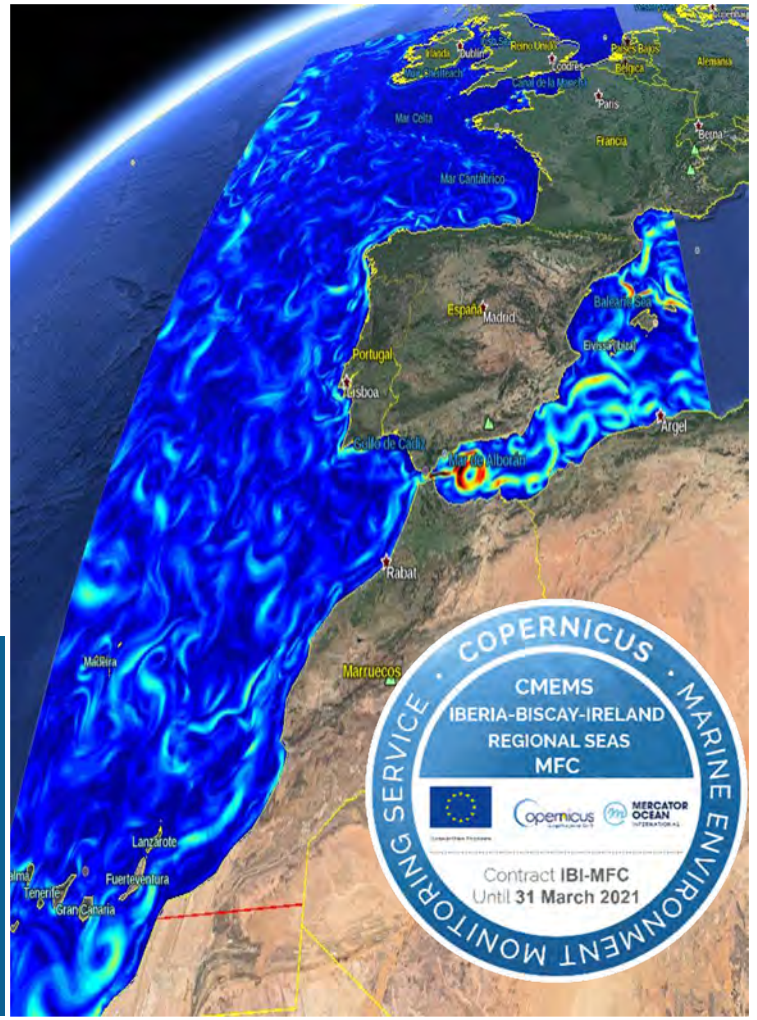
The CMEMS Ocean Indicator portfolio for the Iberian Biscay Irish (IBI) Waters:

Essential variables operationally monitored and future prospects.



A. de Pascual-Collar[1,2], B. Levier[3], M. G. Sotillo[1,3], R. Aznar[1,2], C. Toledano[1,2], L. Aouf[4], M. García-León[1,5], E. Gutknecht[3], J. V. McGovern[6], J. M. García-Valdecasas[1,2], P. Lorente[1,2], T. Dabrowski[6], A. Amo-Baladrón[1,2], K. Guihou[1,2], E. Álvarez-Fanjul[1].

(1) Puertos del Estado
(2) nologin
(3) MERCATOR OCEAN INTERNATIONAL
(4) METEO FRANCE
(5) UPC
(6) Marine Institute

