Integration of Sentinel-3 data In CMEMS

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The Bright Side of Remote Sensing
Brussels, 25 October 2016

European Commission

Copernicus
Europe's eyes on Earth

Implemented by

MERCATOR OCEAN

| Oct. 2005 | Apr. 2009 | Apr. 2012 | May. 2015 |

CMEMS

- The formative Workshop held in Brussels on **October 2005** led to the acceptance of the Marine Core Service as a GMES Fast Track.

- MYOCEAN Project, with its 61 partners from 29 countries, was launched on **April 2009** by a 'European ceremony' which brought together all 'Marine' actors in Toulouse.

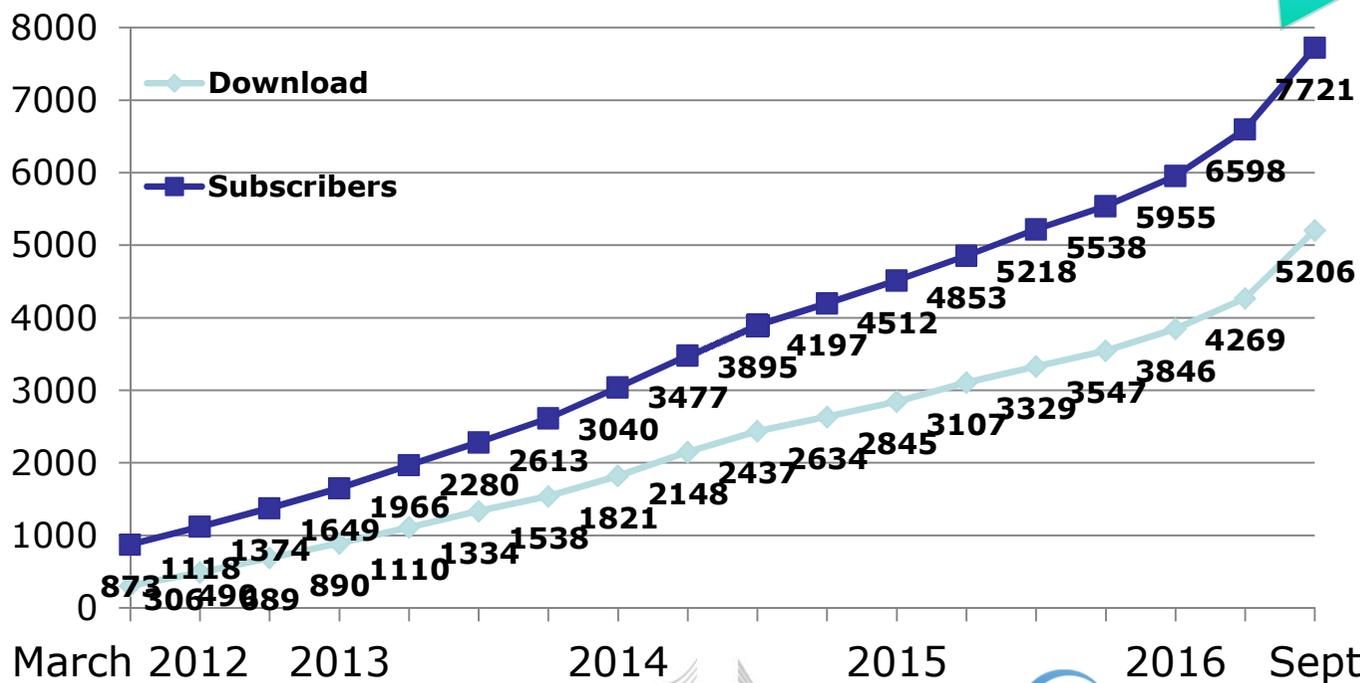- **May 2015**: CMEMS service starts for users.

7000 + Subscriber

120 + countries

247 Tb Disseminated

1650 organizations

31 M Transactions

4.8/5 user satisfaction metric

Outline

- **The CMEMS**

- **Satellite data**

- **Sentinel-3 in CMEMS**

- **Outlook**

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The CMEMS

Drivers

- **Support a sustainable ocean and blue growth**

  Coastal Environment, Marine policies and public information, Marine operation and Safety, Marine Pollution, Research, Climate, New Services.

- **Provide pioneering solutions**

  Operational and scientifically assessed, Worldwide and European-wide coverage, long-term sustainability, thousands of users.

