

# Copernicus Marine Environment Monitoring Service (CMEMS) and Polar regions monitoring

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Mercator Océan



Implemented by



## Outlines

1. Copernicus Marine Service
2. Polar monitoring

# Copernicus

## *Marine Environment Monitoring*

### Service

# (1) A European Service part of

## SATELLITES



## IN SITU



## SERVICES



### MARINE

### ATMOSPHERE

### LAND

### SECURITY

### EMERGENCY

### CLIMATE



### GROWTH

Internal Market, Industry, Entrepreneurship and SMEs

**2007-2013**  
**GMES DEVELOPMENT PHASE**

**2014-2020**  
**COPERNICUS OPERATIONAL PHASE**

## (2) Entrusted to Mercator Ocean by the European Commission



- ✓ MyOcean legacy ( 2009/2015)
- ✓ Delegation agreement (2014/2021)
- ✓ To implement and operate the Copernicus Marine Service.

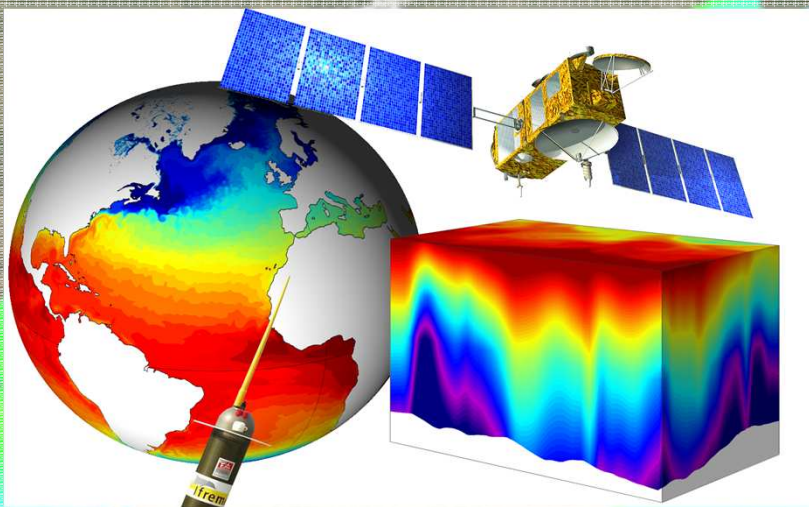


# (3) Networking ocean data producers



- ✓ A network of European data providers
- ✓ State-of-the-art scientific knowledge
- ✓ Unique products portfolio

# (4) Combining Observations and Models



Combining observations from space and from in situ with Ocean/assimilation models

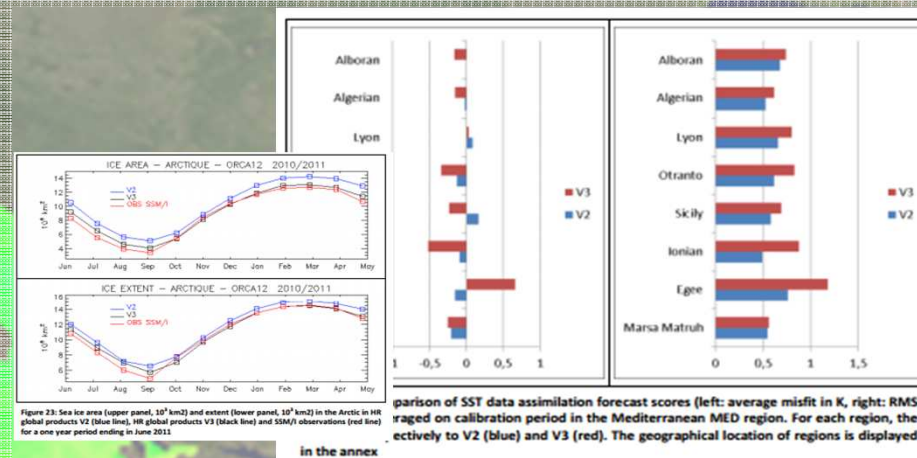


Figure 23. Sea ice area (upper panel, 10<sup>6</sup> km<sup>2</sup>) and extent (lower panel, 10<sup>6</sup> km<sup>2</sup>) in the Arctic in the global products V2 (blue line), V3 (black line) and SSM/I observations (red line) for a one year period ending in June 2011. Comparison of SST data assimilation forecast scores (left: average misfit in K, right: RMS error) on calibration period in the Mediterranean MED region. For each region, the geographical location of regions is displayed in the annex. The geographical location of regions is displayed in the annex. The geographical location of regions is displayed in the annex.