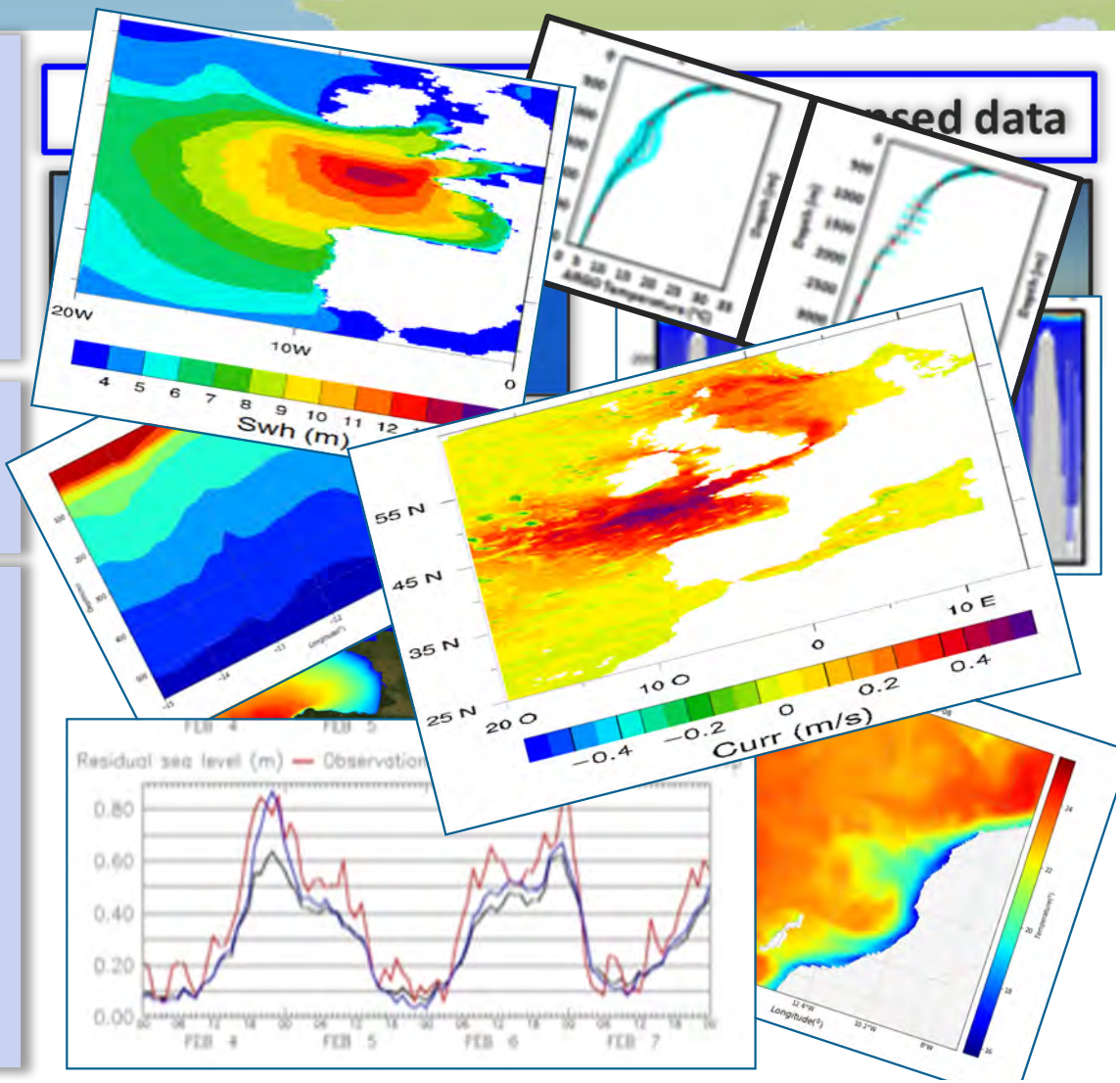
Why Ocean Monitoring Indicators?

Vast increment of oceanographic data available.

Difficulty of interpretation and blurred perception of the big picture

Ocean Monitoring Indicators (OMIs): To summarize ocean information delivering research-based data about relevant oceanographic processes.

CMEMS Ocean State Report (OSR): annual publication to provide a report of the state of the ocean for policy and decision-makers. It is also the platform where the novel OMIs are proposed, discussed, tested and validated.



CMEMS OMI product

Step 1: Scientific proposal

IBI-Team

- External expertise
- Potential users

OMI proposal:

- Definition
- Applications
- Development
- Validation
- Discussion of results

OSR coordination Peer review

OSR issue

Step 2: Transition into operations

Dev. of operational prod.:

- netCDF data
- OMI Figure
- Product User Manual (PUM)
- Quality Information Document (QUID)

CMEMS Change management

CMEMS catalogue:

- Periodic update
- Phased with IBI products

IBI OMIs & OSR along years

- **Currently:**
  - 4 IBI OMIs operational & available to users.
  - 6 IBI OMIs published in OSR.
- **Multidisciplinary:** PHY, WAV and BIO components. Collaboration with external experts.
- **Multiproduct:** Several CMEMS products from GLO-MFC, NWS-MFC, BLK-MFC, MED-MFC, In Situ TAC, and IBI-MFC.

