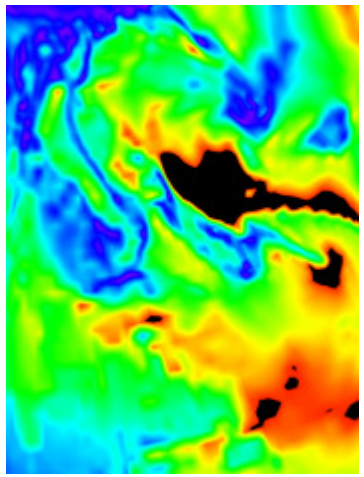
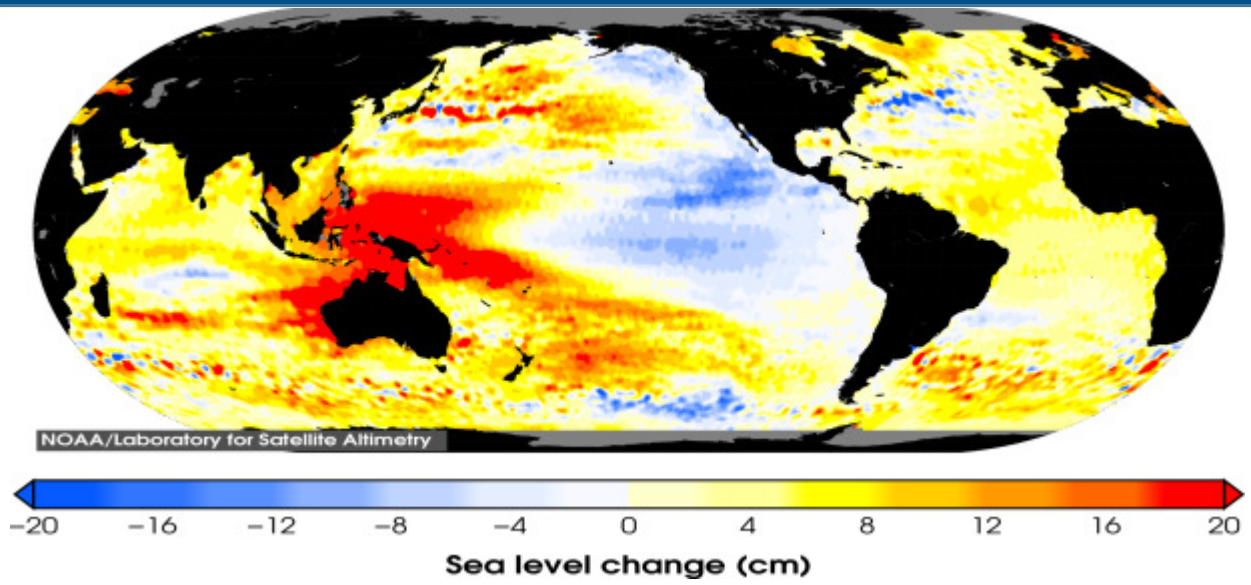


Wind speed at 10 m

EUMETSAT is also discussing with China, India, Japan and Russia for data to be made available to Copernicus

El Niño story - Mean sea level trends and regional differences

1993 - 2012



Why has the western Pacific risen 3 times faster?
Why has sea level dropped near the U.S. West Coast?
How will regional sea level change in the future?

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Copernicus services

Pierre BAHUREL

CEO

Copernicus Marine Service
entrusted entity

MERCATOR OCEAN
OCEAN FORECASTERS

Creating value for our Oceans

Copernicus Marine Service

Pierre BAHUREL,
Mercator Ocean

A unique gateway to high-quality marine information and ocean expertise

OPEN and FREE

- Instataneous information on the global oceans and 6 regional seas.
- Observations and 4D Simulations.
- Scientifically qualified
- Regularly updated
- Primary Interface : Web Portal
- Service Desk

- FOR ENTREPRENEURS & INDUSTRIES
- FOR PUBLIC SERVICES
- FOR EU & NATIONAL POLICIES
- FOR SCIENCE
- FOR CITIZENS

Entrusted to Mercator Ocean by the European Commission

- French non-profit company
- Owned by 5 national agencies
- Global Ocean Analysis and Forecasting center
- 20 years expertise in Operational Oceanography

  - ❑ **Producer (science-based)**
  - ❑ **Service provider**
  - ❑ **International leadership and network**

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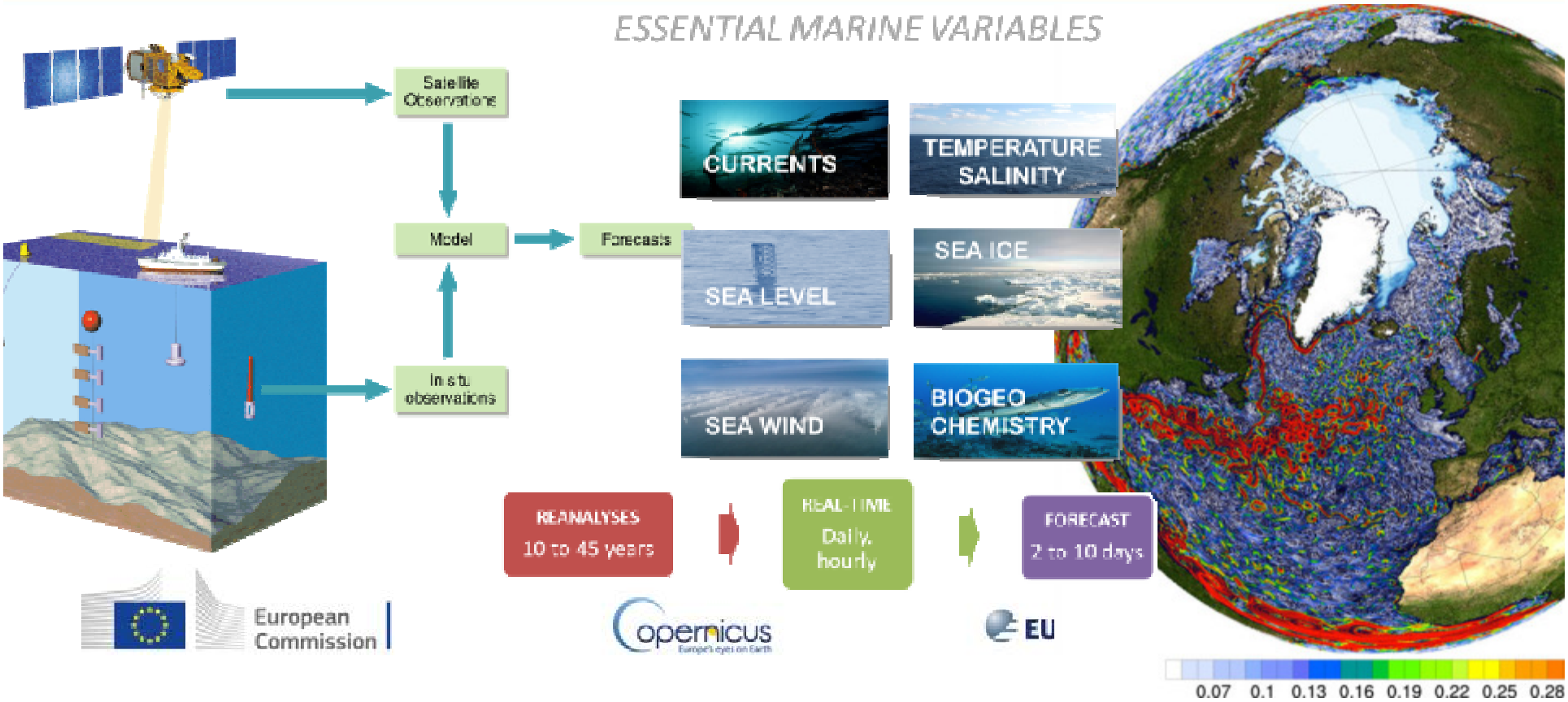
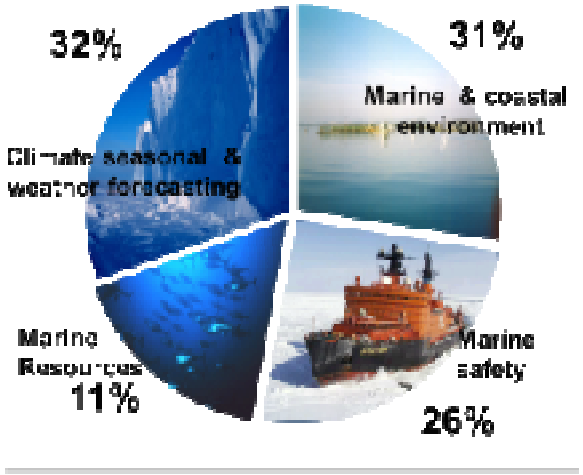
Combining space obs, in situ obs and models for a 4D ocean



A knowledge-based core service for SMEs, Public Services, Scientists and Citizens



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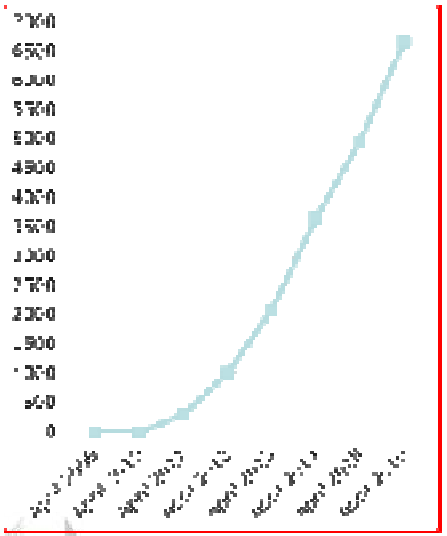
Committed to Blue Growth and Sustainable Ocean

7000 SUBSCRIBERS WW
50% SCIENCE
30% PUBLIC SERVICES
20% BUSINESS



- **HUGE SERVICE DEVELOPMENT POTENTIAL IN MARINE/MARITIME FIELDS:** ENERGY, TRANSPORT, FOOD, PORTS, COASTAL ACTIVITIES, MINERAL RESOURCES…
- **EU & NATIONAL PROGRAMMATIC PRIORITIES** (Integrated Maritime Policy / Strategy 2020)
- **OCEAN ‘s ROLE IN THE CLIMATE SYSTEM** (impacting/impacted).
- **GENERAL PUBLIC AWARENESS**

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Meinte Blaas
Deltares

Kevin Ruddick
RBINS

Patric Bara
CMA-CGM

Gilles Larnicol
CLS

Patrick Josse
Météo France

Ann O'carroll
EUMETSAT

George Wiafe
Ghana University

European Commission

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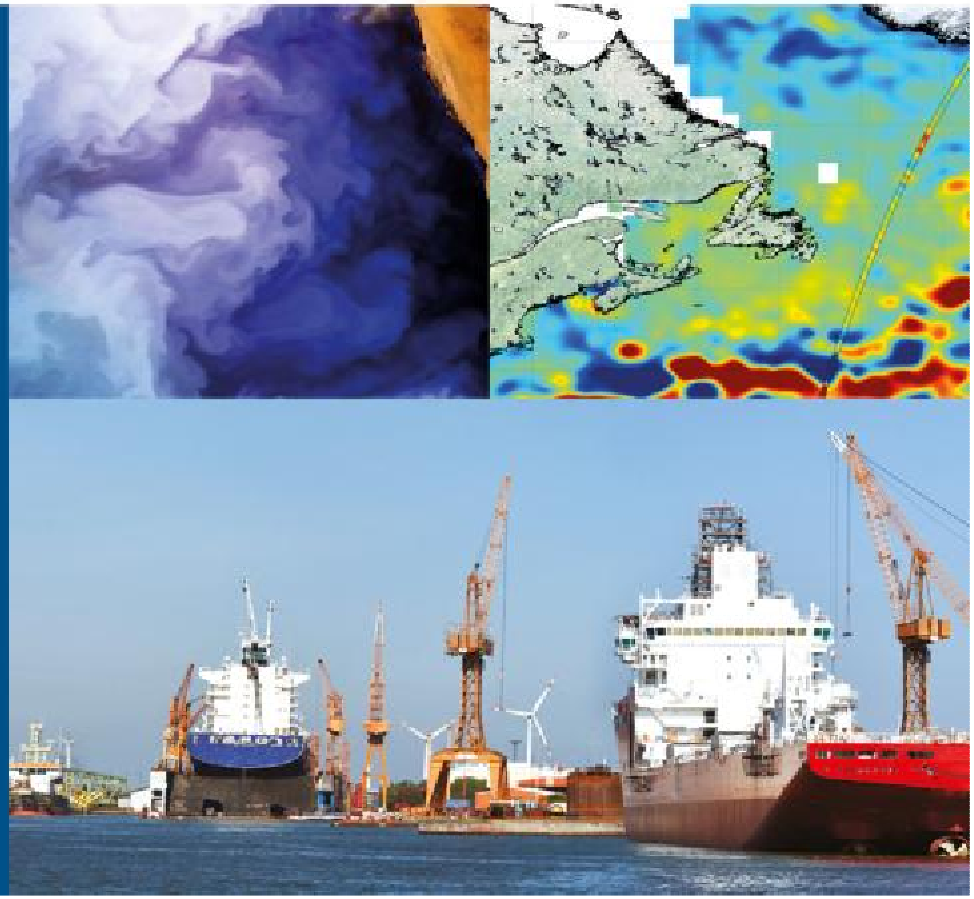
CMEMS for MSFD monitoring & assessments

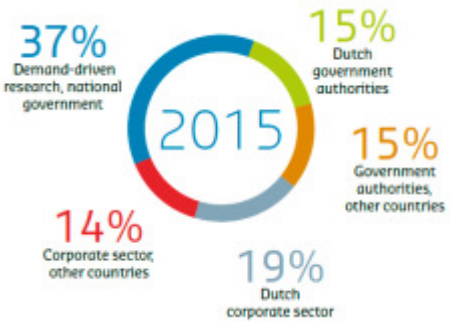
Meinte BLAAS

Deltares, The Netherlands



Deltares

Independent, applied research institute advising governments, industry, NGOs for safe and sustainable living in river & coastal regions worldwide



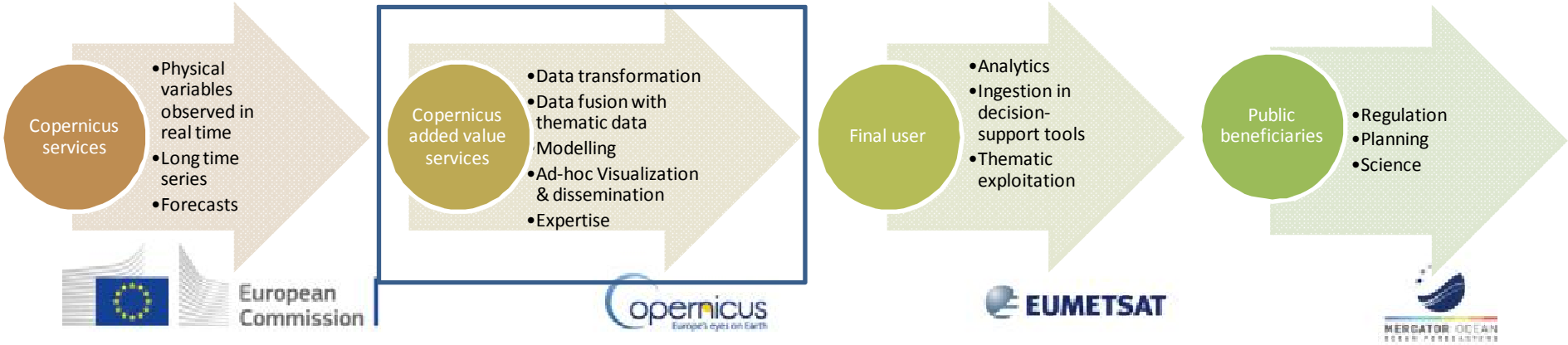
- 800+ employees
- Main offices in Delft & Utrecht NL
- Branch offices & affiliates in Asia, Middle East & Americas