Assessing carefully the information content and accuracy with state-of-the art science



# (5) Full open and Free , accessible via a single portal

marine.copernicus.eu

**COPERNICUS MARINE ENVIRONMENT MONITORING SERVICE**  
Providing PRODUCTS and SERVICES for all marine applications

Search terms  OK

ABOUT US | BENEFITS | NEWS | SCIENCE & LEARNING | TRAINING | SERVICES PORTFOLIO

**ACCESS TO PRODUCTS**  
Search and download your datasets!

**FIRST VISIT ?**

Select your:

- AREA
- PARAMETERS
- TIME COVERAGE
- OBSERVATIONS/MODELS

- ▶ GLOBAL OCEAN
- ▶ ARCTIC OCEAN
- ▶ BALTIC SEA
- ▶ EUROPEAN NORTH WEST SHELF SEAS
- ▶ IBERIA-BISCAY-IRELAND REGIONAL SEAS
- ▶ MEDITERRANEAN SEA
- ▶ BLACK SEA

2016 13 APR

**LATEST NEWS FLASH**  
CMEMS:3837  
Copernicus Marine WebPortal & Temporary Unavailability  
*In progress...*  
ALL NEWS FLASH

PDF CATALOGUE | OBSERVATIONS OVERVIEW  
ONLINE CATALOGUE | MODELS OVERVIEW

28 MONDAY | EVENTS AGENDA

PARTNERS AND STAKEHOLDERS

FOCUS ON

**MARITIME SURVEILLANCE WORKSHOP, DUBLIN, IRELAND, APRIL 22**  
The Copernicus Marine Service will be present at the Maritime Surveillance Workshop discussing the role of marine observation, at Maynooth University, near Dublin, Ireland on April 22 from 10am to 2:30pm.

Arctic-RO  
22-23 Nov 2016 Svalbard



European Commission

Copernicus  
Europe's eyes on Earth

MERCATOR OCEAN  
OCEAN FORECASTERS



# (6) Providing reliable Ocean information

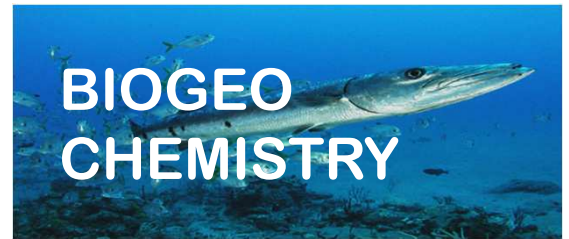
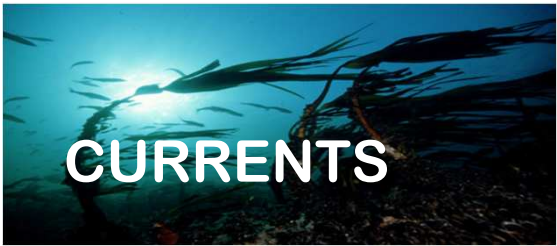
REANALYSES  
10 to 45 years

REAL-TIME  
Daily, hourly

FORECAST  
2 to 10 days



ESSENTIAL OCEAN VARIABLES



- 1 Global
- 2 Arctic
- 3 Baltic
- 4 NWS
- 5 IBI
- 6 Med Sea
- 7 Black Sea

DISCOVER

VIEW

DOWNLOAD

Open & Free

Arctic-ROOS annual meeting  
22-23 Nov 2016 Svalbard



European Commission



# (7) Scientifically assessed

## METHODS FOR ASSESSING OPERATIONAL OCEANOGRAPHY

### INTERNATIONAL METRICS

### QUALITY INFORMATION DOC ATTACHED TO EVERY PRODUCT



**QUALITY INFORMATION DOCUMENT**  
**For Global Sea Physical Analysis and Forecasting Product**  
**GLOBAL\_ANALYSIS\_FORECAST\_PHYS\_001\_002**

WP Leader: GlobalMFC WP05, Eric Dombrowsky, Mercator-Ocean France Issue: 1.2

Contributors : C.REGNIER, J-M. LELLOUCHE, O. LEGALLOUDEC, C. DESPORTES, M.DREVLON

Approval Date by Quality Assurance Review Group : 06 August 2013

Project N°: FP7-SPACE-20011-1  
 Work programme topic: SPA.201  
 Area Duration: 30 Months