- **Provide Open and easy access to marine data**

  Open and free data policy, network of producers throughout Europe, Modular organization, Common standards, Single point of access.
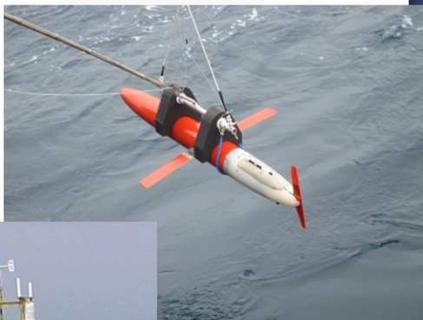
Implementation

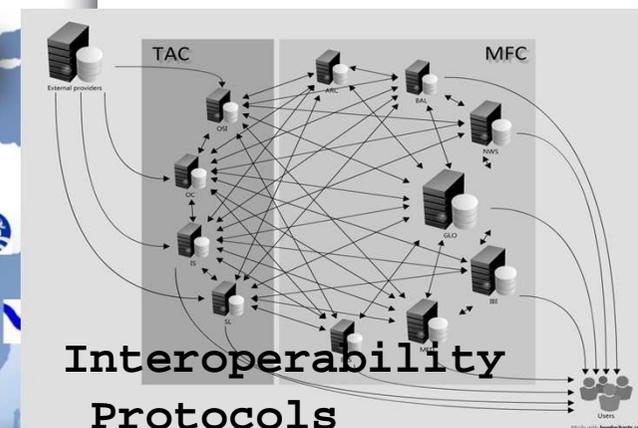**A pan-European distributed platform for securing production & service**
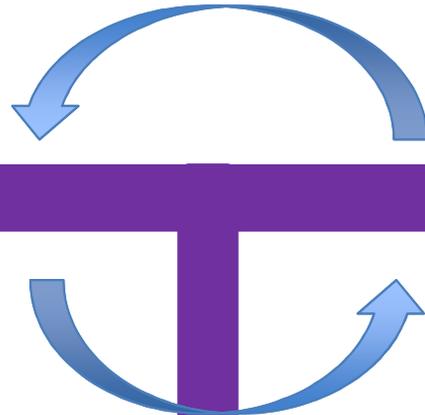

Space data

In-situ data

Computing

Interoperability Protocols
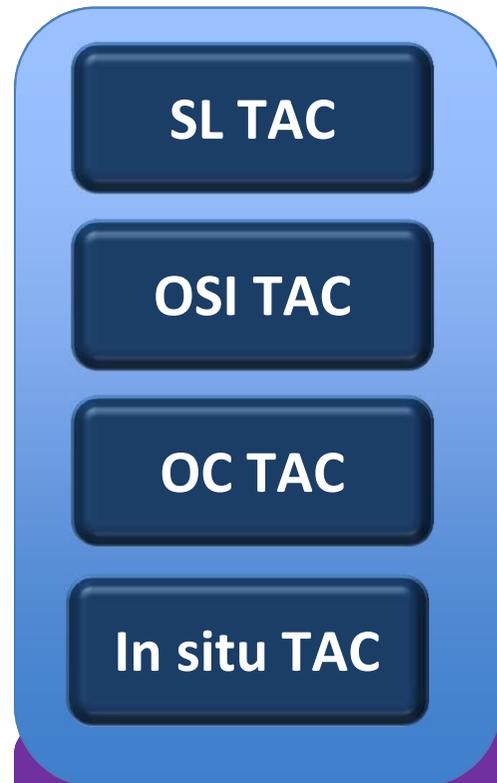
The CMEMS

Architecture

Thematic Assembly Centers (Observations)

- SL TAC
- OSI TAC
- OC TAC
- In situ TAC

Monitoring & Forecast Centers (Models)

- Global MFC
- Artic MFC
- Baltic MFC
- NWS MFC
- IBI MFC
- MED MFC
- BS MFC

Central Information System (CIS)

Service Desk

Web Portal

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

The CMEMS

Products:

6 ESSENTIAL OCEAN VARIABLES

SEA LEVEL	SEA WIND WAVES	TEMPERATURE SALINITY
CURRENTS	SEA ICE	BIOGEO CHEMISTRY

Reanalysis 10 to 45 years   **Real-Time Daily Hourly**   **Forecast 2 to 10 days** → **160 Products**