Deltares & Copernicus services

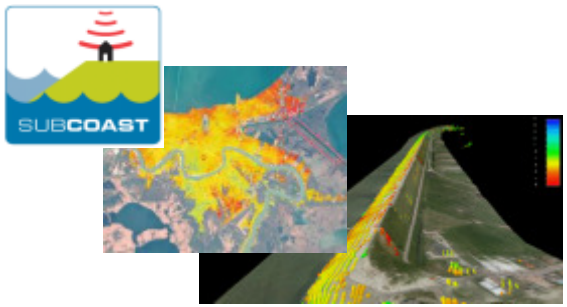
One of Deltares core businesses: develop models & tools to turn observational data into useful information

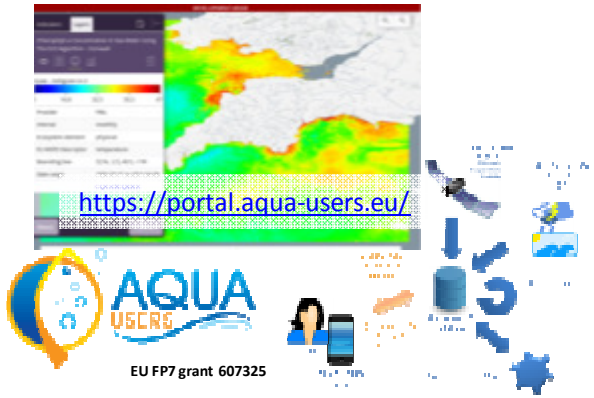
EO data & the various Copernicus Services provide us and our clients with

- excellent data & information resources
- platforms to participate in and co-develop core and downstream services



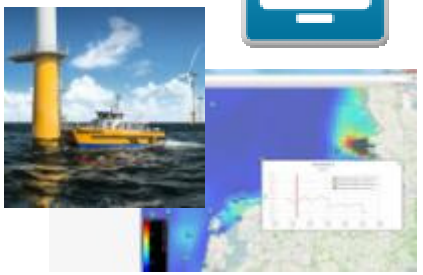
Deltares & Copernicus services





EU FP7 grant 607325

Delft FEWS



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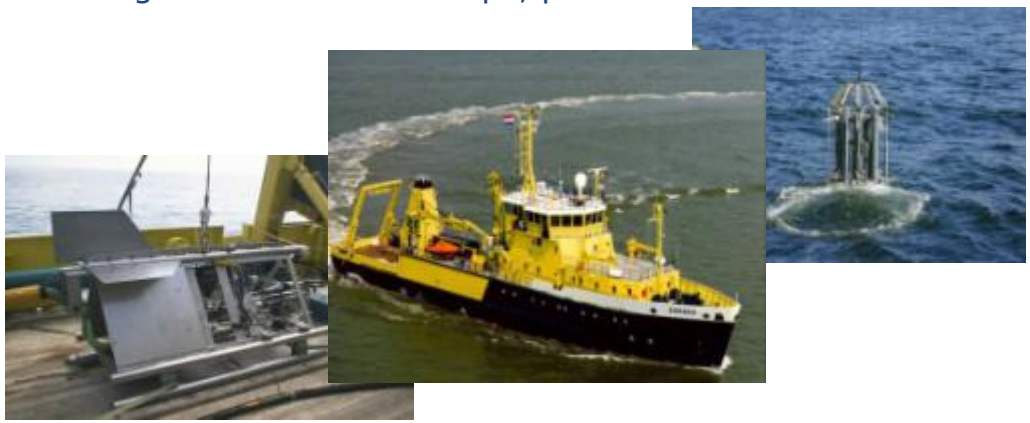
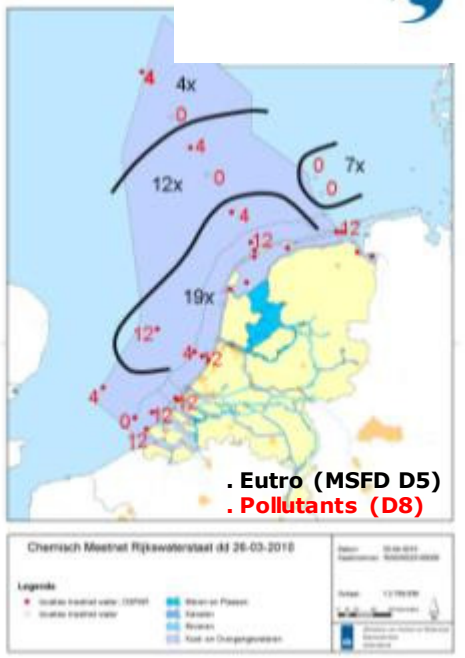
Marine monitoring for MSFD

Deltares

Dutch ministry of Infrastructure & the Environment aims for

- Better international coherence of MSFD assessments
- Cost-effective monitoring programmes
- To integrate multi-use of ships, platforms and satellites





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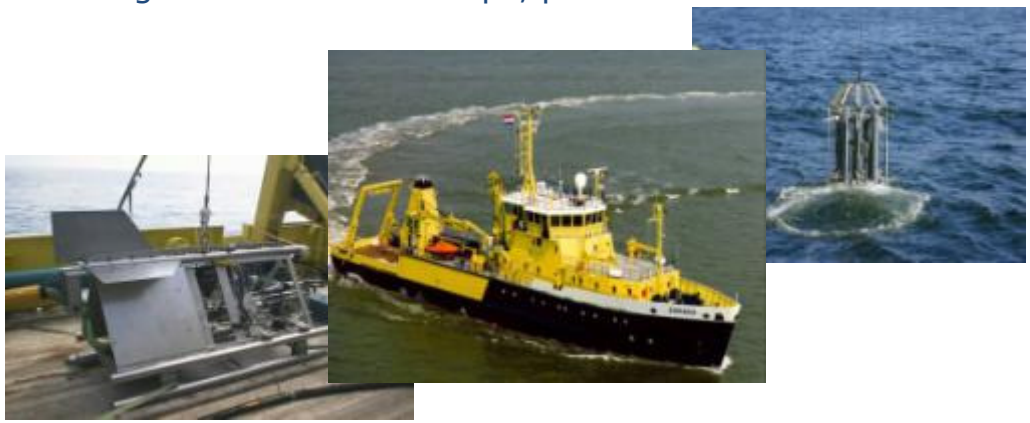

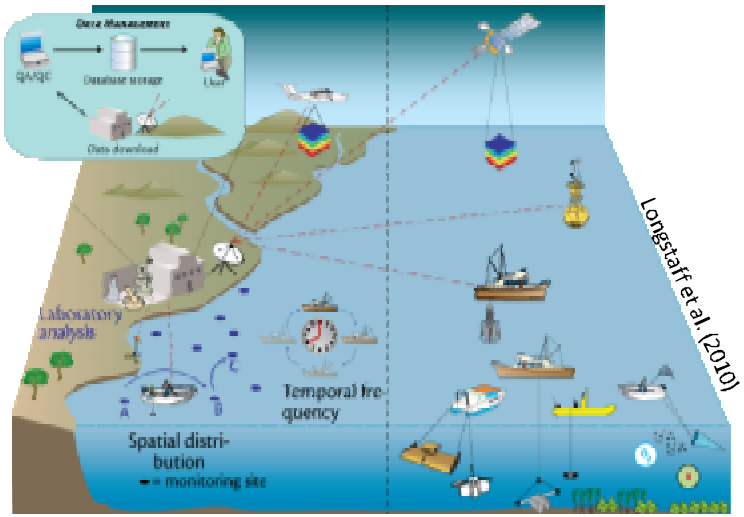

Longstaff et al. (2010)

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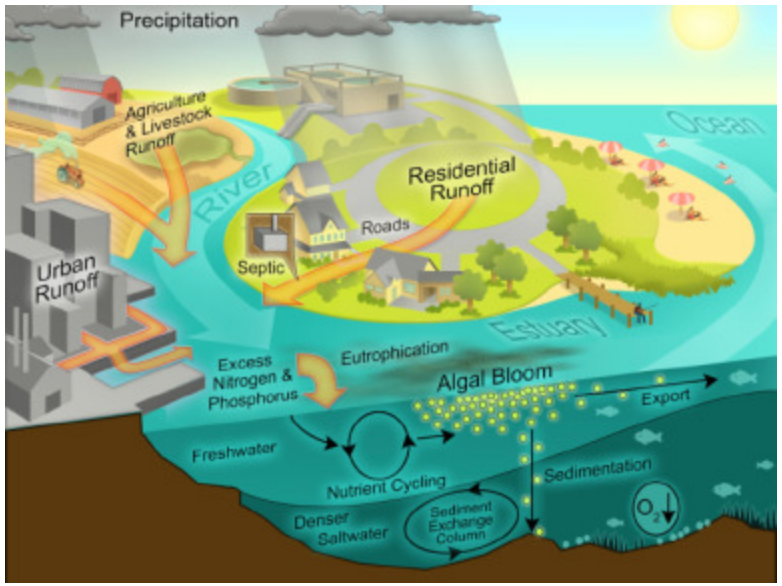
Eutrophication assessments

MSFD Descriptor 5 & OSPAR's common indicators

Every 6 years, MSFD reports on trends & levels of

- Nutrient enrichment
  - Nutrient inputs (water & air)
  - Winter nutrient concentrations
- Direct effects (plankton blooms)
  - Growing-season Chlorophyll conc. statistics
  - Shifts in species/blooms of nuisance species (*Phaeocystis*)
- Indirect effects
  - Oxygen deficiency



Added value of CMEMS

Deltares

When Remote Sensing Chlorophyll (partially) replaces sea-borne data

Gain in resolution & coverage:

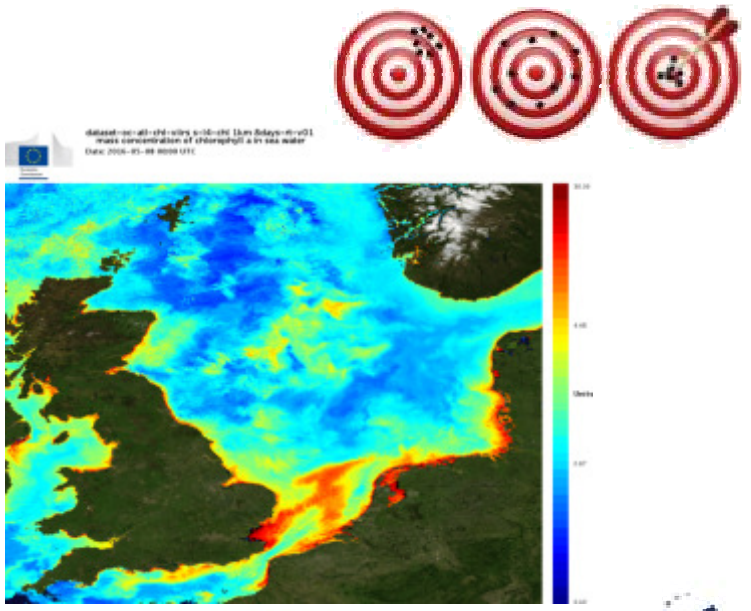
- Lower sampling errors due to improved spatio-temporal pattern description balances possible loss in precision

Overcome bottle neck of national in-situ methodological differences:

- Coherent assessment at larger geographic scales now made easier
- Joint in situ cal/val enables international harmonisation

Flexible and cost-effective ship-borne sampling

- Cal/val project-wise instead of fixed scheme



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User wishes for the near future

Deltares

MSFD reporting authorities wish:

- clear insight & documentation in the **lineage** of the source data used
- Insight in **composite** products, how these are aggregated and processed;
- **Safeguard versions** of data used for a particular assessment
- Consistency
  - In time (with in situ references and past missions/products)
  - In space: ideally geophysical quantities should be valid and **acceptable** for larger than national regions.
- Regional product development only when needed

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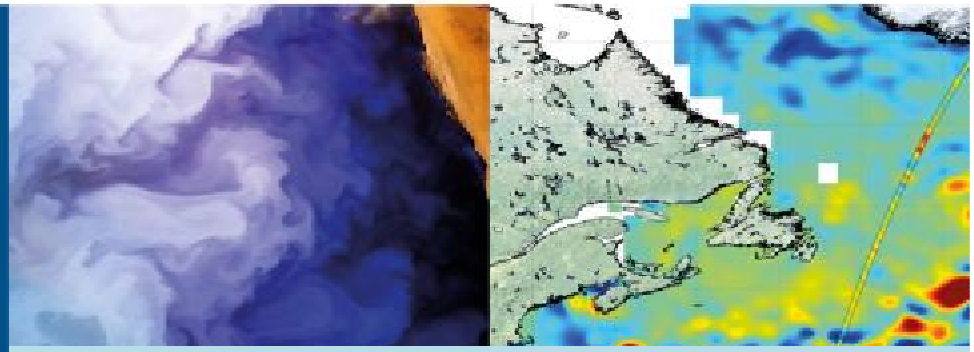
Satellite monitoring of coastal water quality

The HIGHROC project

Kevin RUDDICK
RBINS



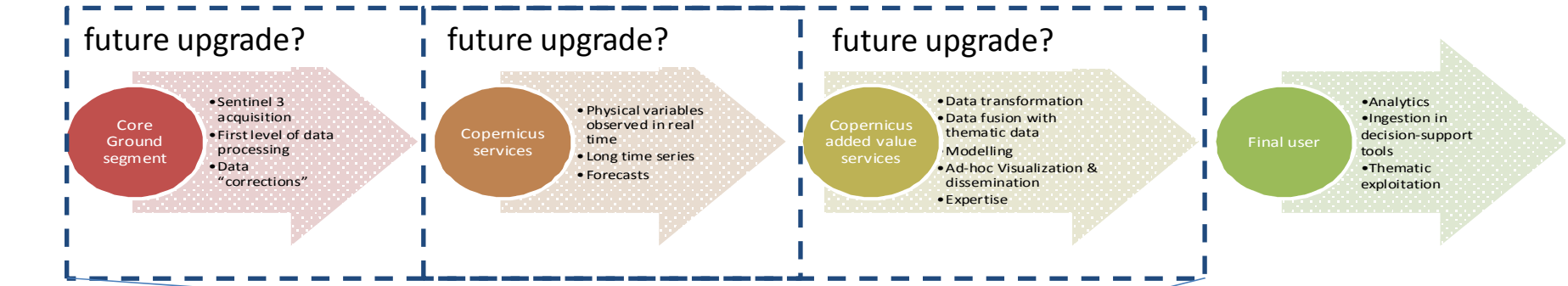
K. Ruddick, C. Brockmann, V. Créach, L. De Keukelaere, D. Doxaran, R. Forster, P. Jaccard, E. Knaeps, C. Lebreton, A. Ledang, B. Nechad, M. Norli, S. Novoa, A. Ody, N. Pringle, K. Sorensen, K. Stelzer,
D. Van der Zande, Q. Vanhellemont

The HIGHROC project is funded by the European Community's Seventh Framework Programme (FP7/2007-2013) under grant agreement n° 606797.