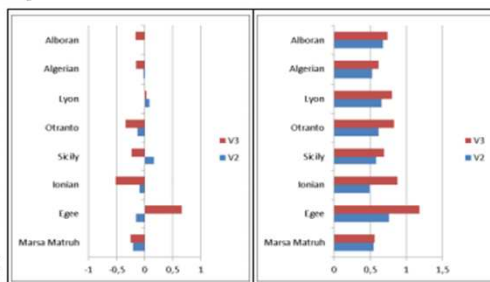


Figure 11: Comparison of SST data assimilation forecast scores (left: average misfit in K, right: RMS misfit in K) averaged on calibration period in the Mediterranean MED region. For each region, the bars refer respectively to V2 (blue) and V3 (red). The geographical location of regions is displayed in the annex

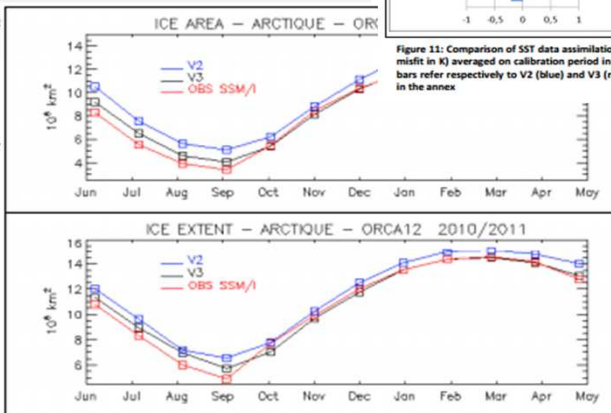
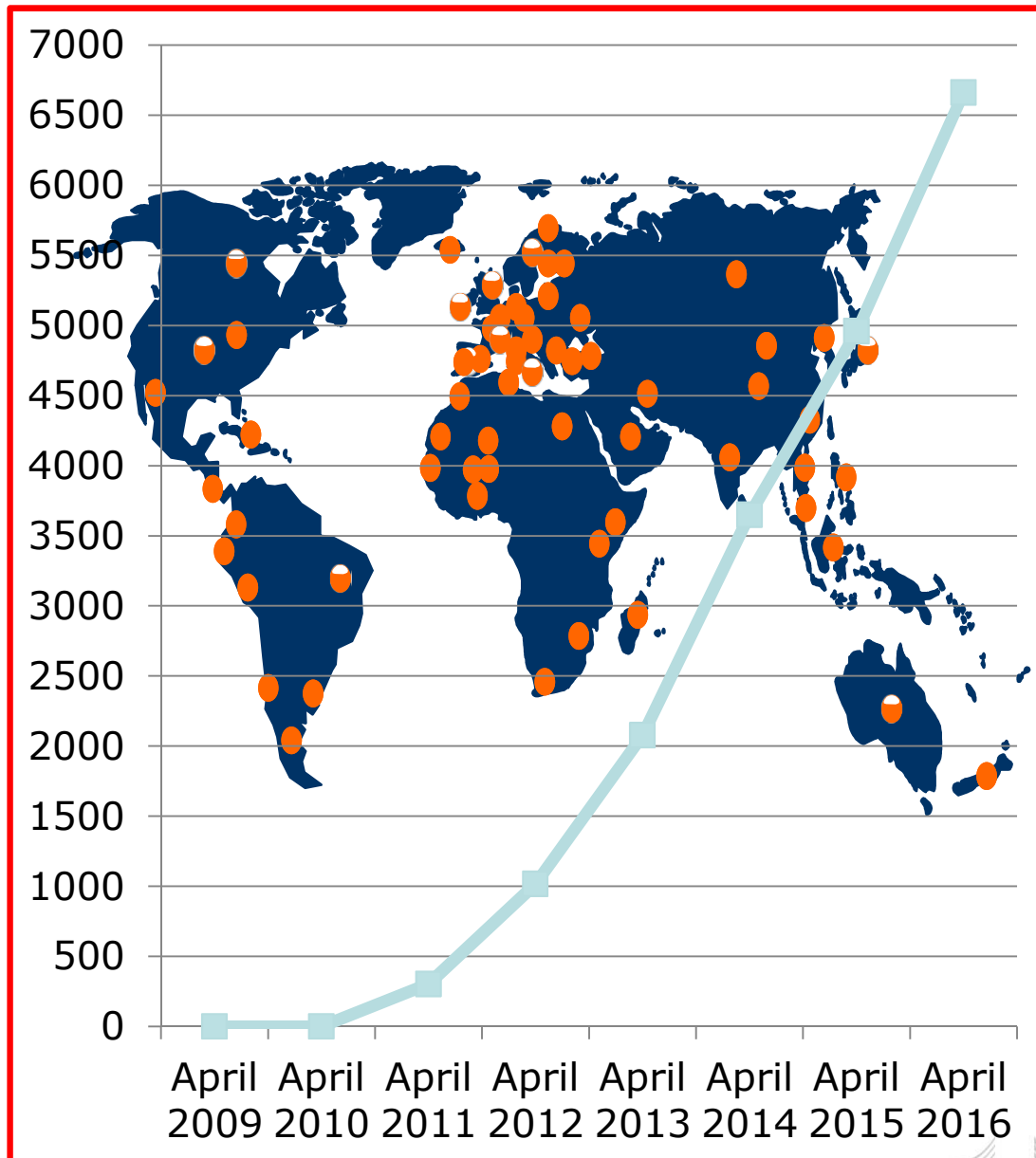