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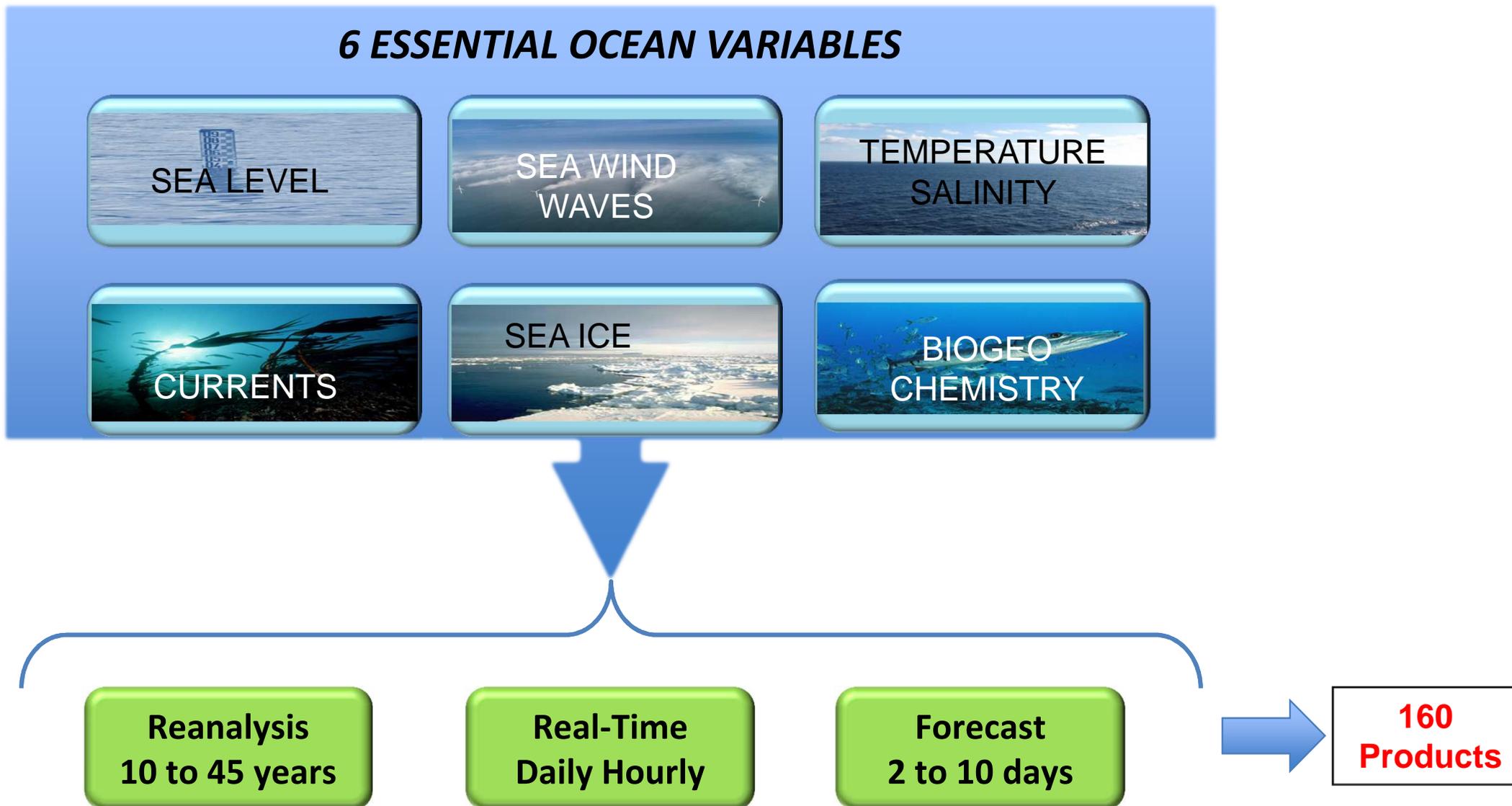
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Dependency on satellite observations: some figures

★**93% of products** in the catalogue depend on at least one satellite sensor

★The service uses data from more than **45 different Satellites** (past and present missions).
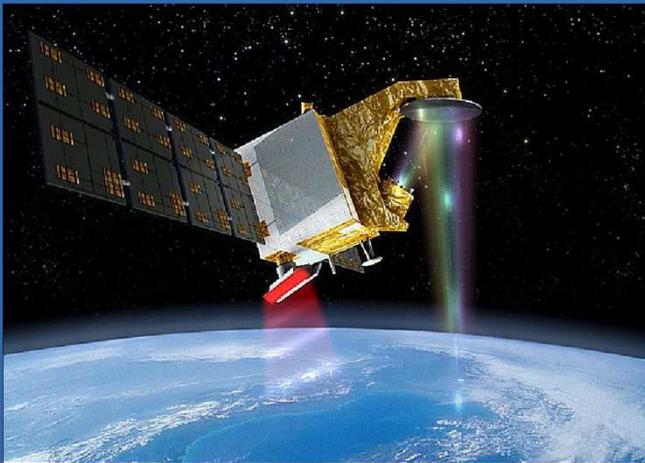
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Current European Missions