RBINS, The HIGHROC Consortium and Copernicus

RBINS = Royal Belgian Institute for Natural Sciences, a Fed Govt Scientific Establishment carrying out research … scientific support to policy-makers

HIGHROC R&D: developing the next generation of coastal water products & services



EU/FP7 R&D project: HIGHROC Consortium (2014-17)

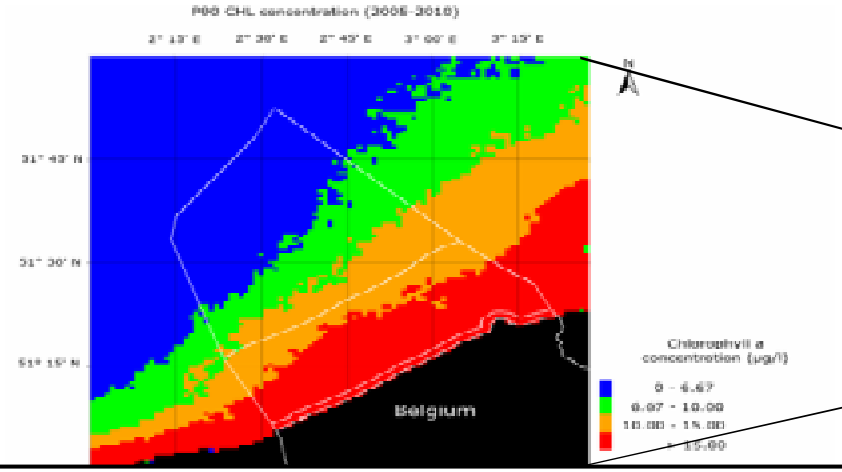
museum OD Nature | OD Natuur | DO Nature · UPMC · CNRS INSU · NIVA Norwegian Institute for Water Research · Brockmann Consult · vito · Cefas · University of Hull

Coastal Water Quality Monitoring: Eutrophication (Chlorophyll)

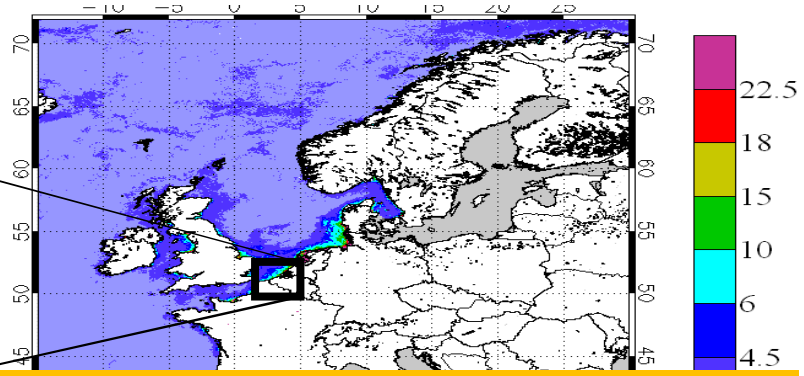
Eutrophication = excessive supply of nutrients (e.g. from agriculture/industry/homes via rivers) with detrimental effects
Water quality monitoring (EU Water Framework Directive)

Belgian CHLa 90% Mar-Oct 2005-2010, WFD product

[Processing: D. Vanderzande (RBINS), L2data: ACRI-ST]



CHLa 90 percentile (MERIS,2005)



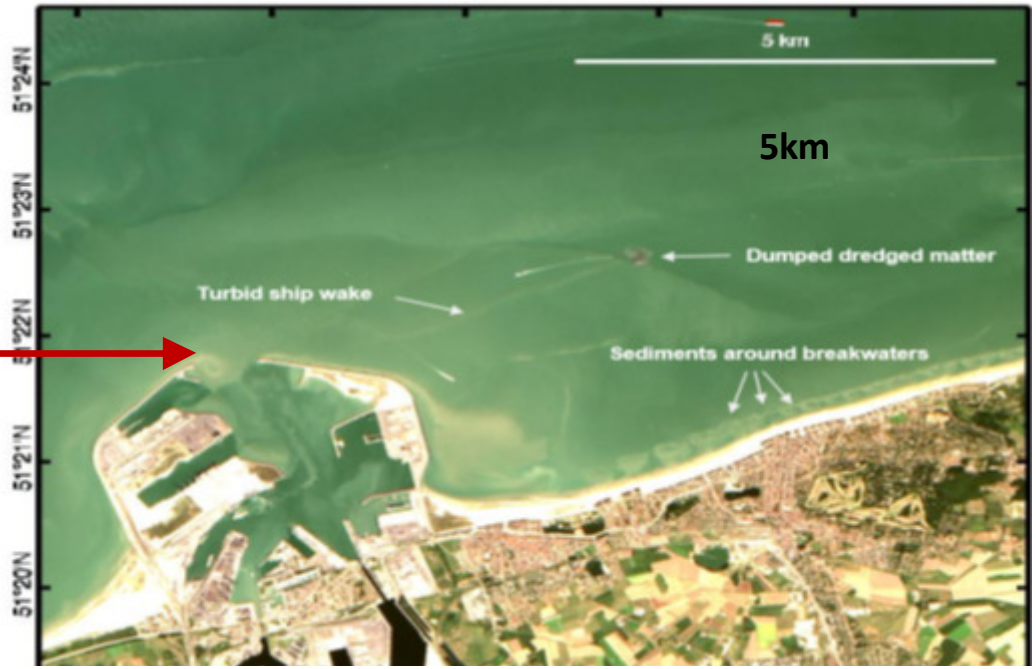
Sentinel-3 sat: **~40** images/year in **all** locations
Ships: **~3-10** measurements/year in **3-10** locations

OSPAR Commission(2006):
Spatially extensive
Cross-boundary
Neutral

New applications: Sentinel-2, Landsat-8

- New sediment transport features become visible at high spatial resolution, e.g. Sentinel-2 10m (ports, estuaries, dredging plumes, windmill wakes, ...)

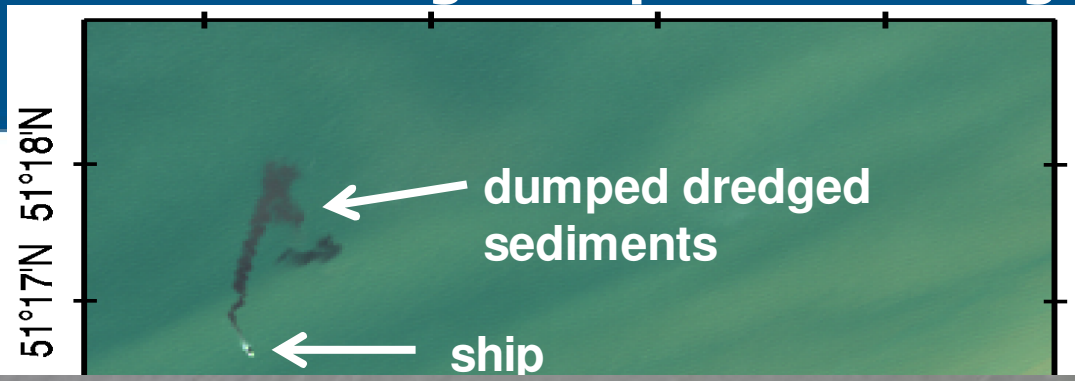
Sediments entering port … will need to be dredged



Landsat-8 (30m…15m) around port of Zeebrugge

[Vanhellemont Q. & Ruddick K. (2014). Landsat-8 as a Precursor to Sentinel-2: Observations of Human Impacts in Coastal Waters. Proceedings of the Sentinel-2 for Science Workshop, Frascati, Italy, 20-23 May 2014, ESA Special Publication SP-726.]

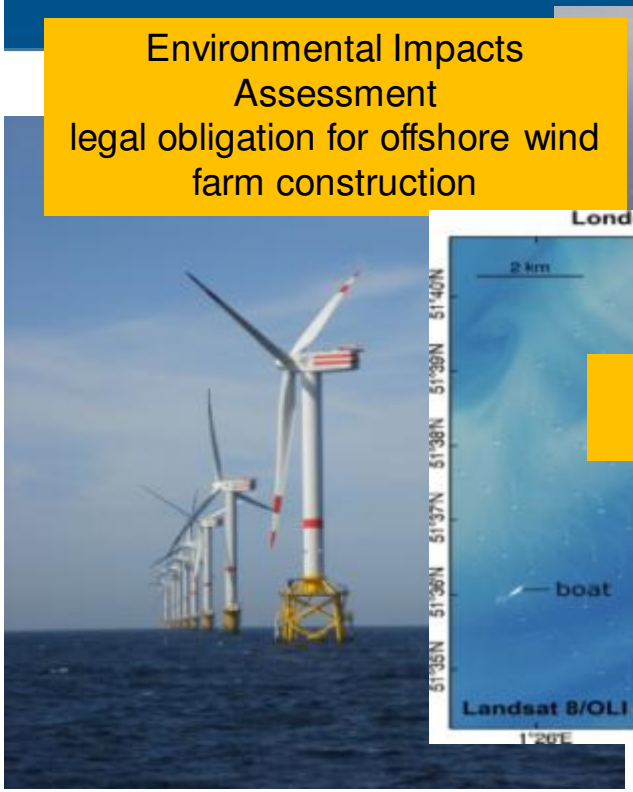
Landsat-8 2013-10-30 image: disposal of dredged sediments

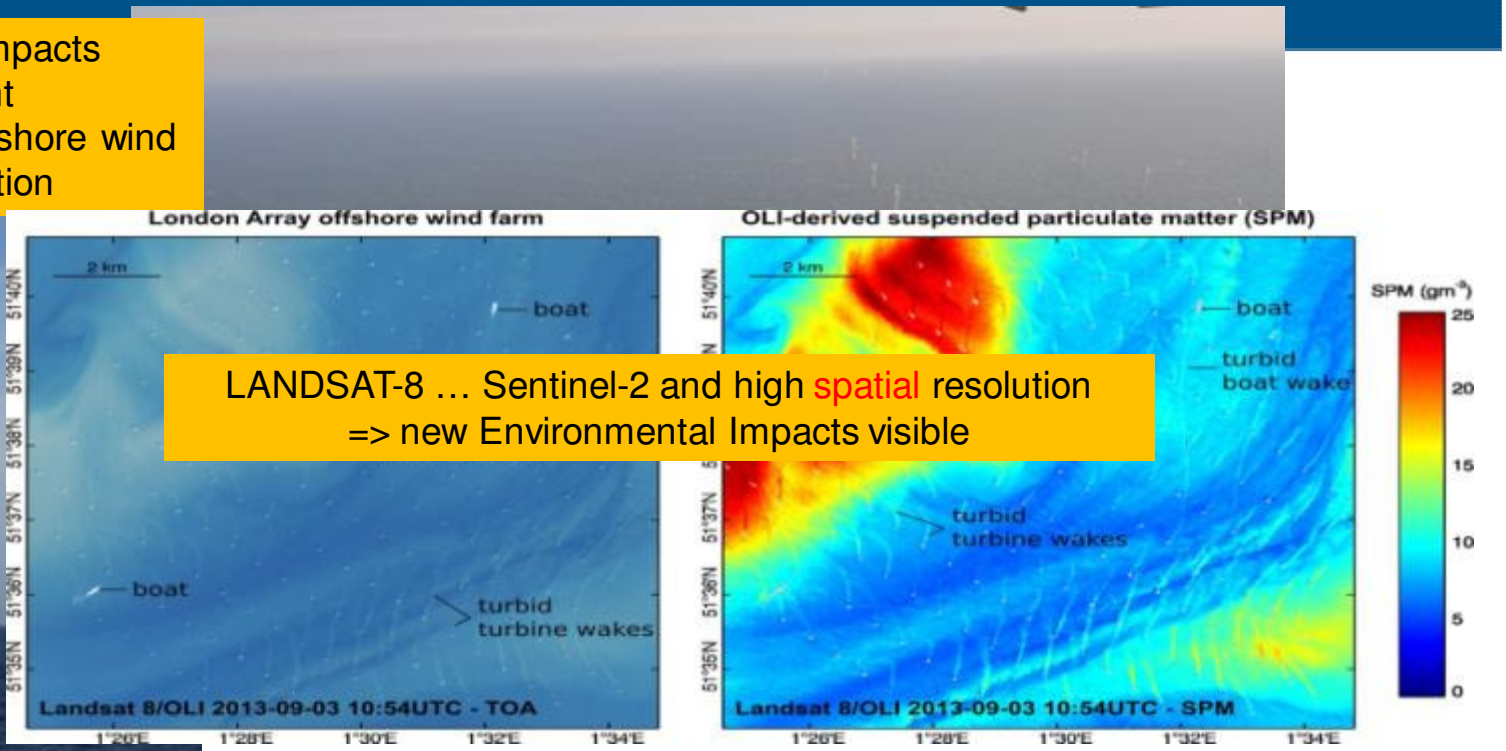


Vanhellemont, Q., Ruddick, K., 2014b. **Landsat-8 as a Precursor to Sentinel-2: Observations of Human Impacts in Coastal Waters.**, in: ESA Special Pub SP-726.

New (Landsat-8/Sentinel-2) uses: Offshore Environmental Impact Assessment

Environmental Impacts Assessment
legal obligation for offshore wind farm construction





LANDSAT-8 … Sentinel-2 and high spatial resolution
=> new Environmental Impacts visible

[Vanhellemont Q & Ruddick K (2014). Turbid wakes associated with offshore wind turbines observed with Landsat 8. Remote Sensing of Environment, 145, pp. 105–115. Open Access]

Summary: Satellites for coastal water quality monitoring

- Satellites provide much better spatial and temporal coverage than ships, e.g. 1 image/day everywhere
- Optical Satellites can only see a few parameters, e.g. chlorophyll a (algae), suspended sediments, turbidity, (and nothing when cloudy)

- Copernicus/Sentinel-3 satellites are vital to ensure continuity of data (no high quality chlorophyll data for some coastal areas since Envisat stopped in 2012)

- HIGHROC project is developing new products and services, e.g. using Sentinel-2 (high resolution!) and METEOSAT SG

- US satellites (MODIS, Landsat) also useful but not sufficient

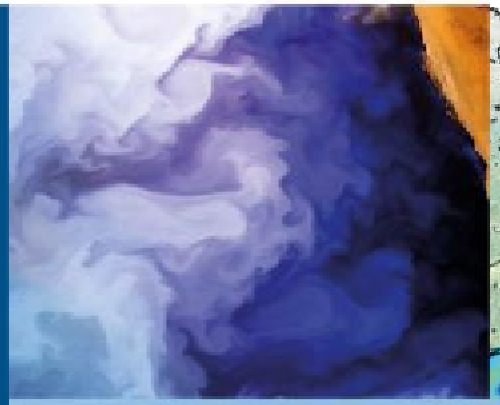
Acknowledgements and References

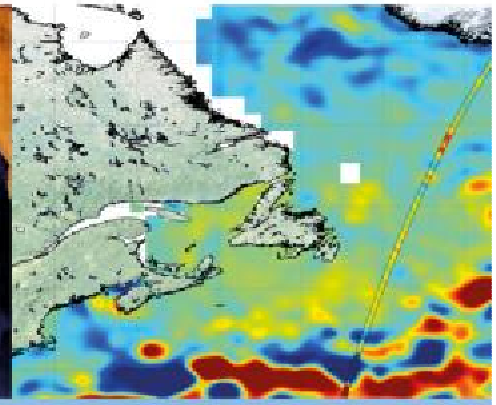
EU FP7 Grant Agreement n° 606797 (“HIGHROC”)
EU/Copernicus, ESA, EUMETSAT, USGS, NASA for satellite imagery
For more info and publications: www.highroc.eu

SAFE SHIPPING

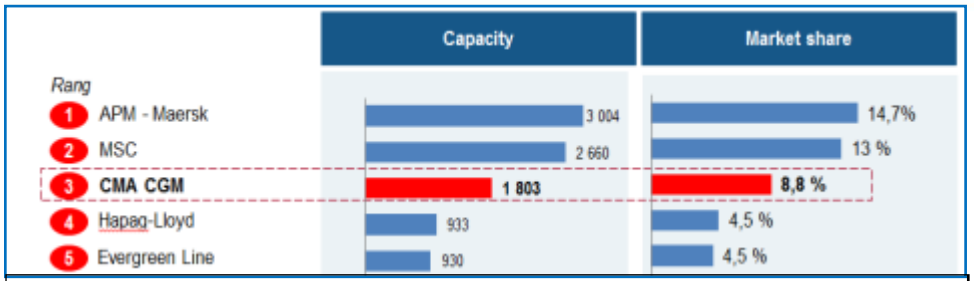
Patrice BARA

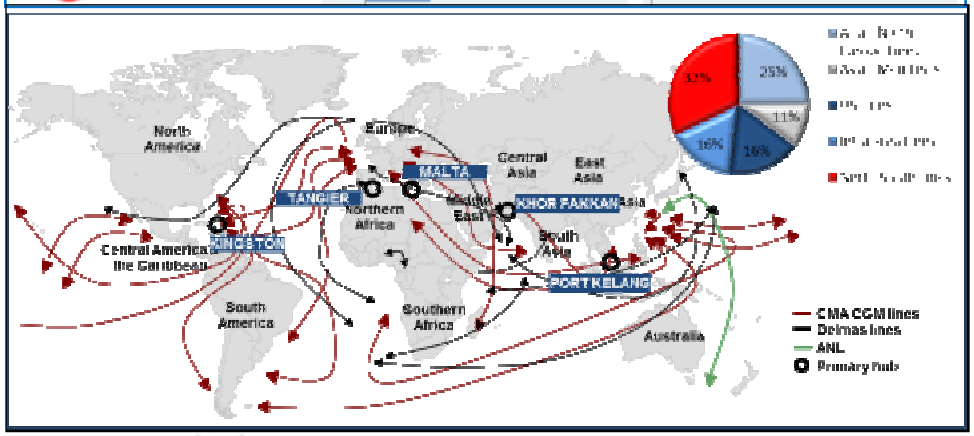
CMA-CGM





CMA CGM, a leader in Container Shipping





Revenue
2014: USD 16,7 billion
2015: USD 15,7 billion*

Volumes
2014: 12,2 million TEU
2015: 13 million TEU

765 Offices and
Over 22,000 Employees
Worldwide

Total fuel consumption per year:
6 M tons

200 Shipping lines
420 Ports of Call

471 Vessels
(41% owned capacity)
1,9 M TEU

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Routing container vessels: challenge & solutions