Figure 23: Sea ice area (upper panel,  $10^6$  km<sup>2</sup>) and extent (lower panel,  $10^6$  km<sup>2</sup>) in the Arctic in HR global products V2 (blue line), HR global products V3 (black line) and SSM/I observations (red line) for a one year period ending in June 2011

## (8) To many users worldwide

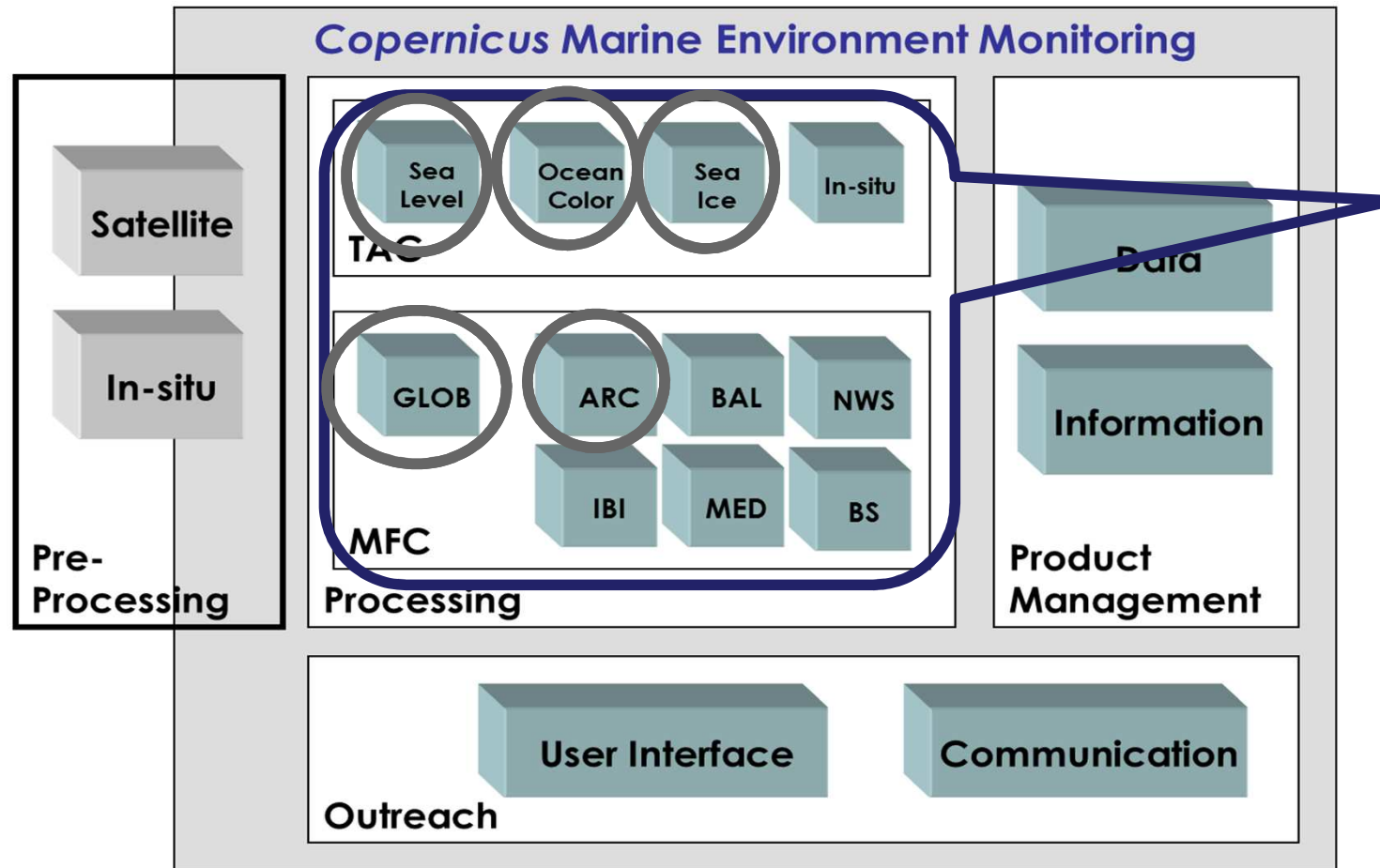