Mission		Estimated Ocean Variable
Sentinel 1 A/B		Sea-Ice
Sentinel 3		SLA ; Ocean Color; SST
Metop A/B		Ocean Winds; SST; Sea-Ice
MSG		SST; Sea-Ice
Jason 2/3		SLA;
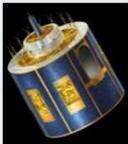
Current Non-European Missions

Mission		Country	Estimated Ocean Variable
ACQUA		USA	Ocean Color, SST, Sea-Ice
SUOMI NPP		USA	Ocean color, SST, Sea-Ice
HY-2A		China	SLA
DMSP		U.S.A	SST, Sea-Ice
SARAL		India/France	SLA
GCOM-W		Japan	SST, Sea-Ice

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Future Missions

CFOSAT (2018)
2D Ocean Spectrum Wind Field

SWOT (2020)
Wide-Swath Altimetry
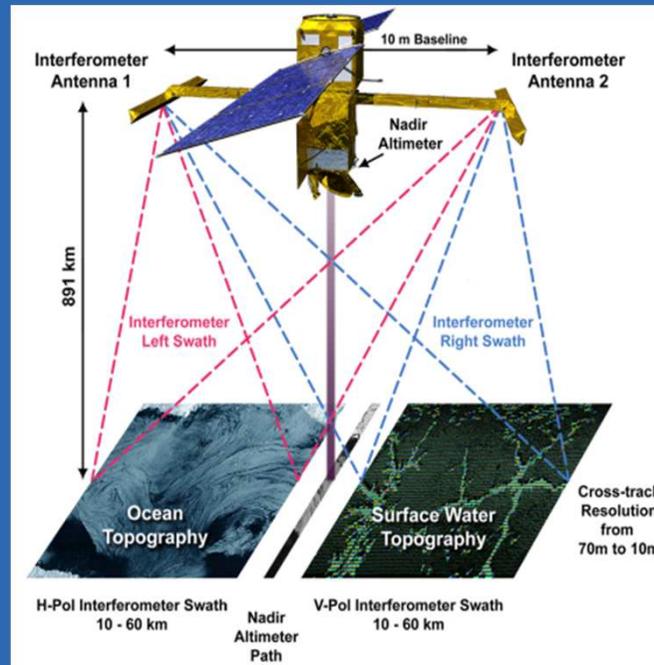
Sentinel-6 (2020)
High-precision Sea level

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The role of sentinel-3 in CMEMS

★ *In the Copernicus Marine product portfolio,* *75% will depend on Sentinel-3*

SENSOR	→	OCEAN VARIABLES
SRAL	→	SLA, SWH
SLSTR	→	SST, SEA-ICE
OLCI	→	OCEAN COLOR

The role of sentinel-3 in CMEMS

SRAL

L3 SLA
(Mono-mission along track surface height with respect to a 20 years mean)
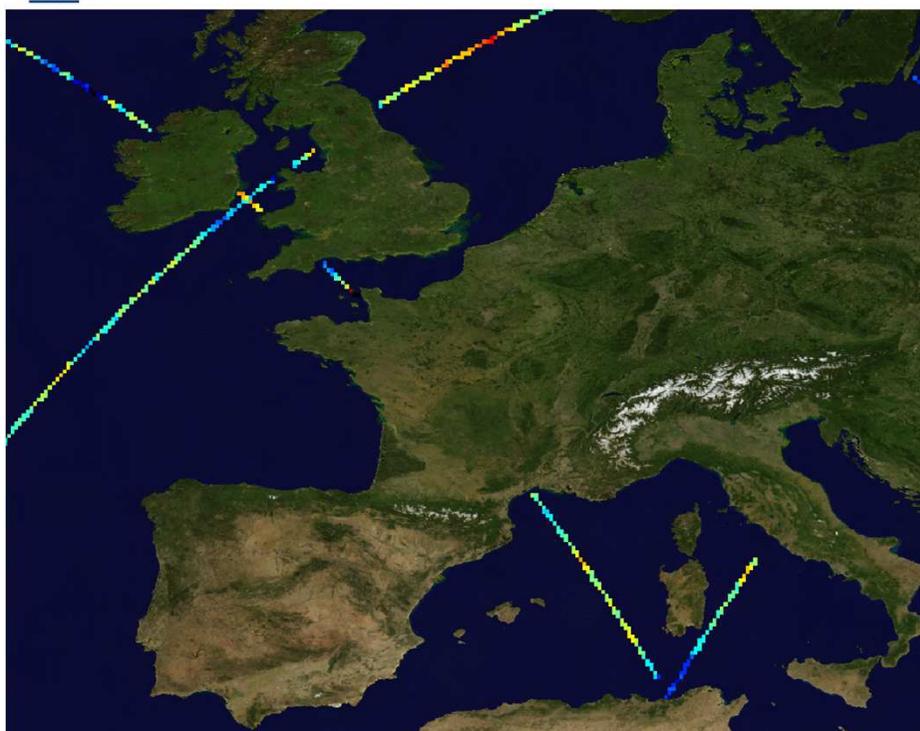
L4 SLA
(Interpolated Multi-mission along track surface height with respect to a 20 years mean)