The challenge:
Enhance the safety of navigation / crew / cargo
Reduce fuel consumption for ecological & economical reasons

The solutions:
Optimize engines, propellers, hulls…
Improve organization…
Take benefit of today's knowledge in meteorology / oceanology

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Routing container vessels: dream and reality

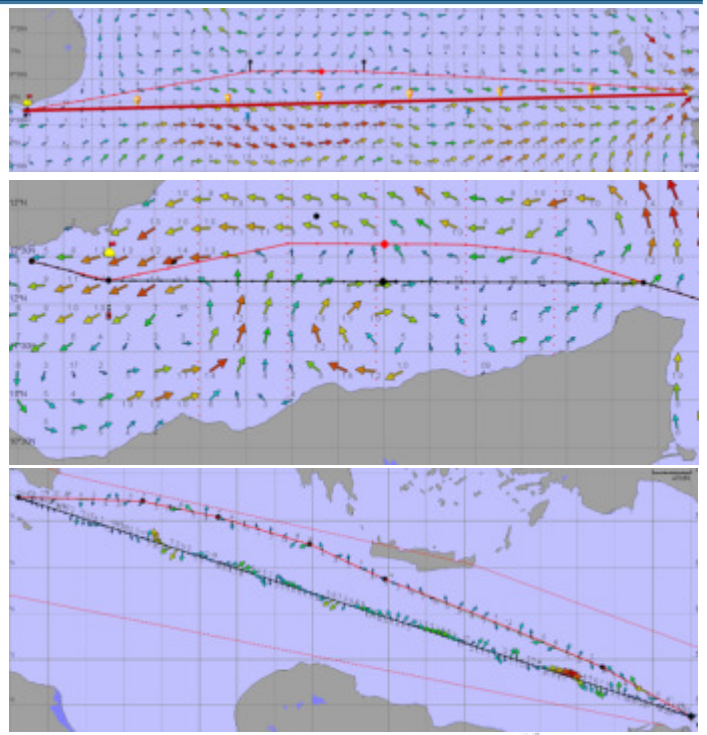
Current routing tests o/b CMA-CGM Amerigo Vespucci between Europe and China – March / May 2015

The gap between forecasted and observed currents is equivalent to 221 NM ie 50 t Fuel

Total consumption during the voyage: 4150 t
Actual savings due to « current routing »: 19 t = 0,4%

Improvement potential: 50 t = 1,2%

A reasonable target?	**1%**
-> for the whole CMA-CGM fleet:	**60 000 t Fuel** **180 000 t CO2**



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Routing container vessels: challenging the reality

Current forecasts are necessary for routing, but their reliability is not sufficient.

Increase the density of observed data seems to be necessary in order to:

- Improve the realism of the forecast by increasing observed data assimilation.
- **Provide data allowing an end-user to select the most realistic forecast for his specific need in a designated area and for a given timeslot.**

3 main observation means:

- Drifters -> in-situ / local / uncontrolled kinematic.
- Vessels -> in-situ / local / high density on vessels track / not very accurate.
- **Satellites -> area-wide observation / multi-sensor.**

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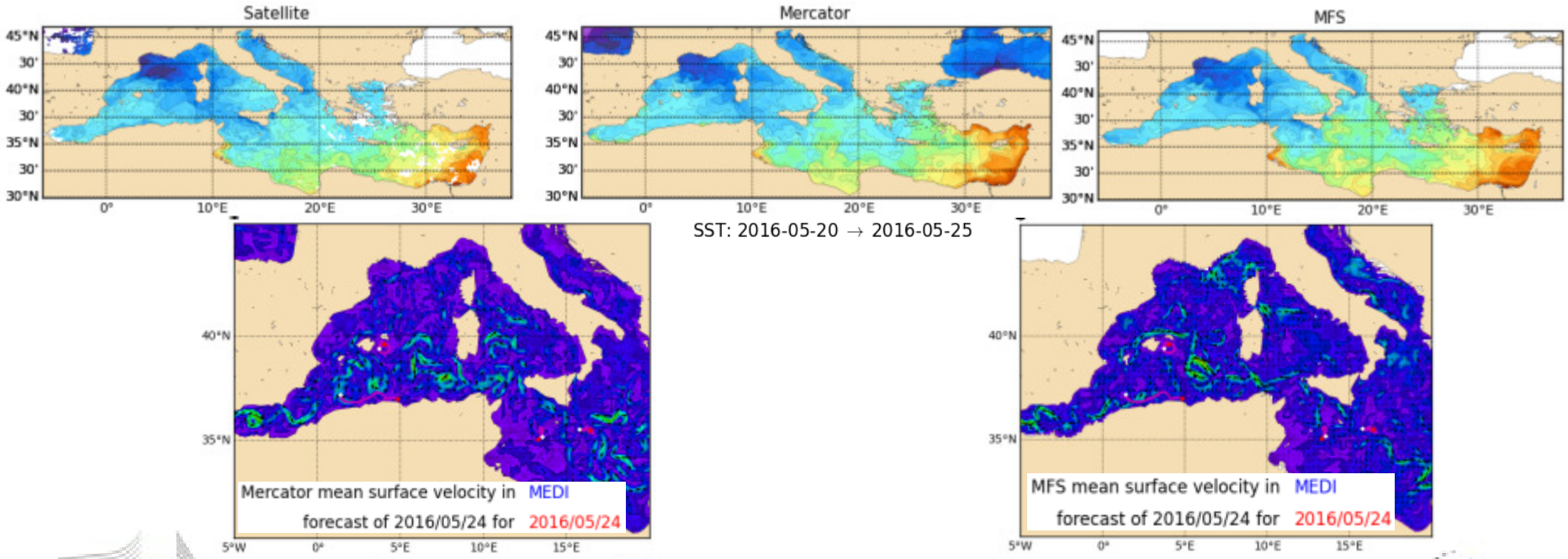
Example of CMEMS products used for selecting the most realistic prediction

The qualification and selection process is done by ACTIMAR on behalf of CMA-CGM



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Thank you

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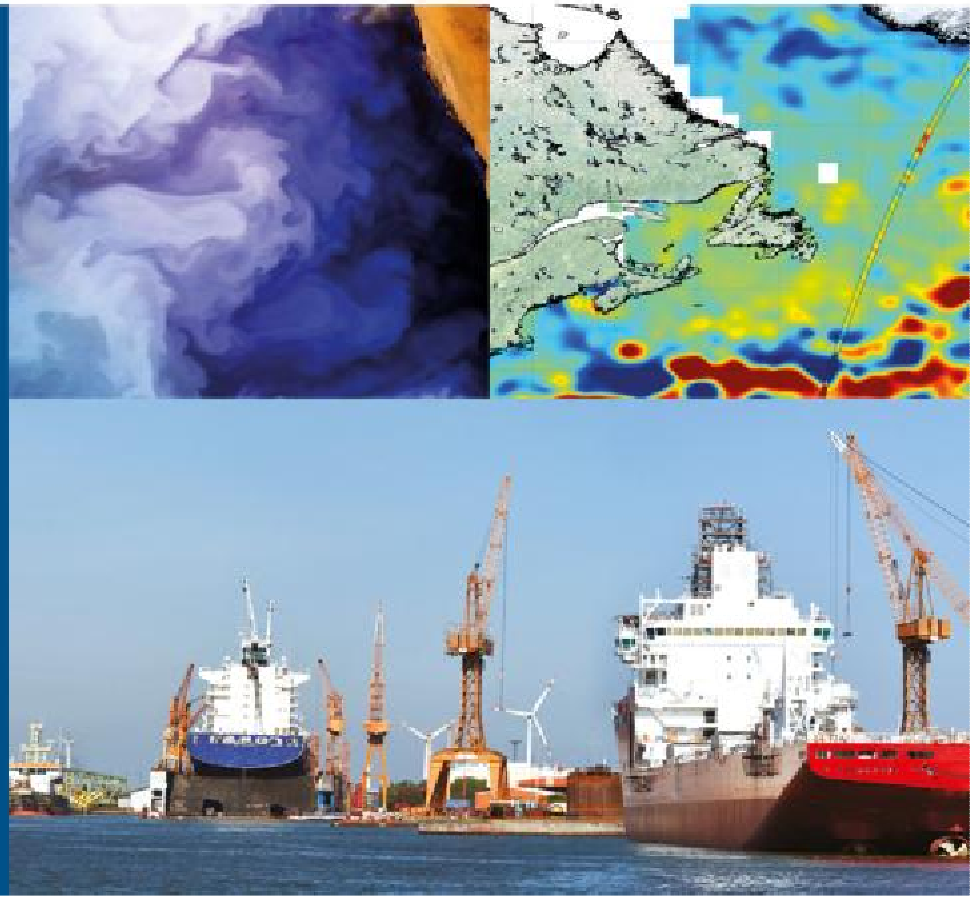
Use of satellite altimetry like Sentinel-3 for shipping application

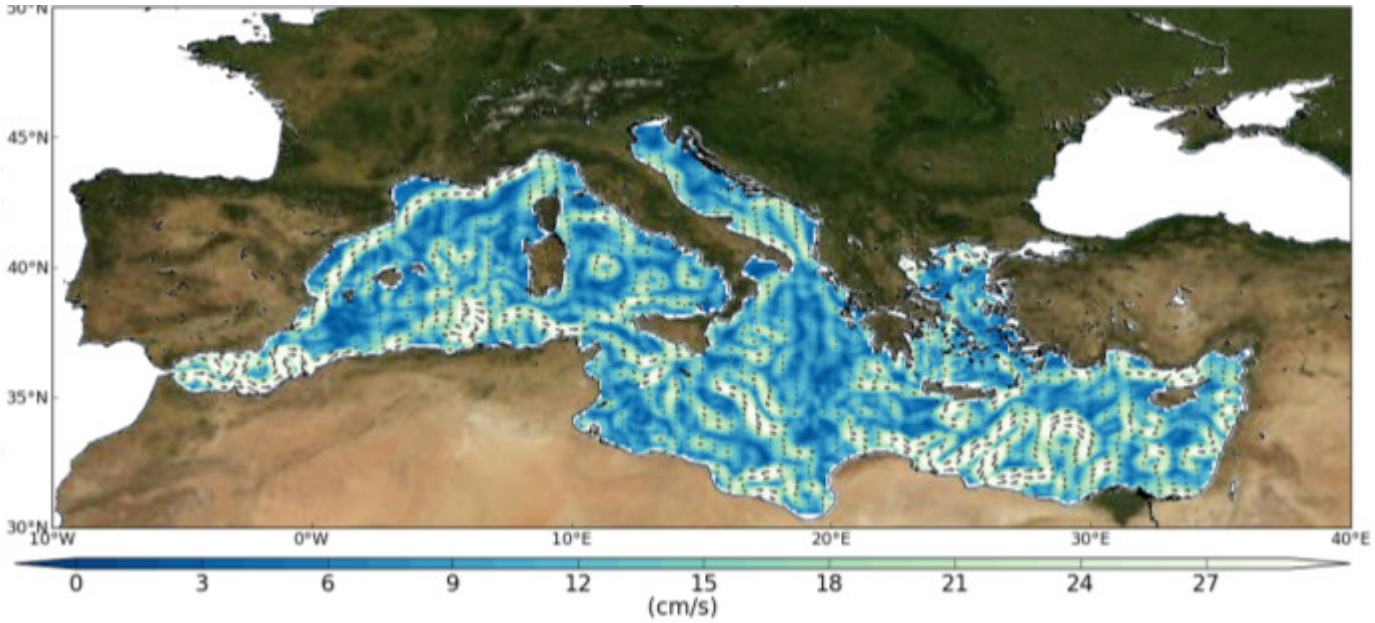
Gilles LARNICOL

CLS



Altimetry and Ocean currents

Shipping application needs: Monitoring and Forecast information of ocean currents



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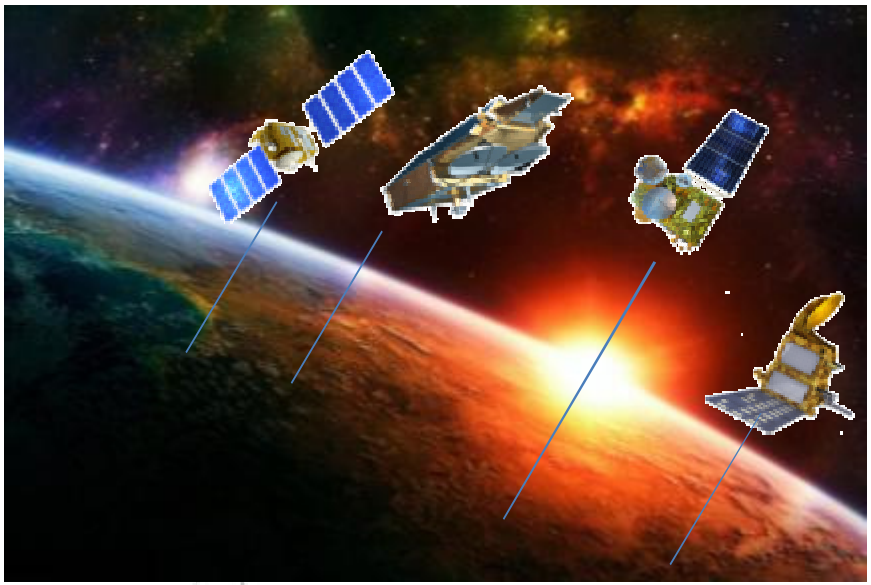
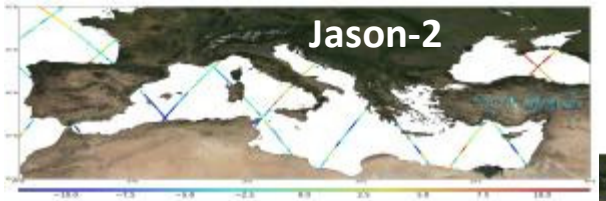
From the raw data to added value products

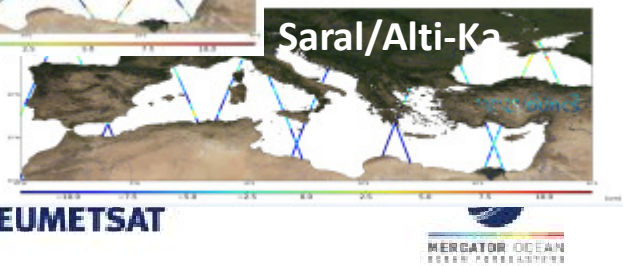
Altimetry constellation → sea Level Observations → Ocean currents



-1- Acquisition of Raw data (every 300m)