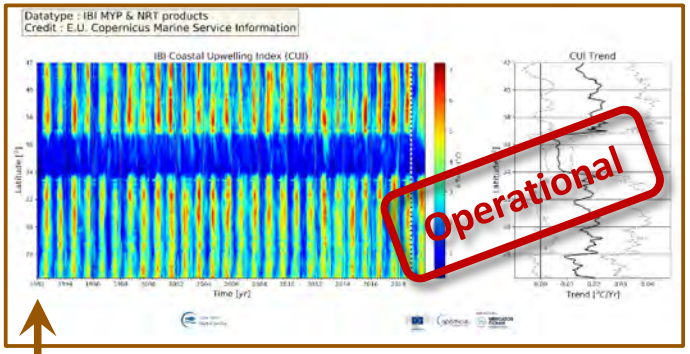
OSR#1 (2016):
Coastal Upwelling Index

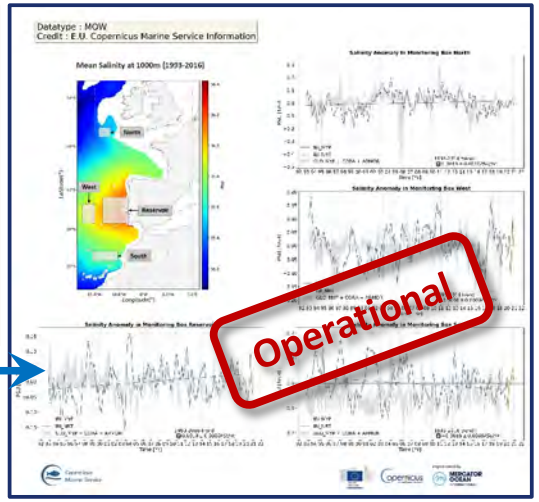
OSR#2 (2018):
Mediterranean Outflow Water

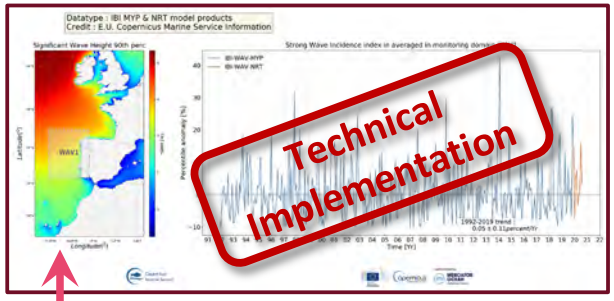
OSR#3 (2019):
- SST extreme variability
- SWH extreme variability

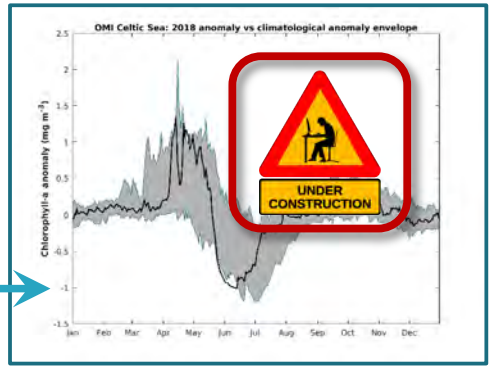
OSR#4 (2020):
Variability of stormy events

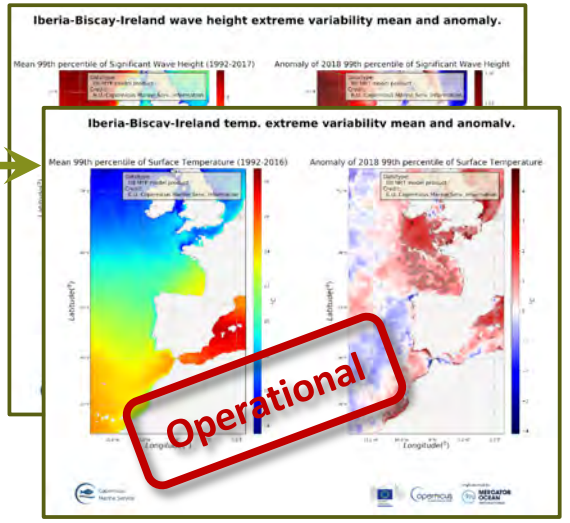
OSR#* (202*):
Median Chlorophyll Anomaly







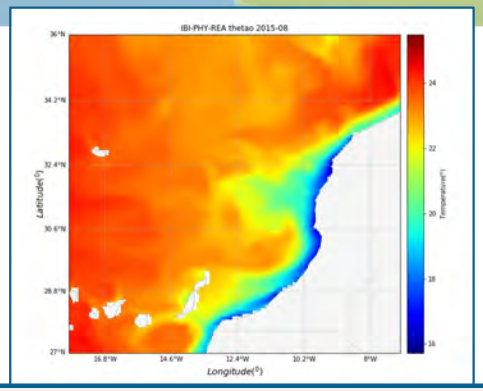


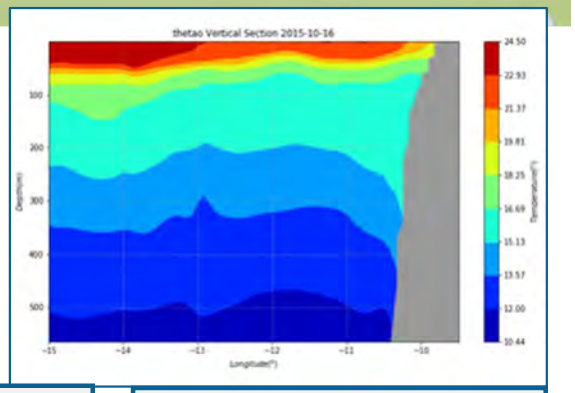


Coastal Upwelling Index

CMEMS product ID: IBI_OMI_CURRENTS_cui

Coastal Upwelling processes occurs along coastlines as the result of the deflection of oceanic water away from the shore.