The role of sentinel-3 in CMEMS

![SRAL logo]
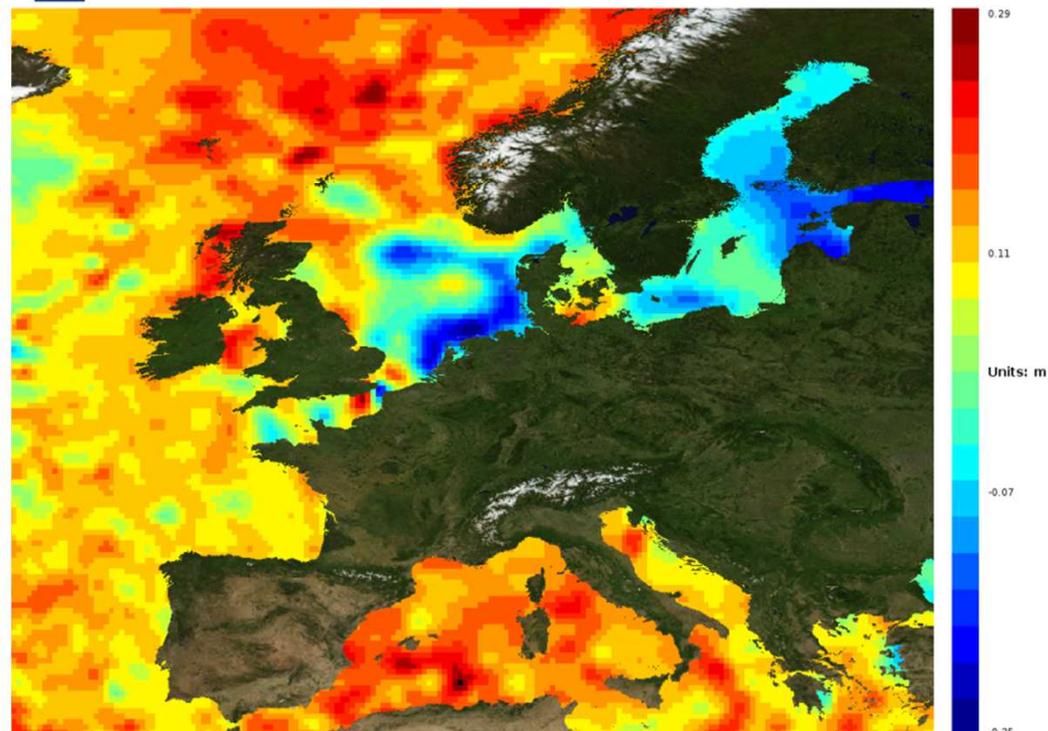
New products

➢ **Global Sentinel-3A L3 products NRT/DT**

➢ **Regional Sentinel-3A L3 products NRT/DT (med, black Sea, Europe, Arctic)**

Improved products

➢ **All Global and Regional L3 products NRT/DT for J3, J2N, C2, AL, H2 (DT only)**

➢ **All Global and Regional L4 products NRT/DT**

Example of a 2 *sat configuration* SLA gridded map for (22-04-2016) (Unit in cm)

   Preliminary QC results confirm the excellent CalVal metrics. After more in-depth quality assessment, Sentinel-3 together with Jason-3 will soon be able to ensure the continuity of CMEMS Sea Level products