-2- Collection and Synchronization with ancillary data





7 km,
10 to 35 days

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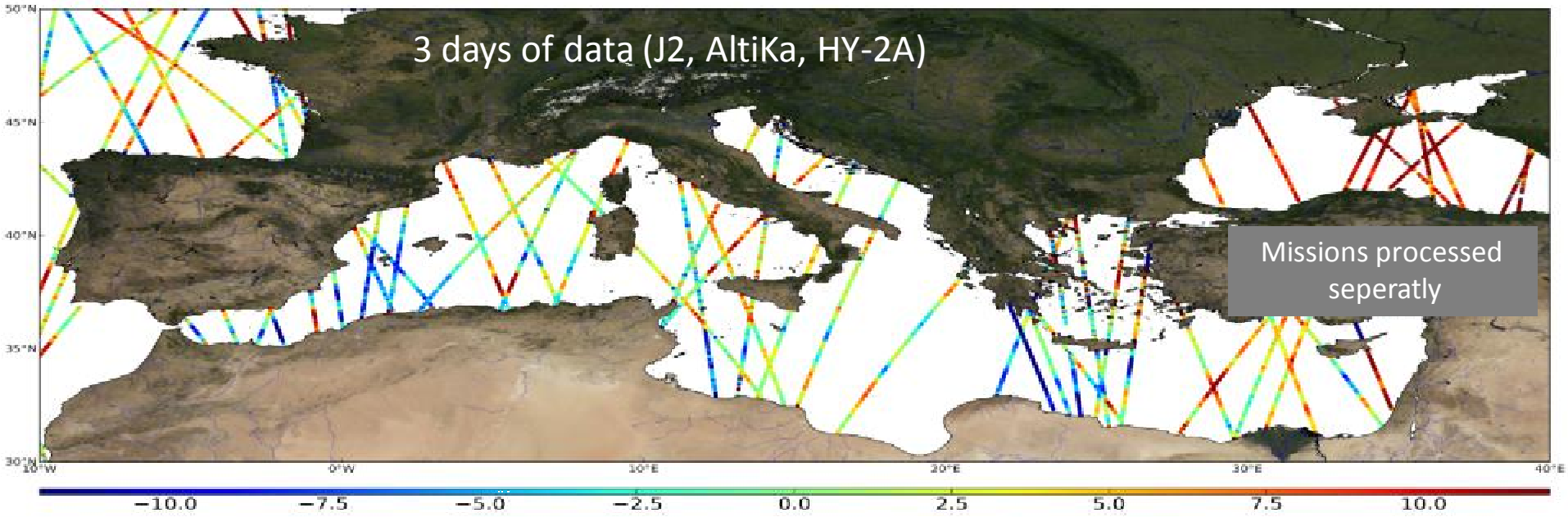
Homogenization and Editing

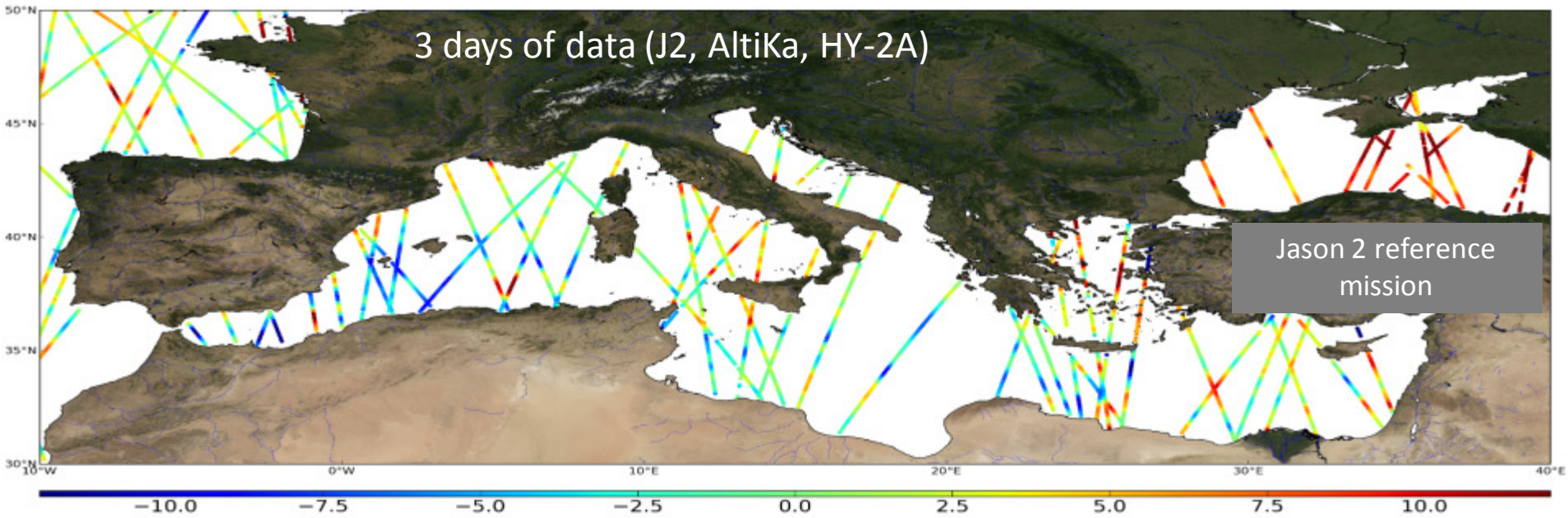
-1- Homogeneization = apply recent standard & corrections
-2- Editing= detect and remove spurious measurements



Inter-calibration and Unification

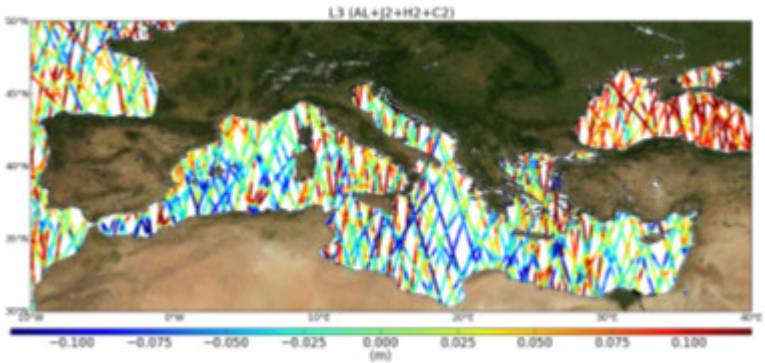
-1- Apply algorithm to reduce bias and longwave length error

-2- Filtering, Subsampling

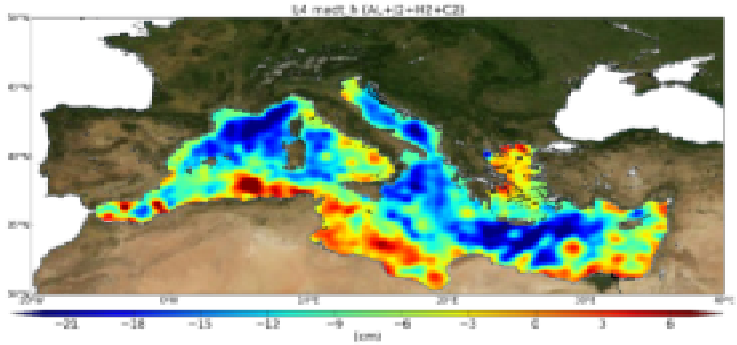


The Copernicus Products

Observed products → 150-200 km, daily

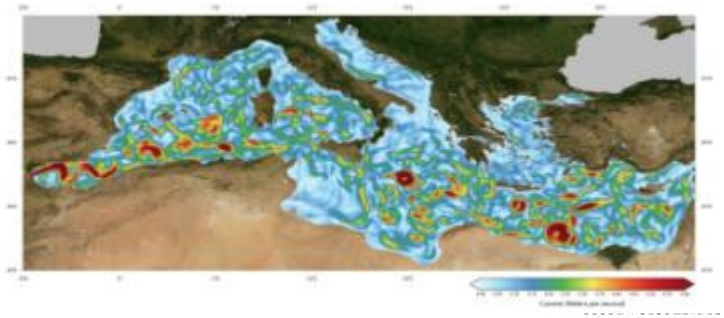


Mapping



Assimilation

Model products → 7-15 days Forecasts



- Provide information on the products uncertainty

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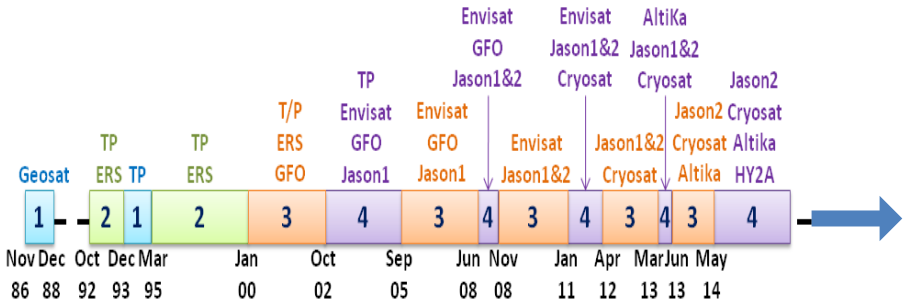
Altimetry Constellation: A new era thanks to Copernicus



- January 2016: Jason 3 launch
- February 2016: Sentinel-3A launch

ensure a 3 satellite constellation and potentially 5-6 missions alive at the same time.

Planning:

- June 2016: Integration of Jason3 (J2 replacement)
- Q4 2016: Integration of Sentinel-3A and Jason 2 interleaved
- Q1 2018: Integration of Sentinel-3B

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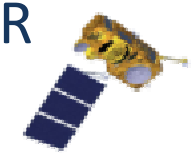
Way of Improvement

- Sentinel -3A will provide **High Resolution measurements** (SAR mode) for the whole ocean



  - Improve forecasts through evolution of assimilation method

  - Improve altimetry products and also develop new generation of products thanks to sensor synergy with other remote-sensing data (SST, Ocean colour) and In-Situ

- Better characterisation of the product errors

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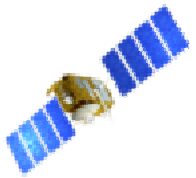
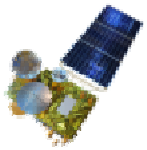
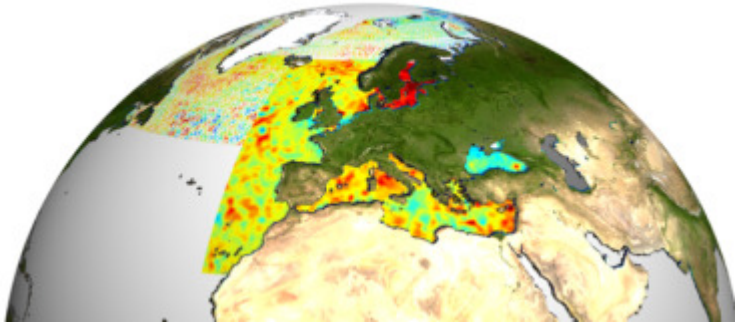
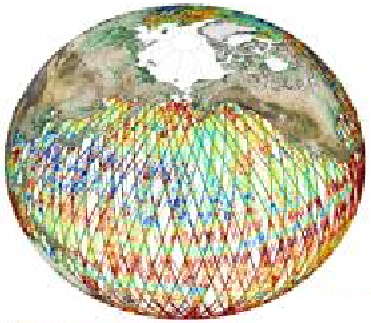
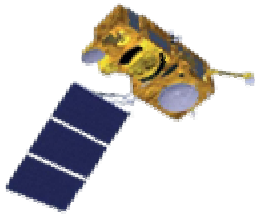
Thank You











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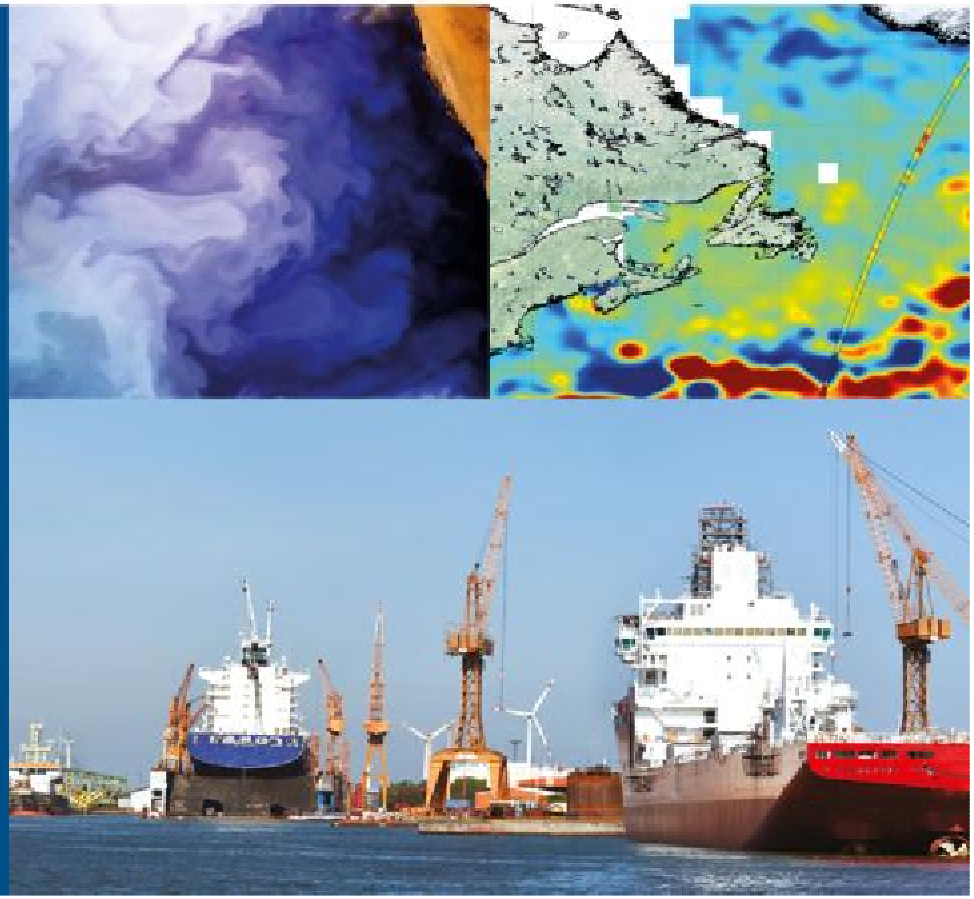
From seasonal Forecasting to El Niño

Patrick Josse

Météo-France
Climatology & Climate Services



Seasonal Forecasts vs weather Forecasts

Weather forecasts range from a few hours to a few days ahead (approx two weeks).

Numerical Weather Prediction techniques are not applicable for longer range : atmosphere is chaotic !

Seasonal forecasts provide less detailed (but valuable !) information about temperature and precipitations up to a few months ahead

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Seasonal Forecasts : for whom ?