- ✓ **Close to 7000 Subscribers**
- ✓ **+120 EVERY MONTH**
- ✓ **120 COUNTRIES**
- ✓ **150 Tb disseminated worldwide per year**
- ✓ **98% availability of data**
- ✓ **4.8/5 user satisfaction metric**



# *Polar Monitoring*

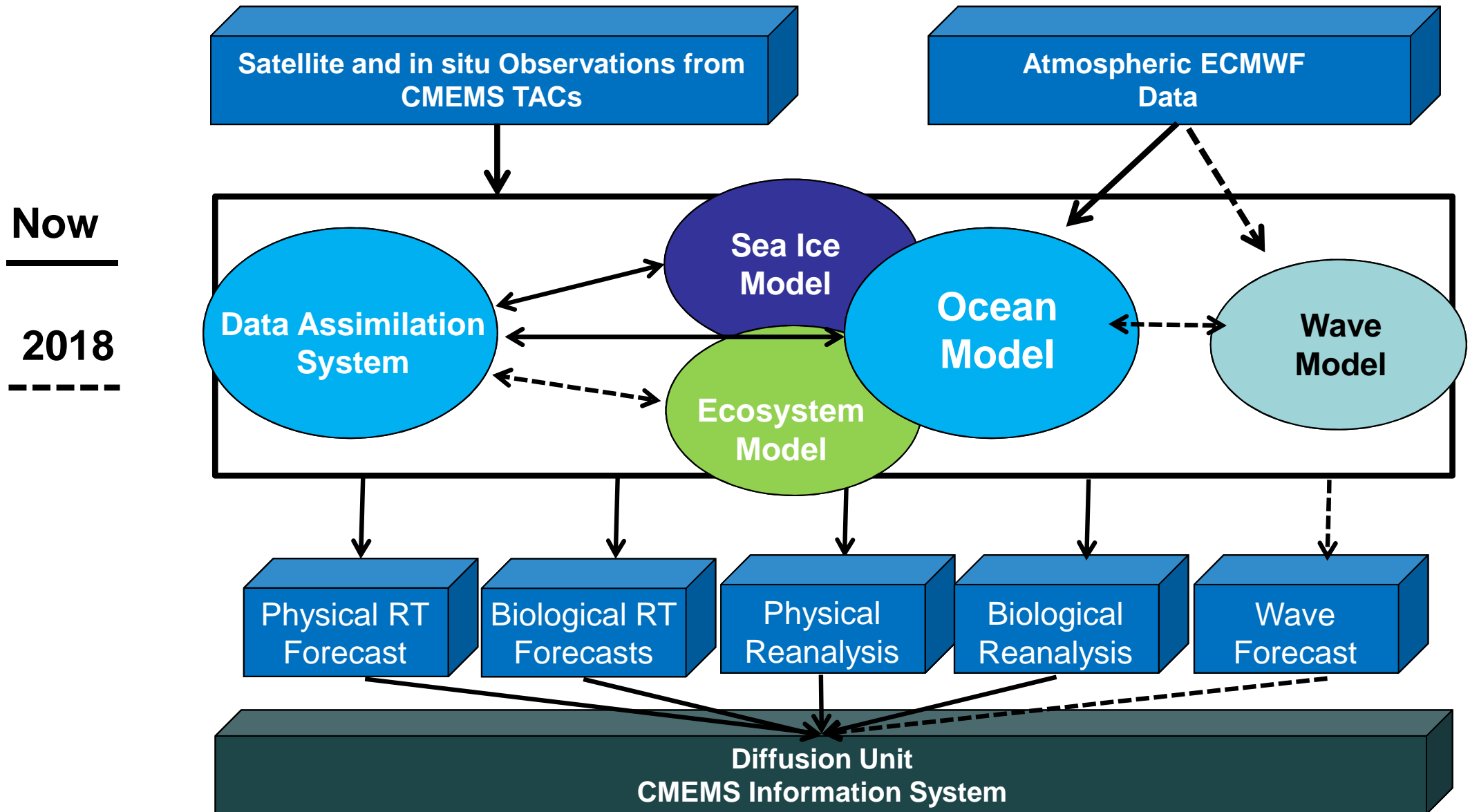
# CMEMS technical « internal » Framework: building blocks