J2/S3a
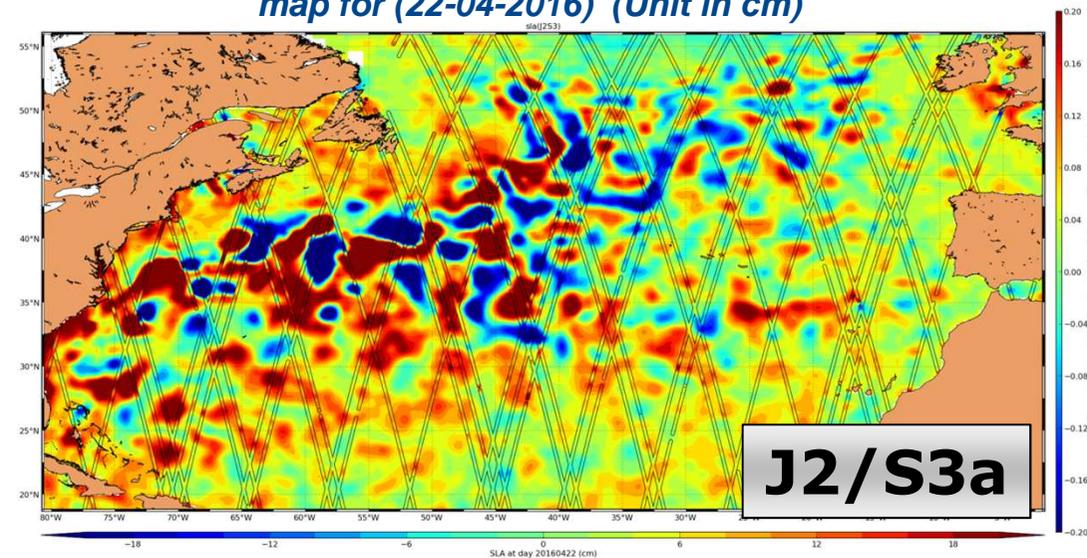
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SLSTR

L4 SST
(Interpolated Multi-mission
sea surface Temperature)

L3 SST
(Multi-mission
sea surface temperature)
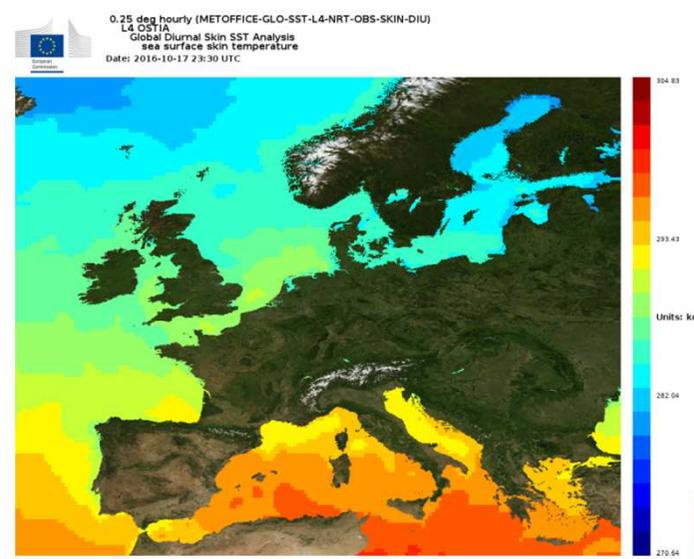
L4 Sea-Ice
(Interpolated Multi-mission
sea ice coverage)
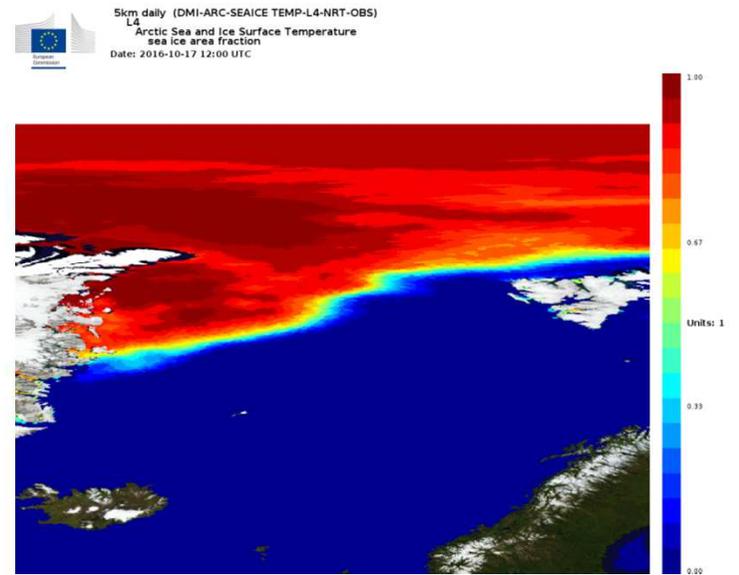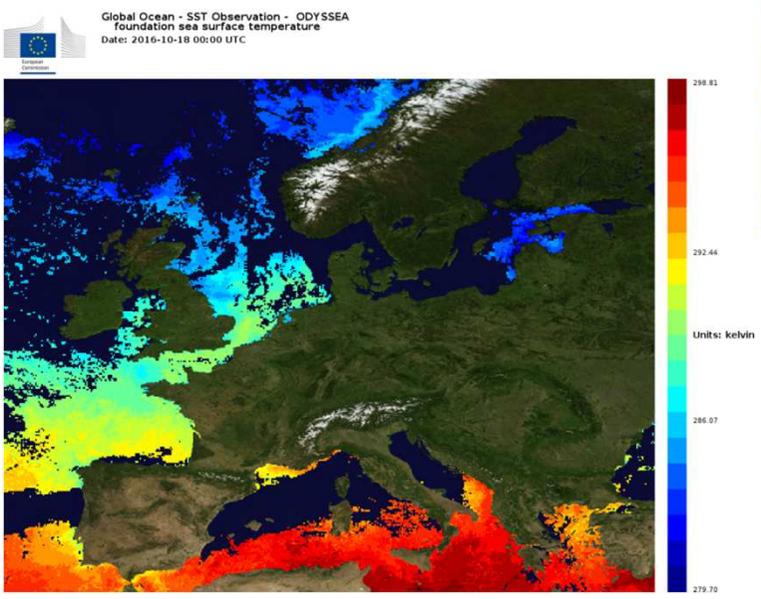
The role of sentinel-3 in CMEMS