Water management ressource at Manantali dam (Senegal)

Impact of wintry conditions on transports in UK

Hydroelectric energy production in Sweden

Food security in Ethiopia

River management in France…

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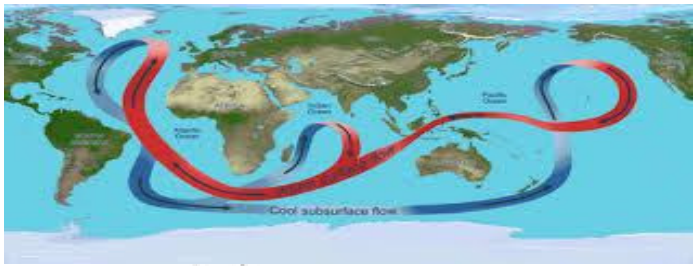
Oceans are the key

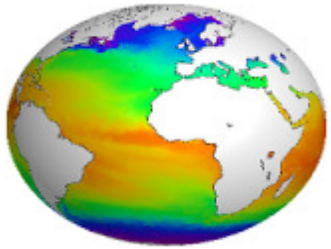
More predictable : inertia and slow evolution

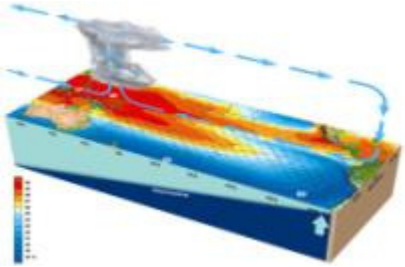
70% of the Earth Surface

Impact on the atmosphere is essentially driven by SST

Influence is even greater in the tropics







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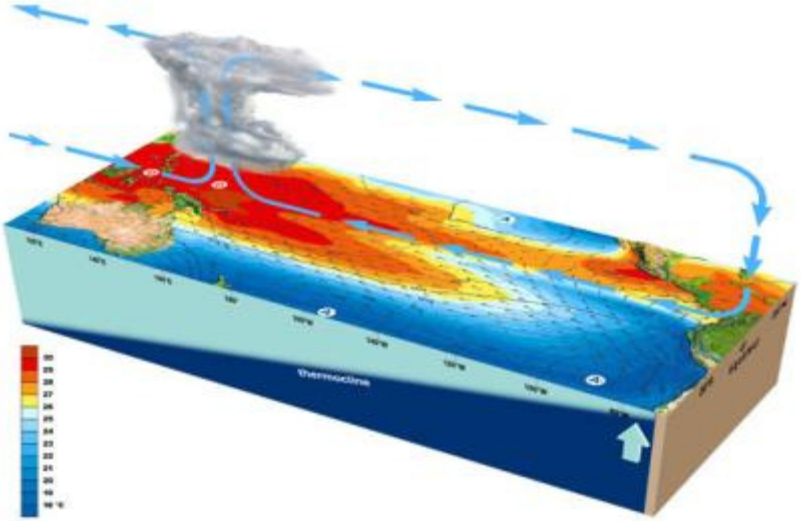
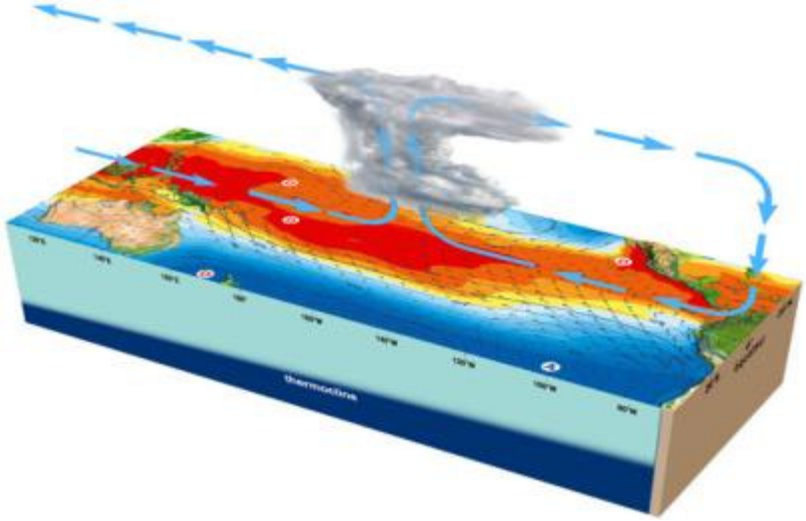
El Niño





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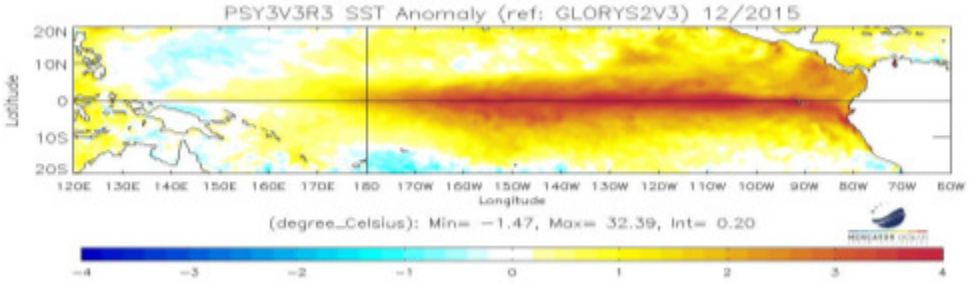
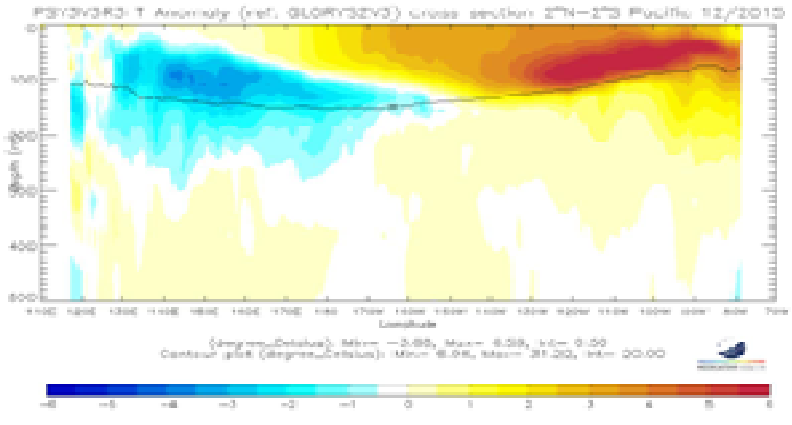
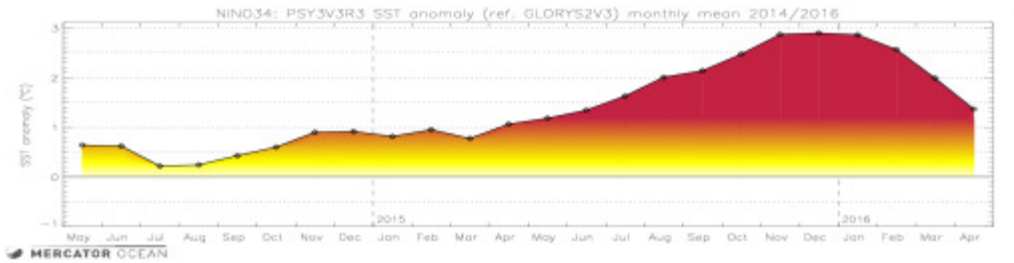
El Niño







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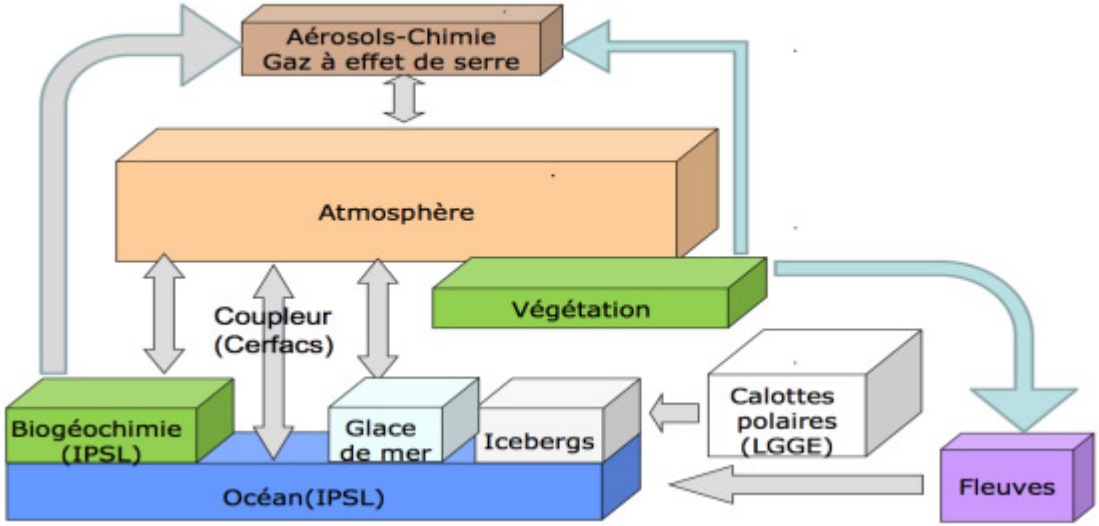
Seasonal forecast models

Coupled models are used : ocean can not be regarded as constant at the seasonal scale

Initial states based on observations are needed for each component of the system



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Seasonal forecast models (cont')

At the seasonal scale, focus is on temperature and precipitation anomalies : warmer/cooler and drier/wetter than « normal conditions » (reference period)

Due to model imperfections (biases…), the reference period must be described by the same model : the forecast simulation is compared to hindcast simulations

For Meteo France current seasonal forecast operational suite, the reference period covers 1991-2014. Over this period, hindcast simulations are initiated each month

Consistent oceanic initial states are needed both for the forecasts and the 24 years hindcast period.

In brief

Society's expectations for reliable weather information at the seasonal scale are high.

Seasonal predictability is however limited and mostly brought by the oceans.

The modelling techniques used are based on ocean-atmosphere coupled models and simulations are performed both in real time and for a long reference period in the past.

High quality consistent initial oceanic states are needed, both in (near) real time and over the last 25 years.

Copernicus Marine Service Products relying on high quality SST satellite products are a key input for seasonal forecasting activities

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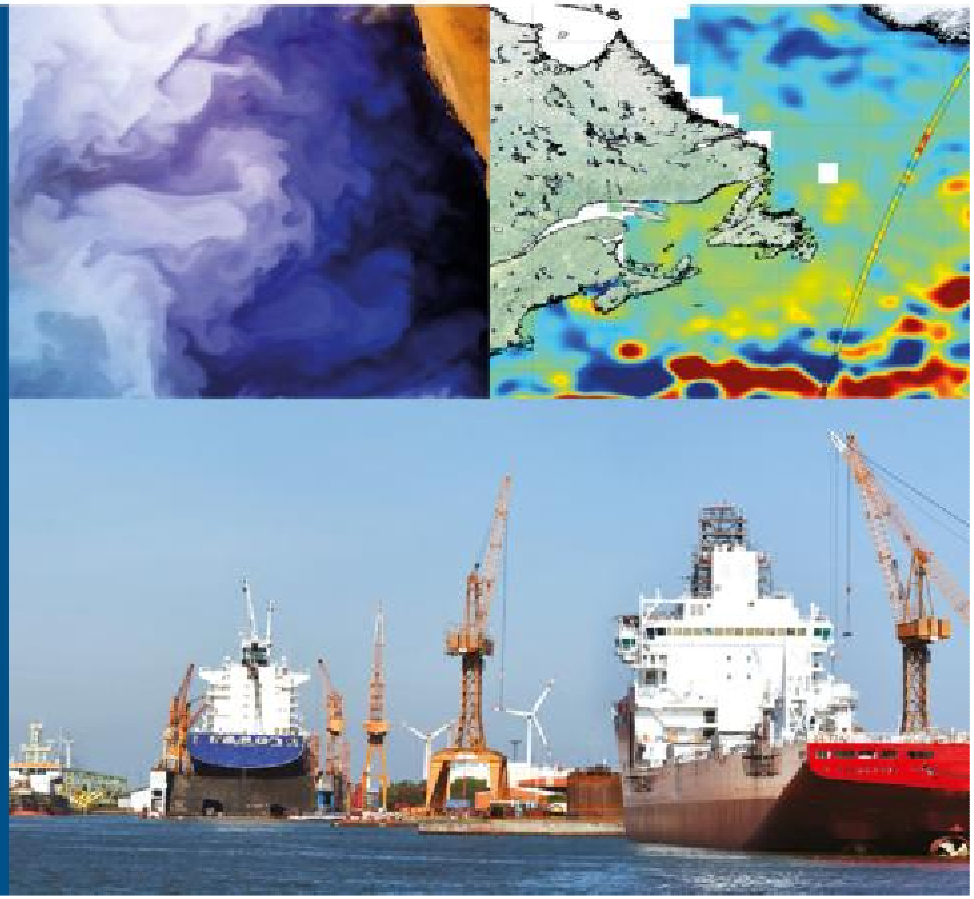
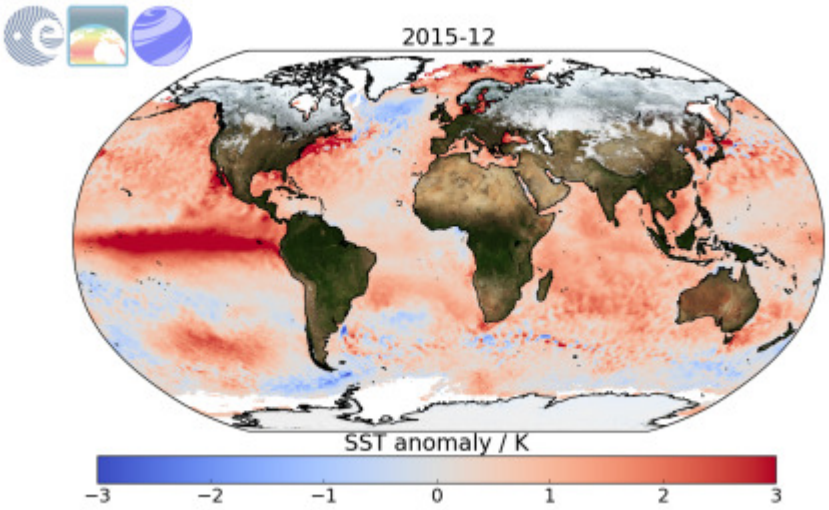
El Niño from space

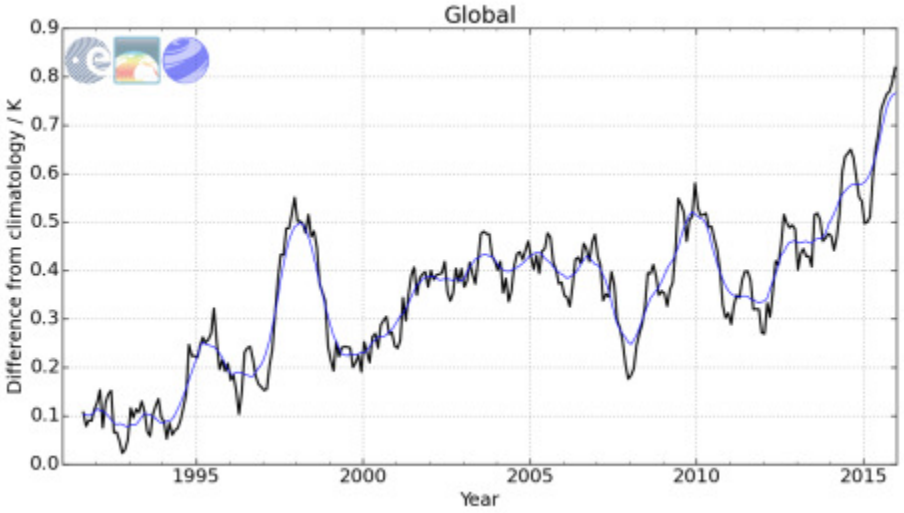
Anne O'CARROLL

EUMETSAT
Remote Sensing scientist



Monitoring of El Niño from satellite SST





SSTs from satellites provide global and accurate observations
Long time-series to ensure continuity
Consistency of measurements important

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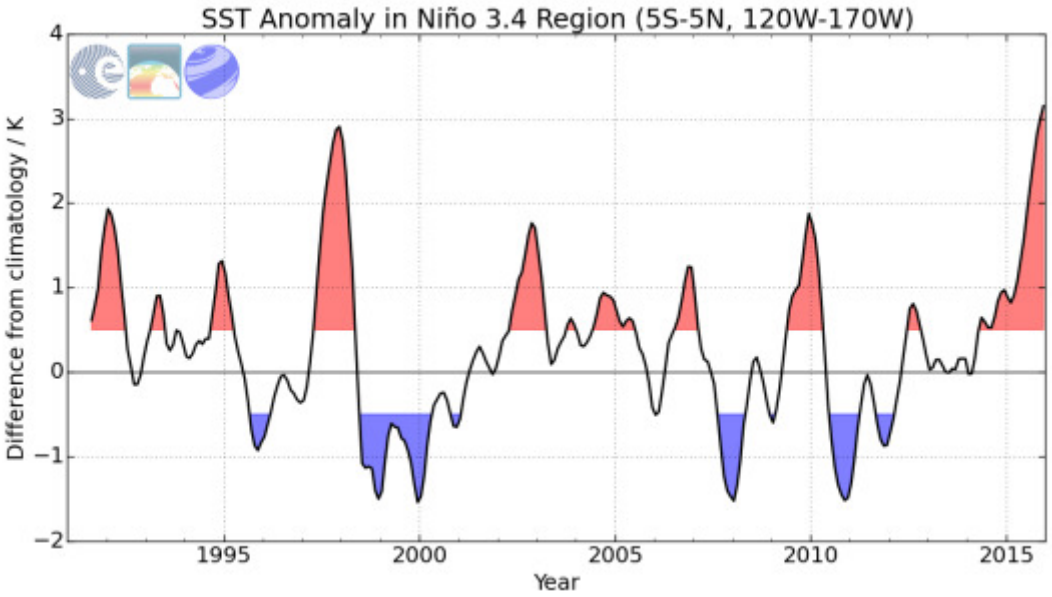
Climate SST anomalies