*Polar (Sea Ice)  
Products*

**The Copernicus Marine Environment Monitoring Service (CMEMS) provides regular and systematic reference information on the physical state, variability and dynamics of the ocean and marine ecosystems for the global ocean and the European regional seas with a free open**

# Arctic and Global MFC





# Catalogue of Products

## Sea Ice



### Model products

**SEA ICE COVERAGE,  
THICKNESS, DRIFT, SURFACE  
TEMPERATURE**

Surface

NRT, Forecast and analysis

Source: 3 MFCS (Arctic, Baltic and Global)

### In Situ Observation products

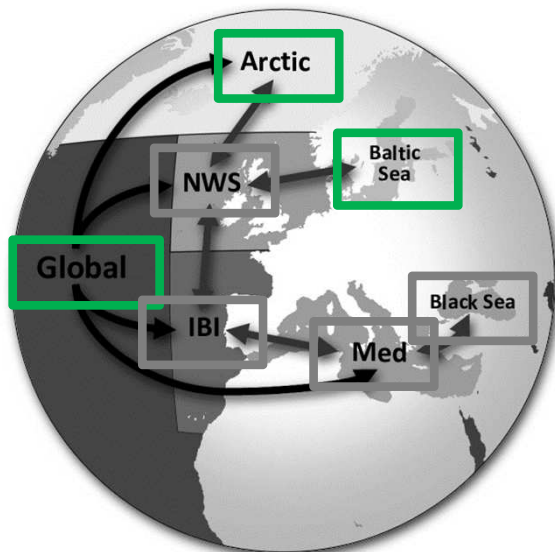
### Satellite Observation products

**SEA ICE COVERAGE, THICKNESS,  
DRIFT, EDGE, TYPE, ICEBERG  
DENSITY**

Surface

NRT and Reprocessing

Source: OSI TAC



ARCTIC-ROOS annual meeting  
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# Ice products in CMEMS

## MFC/TAC

### Sea Ice Drift

METno:ARC,ARC\_RAN;MO : GLO,GLO\_RAN ;  
UkMet : GLO\_CPL,GLO\_RAN; CMCC:  
GLO\_RAN; LGGE :GLO\_RAN; CERSAT : ARC ;  
FMI: BAL; METno : ARC & ANT ; DTU : ARC  
&ANT

### Sea Ice Thickness

METno:ARC,ARC\_RAN;SMHI:BAL,BAL\_RAN;D  
MI: BAL\_RAN ; MO: GLO, GLO\_RAN ; UkMmet  
: GLO\_CPL,GLO\_RAN; CMCC : GLO\_RAN ;  
LGGE: GLO\_RAN; FMI : BAL+SAR; METno :  
GLO

### Snow Thickness

METno : ARC, ARC\_RAN  
LGGE : GLO\_RAN

### Sea Ice Concentration

METno : ARC,ARC\_RAN ; MO: GLO,GLO\_RAN ;  
UKMet : GLO\_CPL,GLO\_RAN ; CMCC :  
GLO\_RAN ; DMI : BAL,BAL\_RAN ; LGGE :  
GLO\_RAN ; Metno : ARC, GLO ; DMI : ARC ;  
FMI : ARC; DMI : SST\_BAL; MEF : SST\_EUR  
; UKMet : SST\_GLO