SLSTR

New products

➤**New Arctic hi-res ice concentration and edge product**

   ➤**Multi-sensor approach: S-1 SAR + SLSTR and optical/IR**

Improved products

➤**Integration of SLSTR data in all SST near-real-time products**

   ➤**Integration in 14 CMEMS SST products – L3 and L4, global and regional.**

Impact of S-3 SLSTR is expected to be at least as positive as Envisat AATSR.

OSTIA validation against ARGO March 2012, using in situ data with and w/o AATSR as reference data sets for bias correction.

	Argo observation-minus-analysis standard deviation error (K)	
	In-situ only	+ AATSR
Global	0.53	0.47
North Atlantic	0.67	0.62
Tropical Atlantic	0.34	0.27
South Atlantic	0.47	0.37
North Pacific	0.40	0.32
Tropical Pacific	0.40	0.29
South Pacific	0.54	0.50
Indian Ocean	0.41	0.28
Southern Ocean	0.60	0.56

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OLCI

L3 Chl & RRS
(Daily Mono/ Multi -mission chlorophyll and ocean optics)
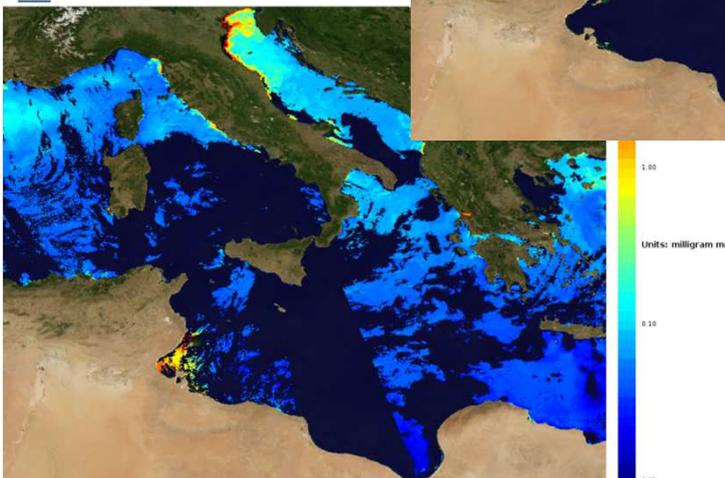