2015 was the warmest year for SST, influenced by the 2015 / 2016 El Nino

SST anomalies show 2015 / 2016 El Nino

Warm peak also visible for 1997 / 1998 large El Nino

Gradual significant increase in global SST since 2012

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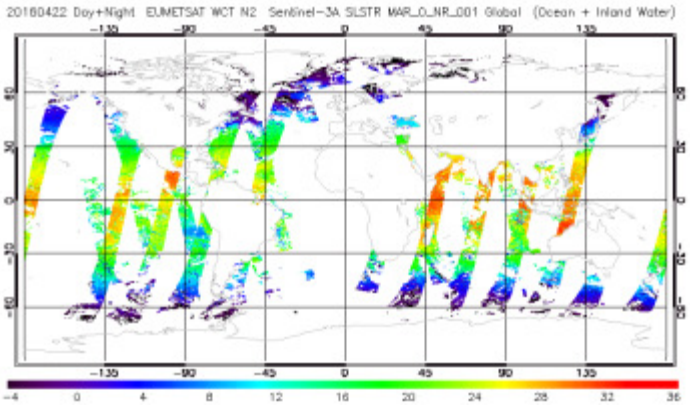
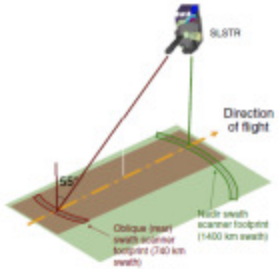
Copernicus Sentinel-3 SLSTR





Sea & Land Surface Temperature Radiometer on board Copernicus Sentinel-3A, launched 16 Feb.2016

Sentinel-3A to D will ensure continuity, consistency with operational measurements for 15-20 years.

Higher accuracy expected from SLSTR SSTs.
Use as a reference sensor for other SST missions and higher level products. Benefits over previous missions.

Ensure measurements consistent with previous ones through extensive Calibration and Validation activities.

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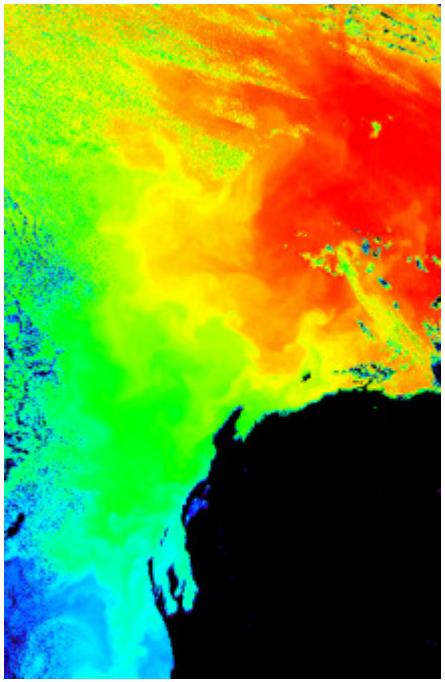
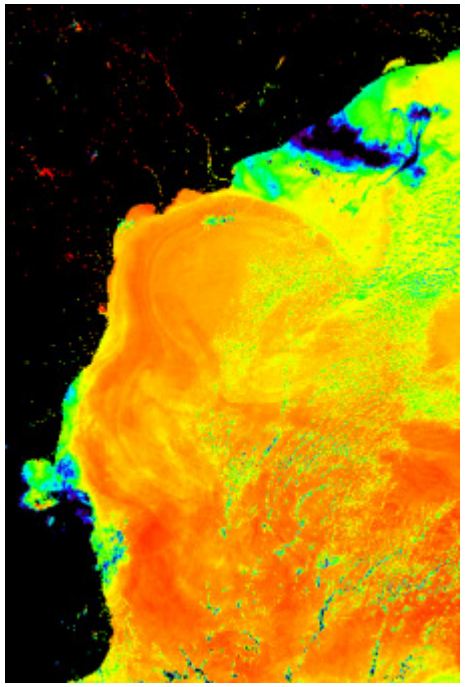
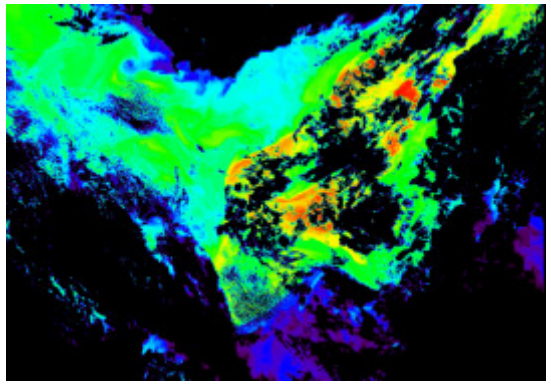
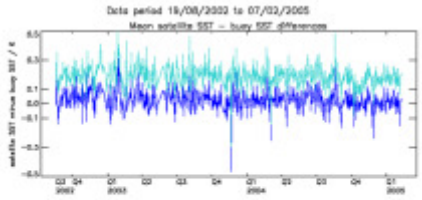
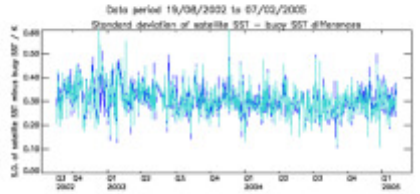
Recent SST: Sentinel-3 SLSTR

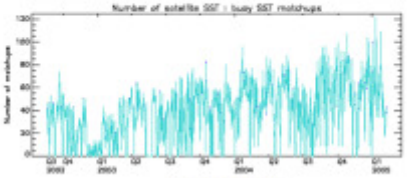












Continuous assessing of SSTs with in situ data (drifting, moored buoys; ship board radiometer data) and other satellite data to ensure quality and understand uncertainties

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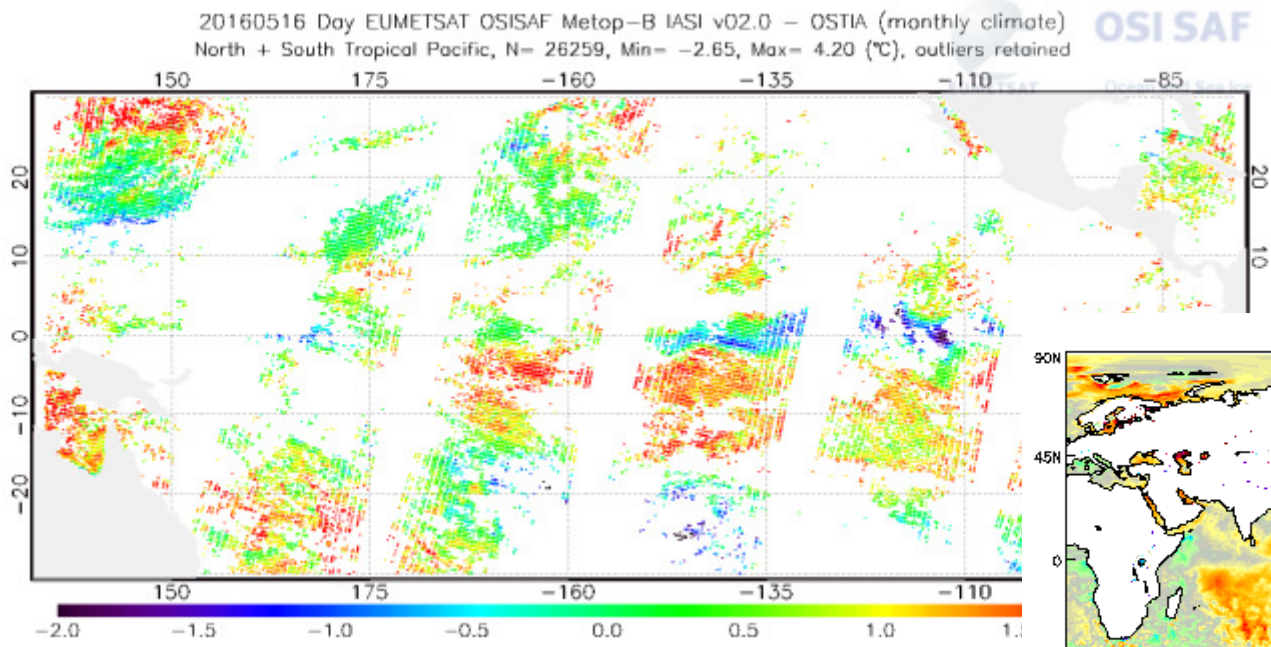
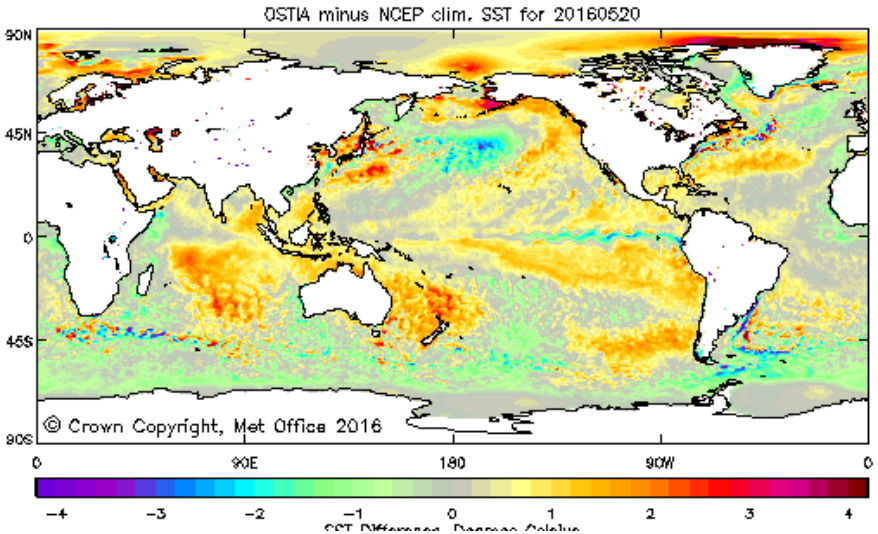
Recent SST anomalies: Metop-B IASI



Credit: P. Dash, EUMETSAT

Cool SST anomalies observed by satellite data in the Tropical Pacific

-> early indication of emerging La Nina conditions?



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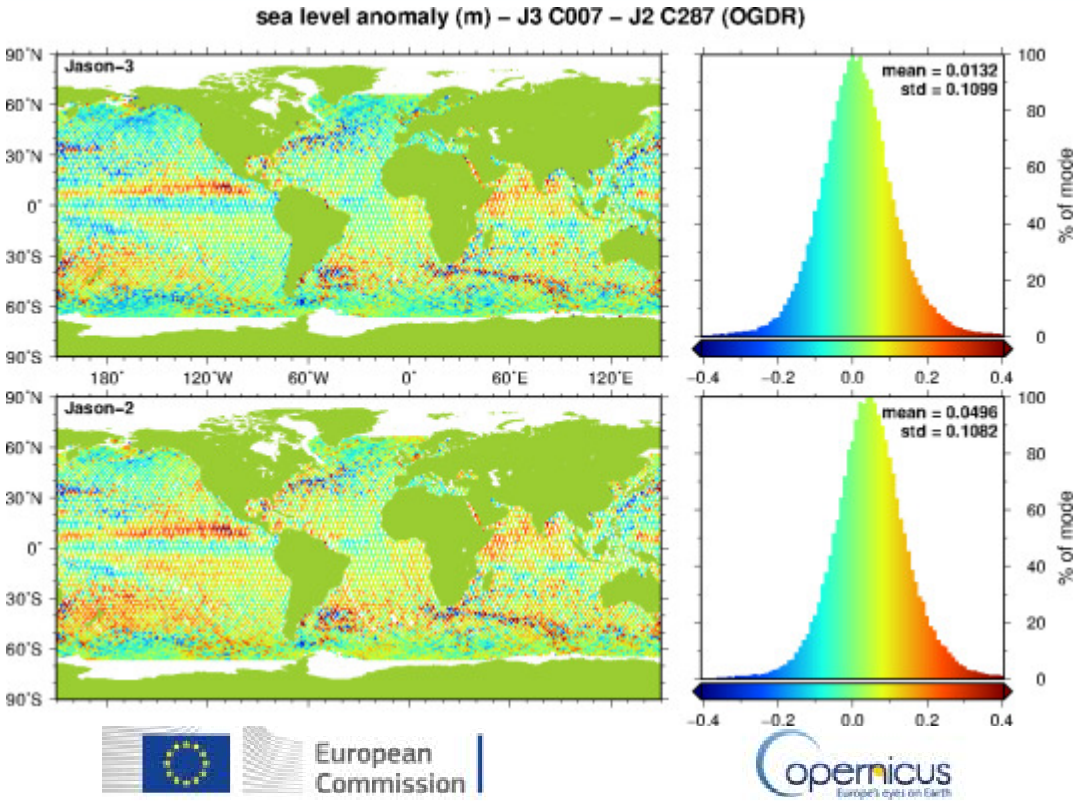
Recent sea level anomaly: Jason-3 & 2



The satellites are trailing each other momentarily by 80 seconds.

In September Jason-2 will be moved so that the two track patterns will interleave, hence enhancing the space-time sampling.

April 16 to 26, 2016

Source: R. Scharroo, EUMETSAT

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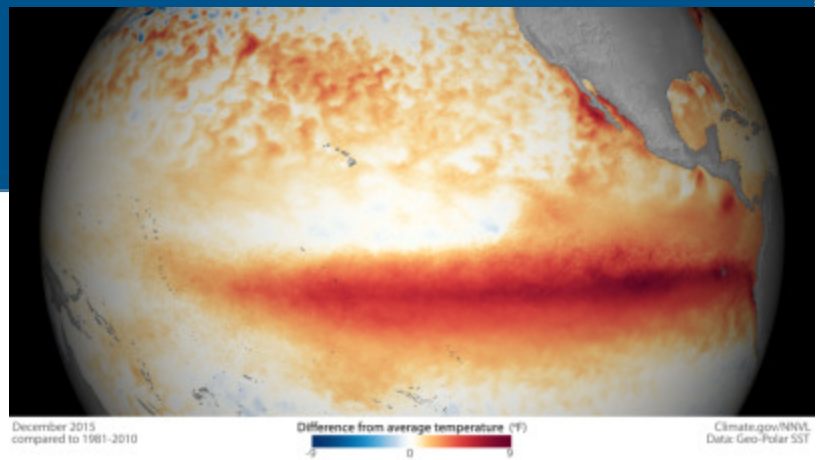
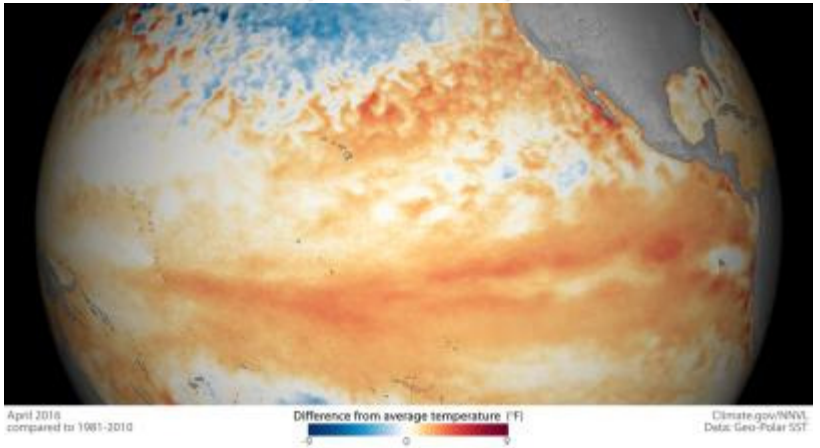
Summary

Copernicus data from Sentinel-3 and Sentinel-6 crucial for El Niño monitoring, detection and forecasting, ensuring continuity and consistency.