### Sea Ice Edge

Metno : ANT,GLO

### Sea ice albedo

METno : ARC

### Sea Ice Type

METno :GLO

### Density of icebergs

DMI : ARC

### Ice surface temperature

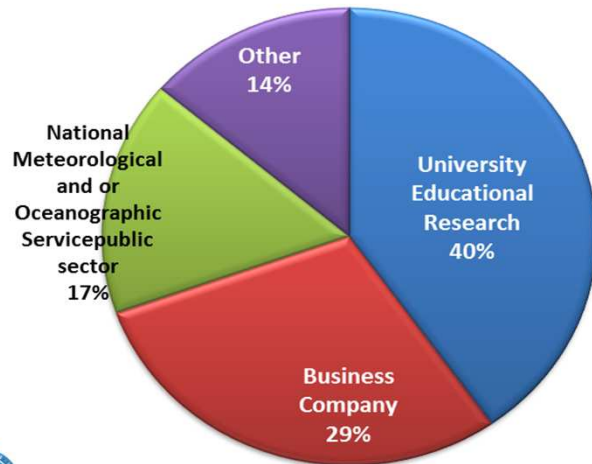
DMI : ARC

See catalog : <http://marine.copernicus.eu/web/69-interactive-catalogue.php>

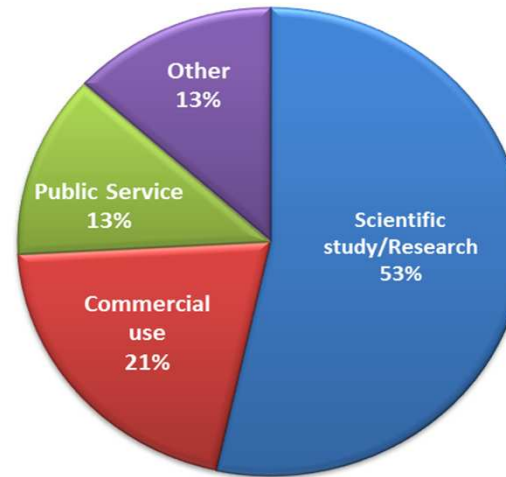
# ARCTIC\_ANALYSIS\_FORECAST\_PHYS Users



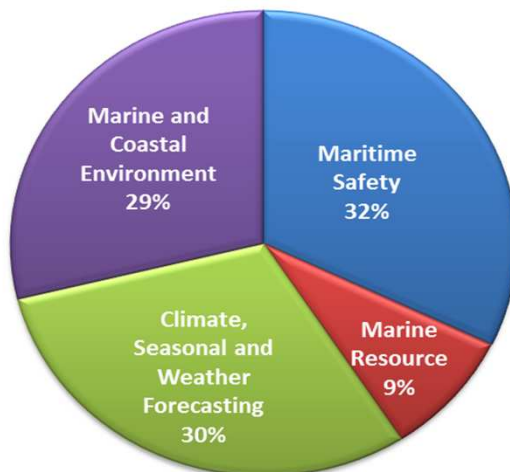
ARCTIC\_ANALYSIS\_FORECAST\_PHYS Users  
Type of Organisation