L4 Chl & RRS
(Weekly/Monthly Multi-mission interpolated chlorophyll and ocean optics)
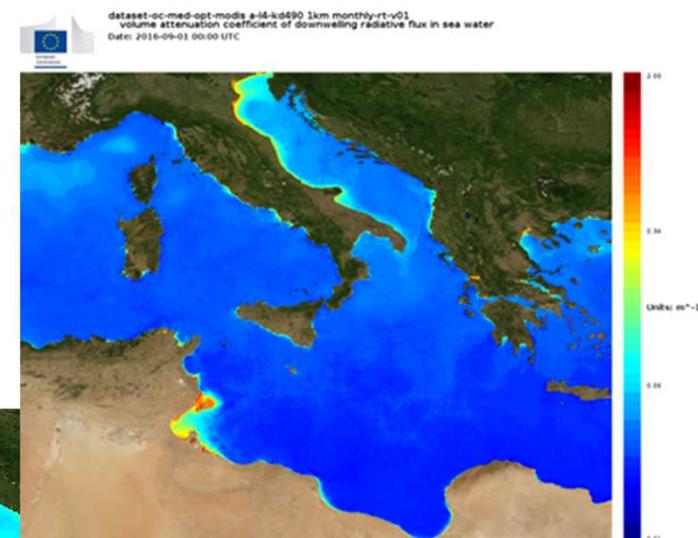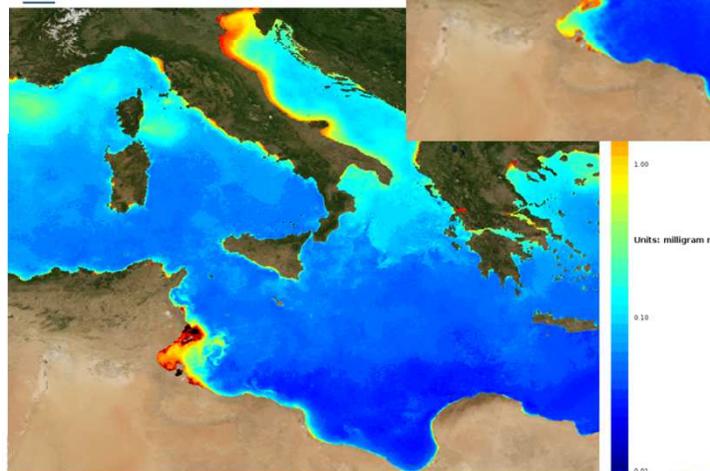
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OLCI

New products

➤**Single OLCI sensor**

　➤**Chlorophyll products daily single sensor**

　➤**RRS (limited to selected bands, with uncertainties) - TBC.**

Improved products

➤**Multi sensors including OLCI sensor:**

　➤**Chlorophyll products**

　➤**RRS (limited to selected bands, with uncertainties) - TBC**

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Outlook

Sentinel-2

★ *At the moment S2 data are used for validation of Sea-Ice products.*

★ *Sentinel-2 will serve between 5% and 10% of the CMEMS products.*
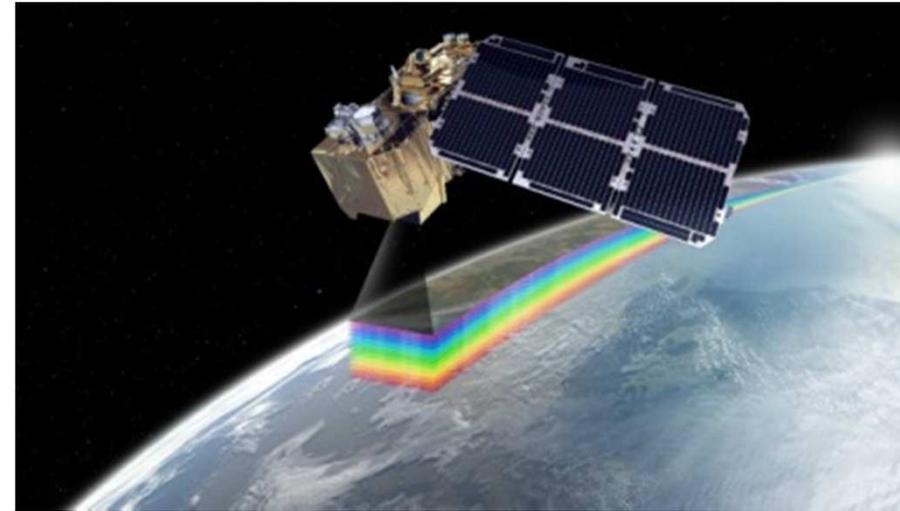
Ocean Variables
➢**Coastal water applications**   **(HR Ocean Color; Waves)**

Thanks for Your Attention!

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