Contributes to assessing impacts of El Niño and potential future La Niña. E.g. 2015/2016 event put large populations at risk from insufficient food.

Changing weather patterns from a La Niña event may vary but can include drier than usual parts of N & S America; increased precipitation SE Asia / W Australia; changes in tropical cyclone / hurricane activity.





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Earth observation for marine resources Management in West Africa

George, WIAFE

ECOWAS Coastal & Marine Resources Management Centre, University of Ghana

MESA

Outline

Maritime domain of West Africa: uses & abuses

MESA Marine thema in West Africa

Conclusion

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Maritime domain: Uses & Abuses

- Abundant living & non-living resources
- Food security
  - (Fishery 1.6m t/yr; 3billion/yr)
- Employment

- Habitat degradation & Pollution
- IUU fishing & biodiversity loss
- Lack of science-based policies
- Weak legal enforcement

GMES-Africa: Africa's version of Copernicus

GMES-Africa to utilize operational Earth Observation data to address environmental concerns

A comprehensive end-to-end service from observations, through analysis & forecasts, to dissemination of value-added products

Products and services to feed into national governance schemes that will ensure effective management

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GMES-Africa (marine services)

Service 1: Monitoring and Forecasting of Oceanography Variables

- Monitoring and forecasting of physical and biological oceanography variables
- Potential Fishing Zones Management

Service 2: Coastal Area Monitoring

- Coastal Ecosystems Mapping and Monitoring
- Coastal Vulnerability

Service 3: Ship Traffic and Pollution Monitoring

- Ship Traffic Monitoring
- Pollution Monitoring and Warning

Service 4: Marine Weather Forecast

- Marine Weather Forecast

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MESA Regional Thematic Actions

THEME : «Crop and rangeland management»

RIC : Cilss, Agrhymet Niamey

THEME Marine & Coastal management
RIC: University of Ghana

THEME : « Integrated Water Resource Management »

RIC : Cicos, Kinshasa, RDC

THEME : «Agricultural & Environemental ressource management»

RIC : NMS Gaborone, Botswana

THEME : « Mitigation of land degradation & natural habitat conservation »

RIC : ICPAC, Nairobi

THEME Climate change monitoring
RIC: ACMAD

THEME Marine & Coastal management

RIC: Mauritius Oceanography Institute

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ECOWAS
1. Benin
2. Cape Verde
3. Cote d'ivoire
4. Gambia
5. Ghana
6. Guinea
7. Guinea Bissau
8. Liberia
9. Nigeria
10. Senegal
11. Sierra Leone
12. Togo
13. Mauritania
14. Sao Tome & Principe

CEMAC
1. Cameroon
2. Equatorial Guinea
3. Gabon
4. R. Congo
5. DR Congo

SADC
1. Angola
2. Namibia

National & Regional needs assessment

Capacity strengthening

Insufficient capacity (human and

Policy Framework & Decision making

Poor legal framework at the regional and national levels (Governance)

Inadequate implementation of instruments (governance)

Insufficient public/stakeholder involvement, co-management (governance)

Factors

MAJOR TRANSBOUNDARY PROBLEMS

- Decline in fishery resources
- Uncertainty with ecosystem status & yields
- Marine pollution and habitat degradation
- Loss of ecosystem integrity, biodiversity loss

Data needs

Sustainable management and utilization of resources

Assessment of environmental improvement of predictability

Maintenance of ecosystem health and management of pollution

Factors

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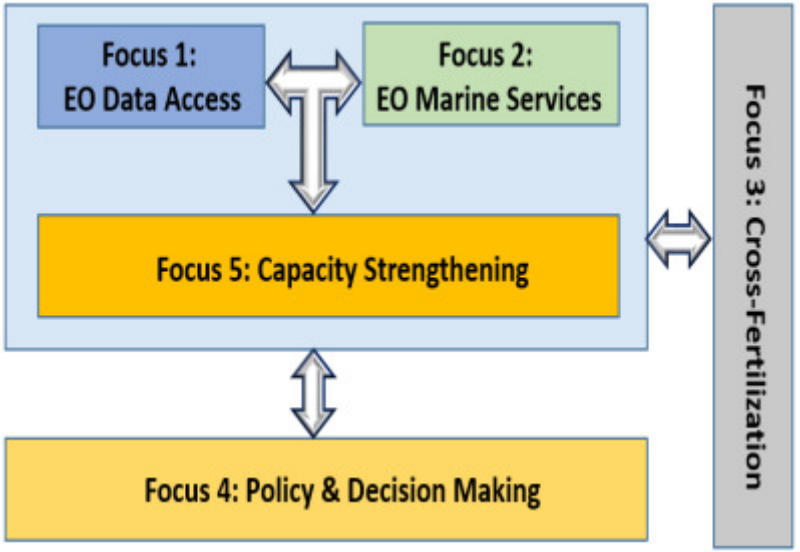
MESA (Marine) services in West Africa

Objective:

– To increase decision-making & planning for coastal and marine resources management, by enhancing exploitation of Earth Observation data



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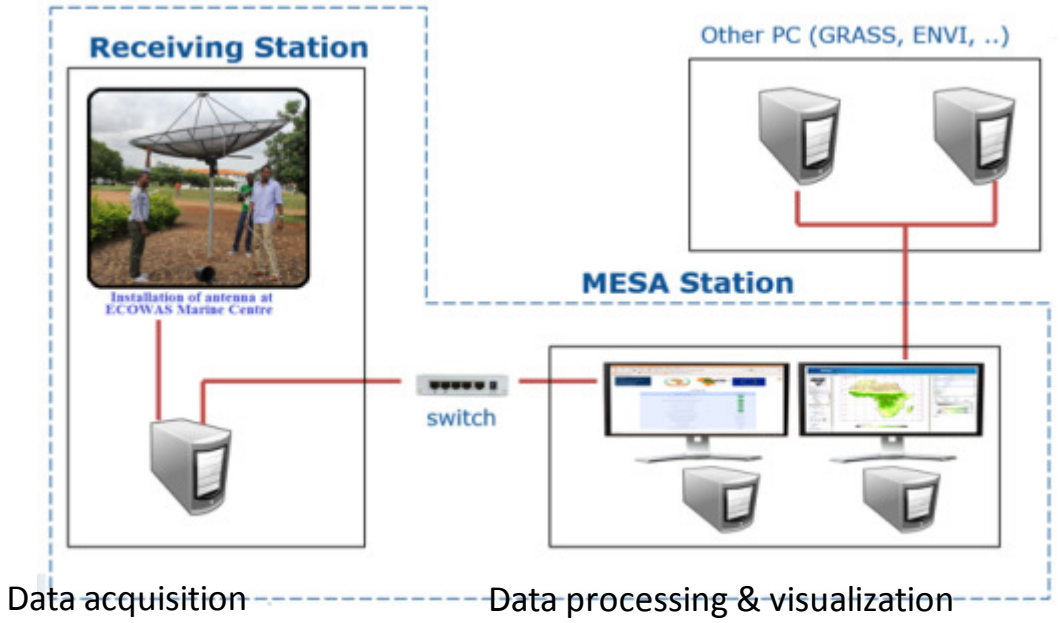
Need 1: Operational data & platform

- Satellite data
- In-situ measurements
- Model outputs (e.g. Mercator)

- EUMETCast
- Internet



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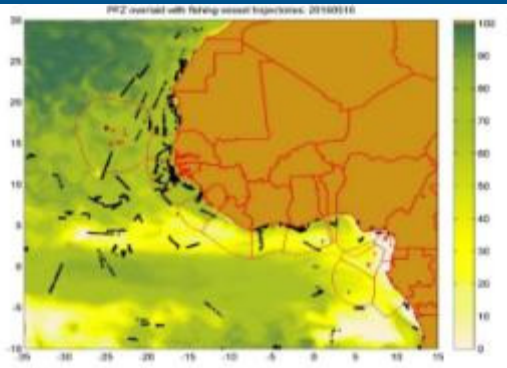
MESA: marine products & services

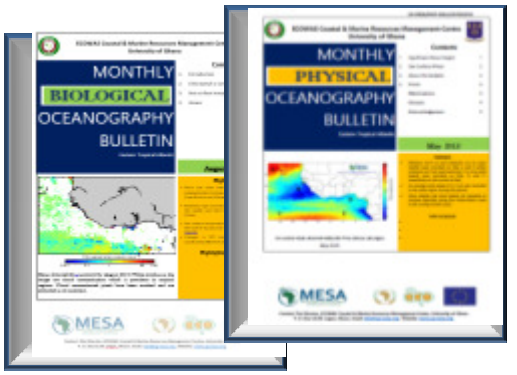
Forecast Potential Fishing Zones (PFZ)

Overlay PFZ with fishing vessel traffic

Monitor and forecast ocean conditions

Disseminate SMS alerts to local fishers





Enhanced services with Sentinel 3A data sets via EUMETSCast

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Need 2: Policy & decision making

ECOWAS Commission chairs Regional Steering Body

Membership: Directors of Ministries of Fisheries; Representatives of Regional Fisheries Bodies

Caucus Body of Regional Fisheries Directors for experience sharing

MESA has piloted surveillance of small fishing vessels in Ghana

MESA has initiated policy dialogue on harmonizing legal framework for small fishing boat surveillance

Need 3: Capacity strengthening in EO applications

Academic Thread (University Departments)

- Curricula development for students
- Professional courses for service beneficiaries
- Research support
- Academic collaboration (locally and internationally)

Operational Thread (Regional Marine Centre)

- Develop operational capabilities
- Service transition (academic applications to operational)
- Service delivery to target beneficiaries

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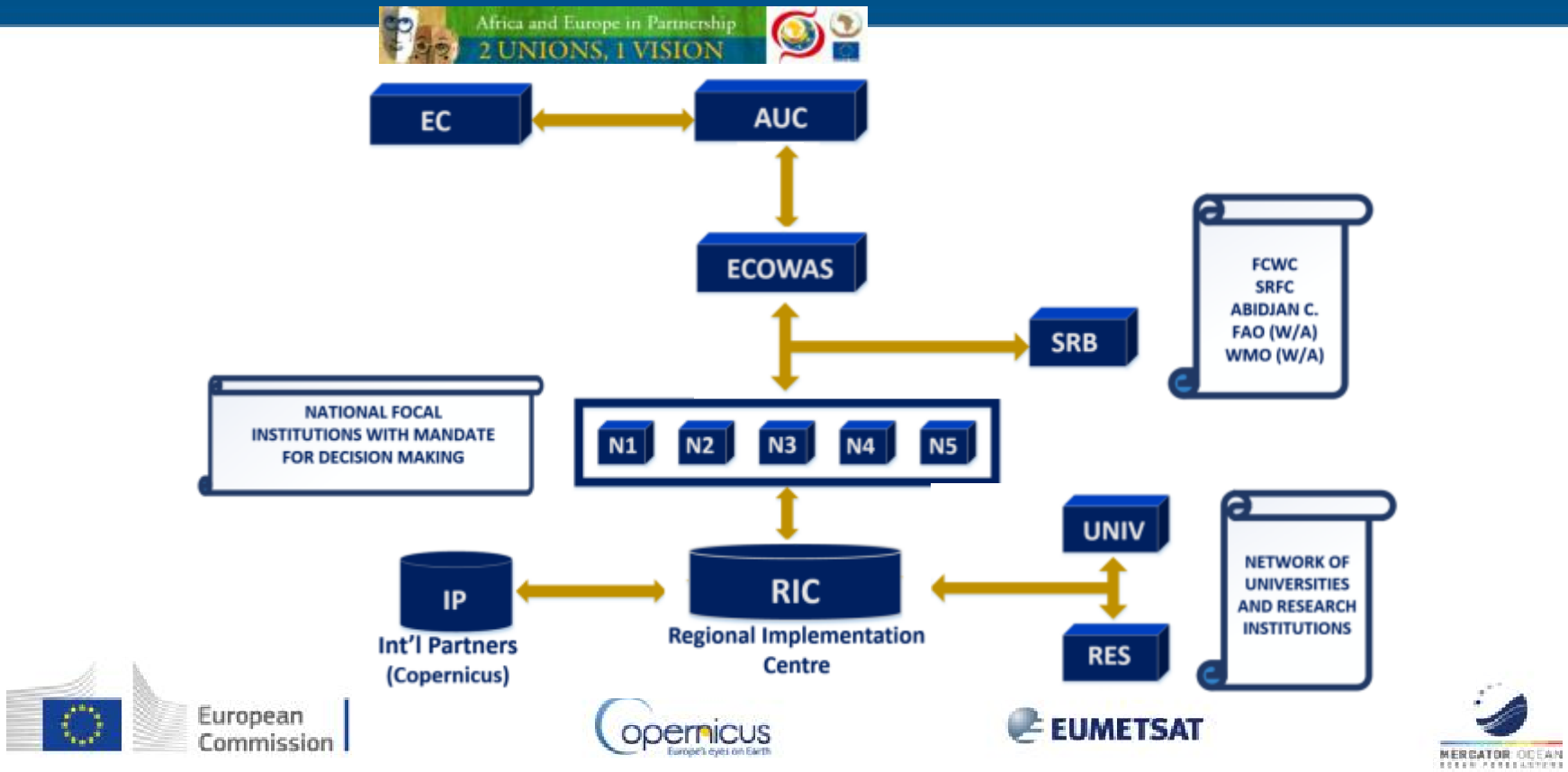
Way Forward


Africa and Europe in Partnership
2 UNIONS, 1 VISION
EC
AUC
ECOWAS
SRB
FCWC
SRFC
ABIDJAN C.
FAO (W/A)
WMO (W/A)
NATIONAL FOCAL INSTITUTIONS WITH MANDATE FOR DECISION MAKING
N1
N2
N3
N4
N5
UNIV
NETWORK OF UNIVERSITIES AND RESEARCH INSTITUTIONS
IP
Int'l Partners (Copernicus)
RIC
Regional Implementation Centre
RES
European Commission
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Conclusion

Blue Economy is key to socio-economic well-being of the people

Effective management requires

- *Operational EO data*
- *Capacity strengthening*
- *Utilization of services for policy & decision making*

ECOWAS Marine Centre implementation strategy

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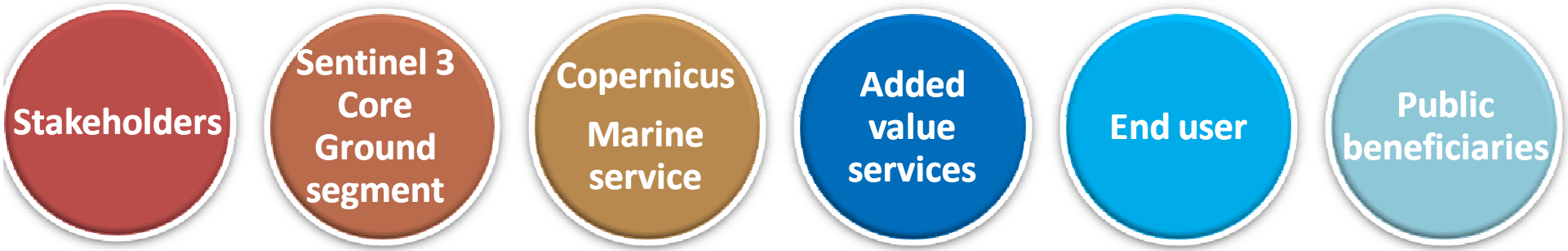
Round table - the value chain



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Mercator Ocean

Meinte BLAAS
DELTARES

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THANK YOU

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