ARCTIC\_ANALYSIS\_FORECAST\_PHYS Users  
Use of data



ARCTIC\_ANALYSIS\_FORECAST\_PHYS Users  
Areas of Benefits



**198 distincts Users**  
**3,7 Tb downloaded**

22-23 Nov 2016 Svalbard

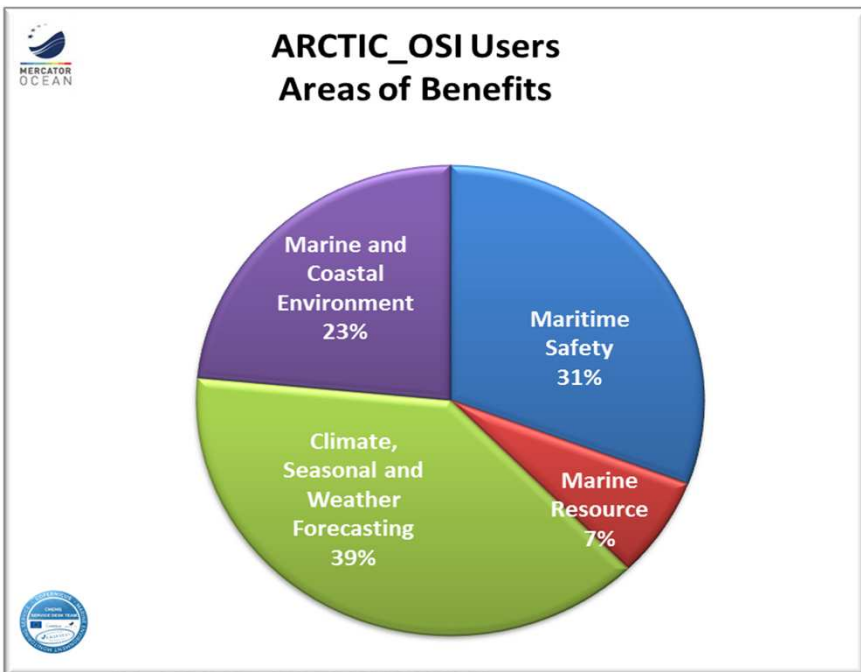
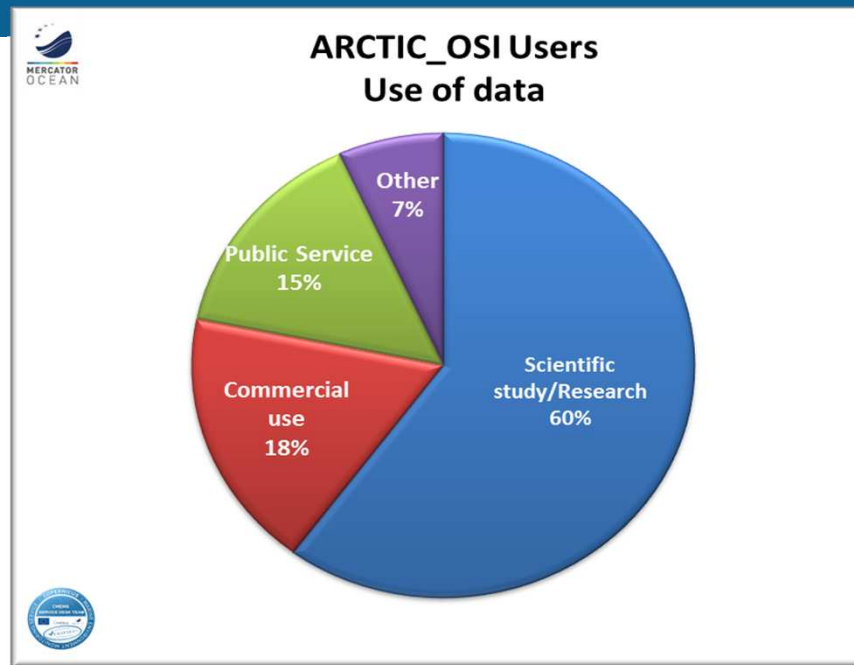
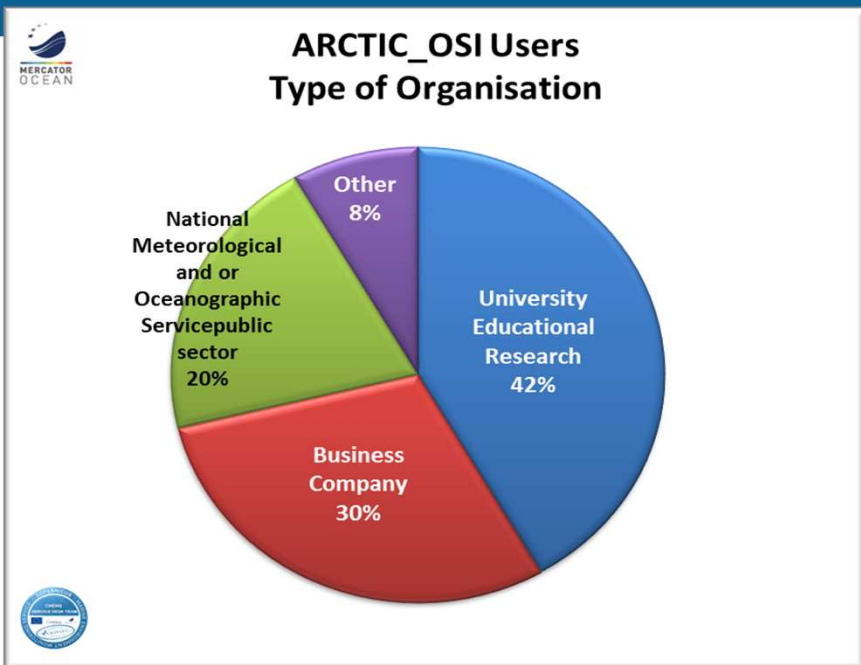


European Commission





# ARCTIC\_OSI DATA Users



**153 distincts Users  
1,5 Tb downloaded**



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