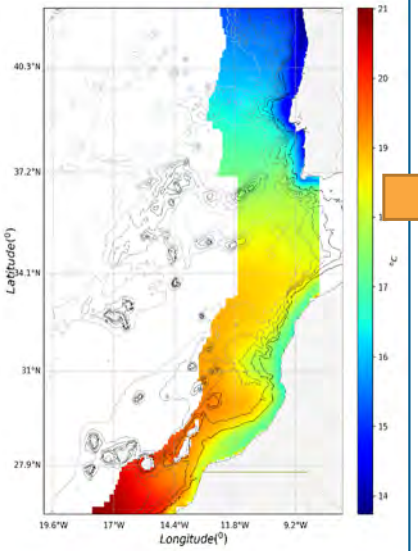


OSR#1:

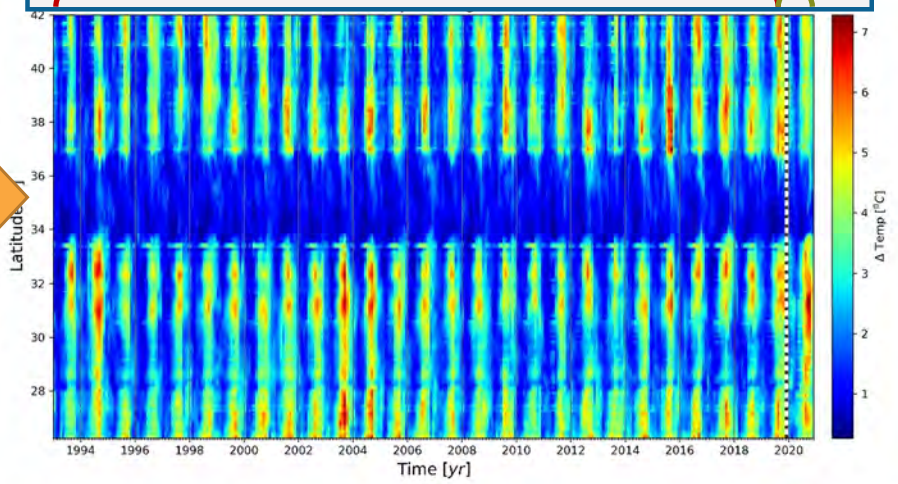
Sotillo et al., 2016

Update:
Quarterly

Masked domain including Temp. data from coast up to 3.5º westward.

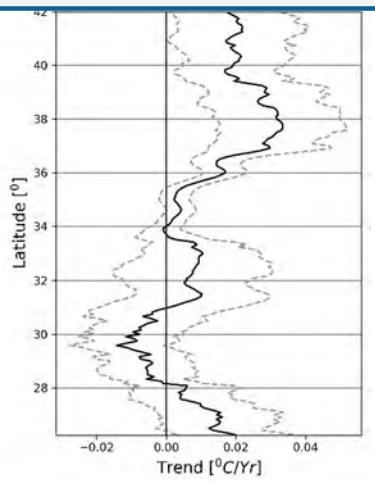


IBI-MY **IBI-NRT**



CUI = Tmax – Tmin
Computed at each latitude in the masked domain

Trend estimated zonally from IBI-MY



99% confidence interval.

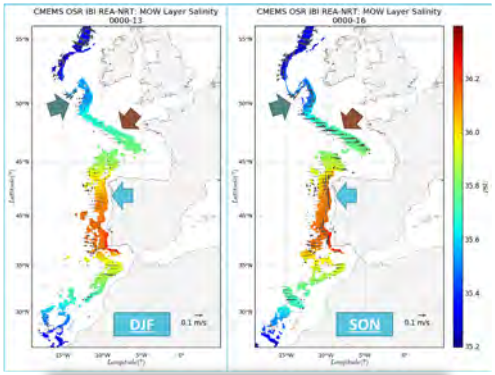
Variability of Mediterranean Outflow Water

CMEMS product ID: IBI_OMI_WMHE_mow

Mediterranean Outflow Water (MOW): Saline and warm water mass principally occupying the intermediate depths of eastern North Atlantic. Generated by the outflow of Mediterranean water through the Strait of Gibraltar.

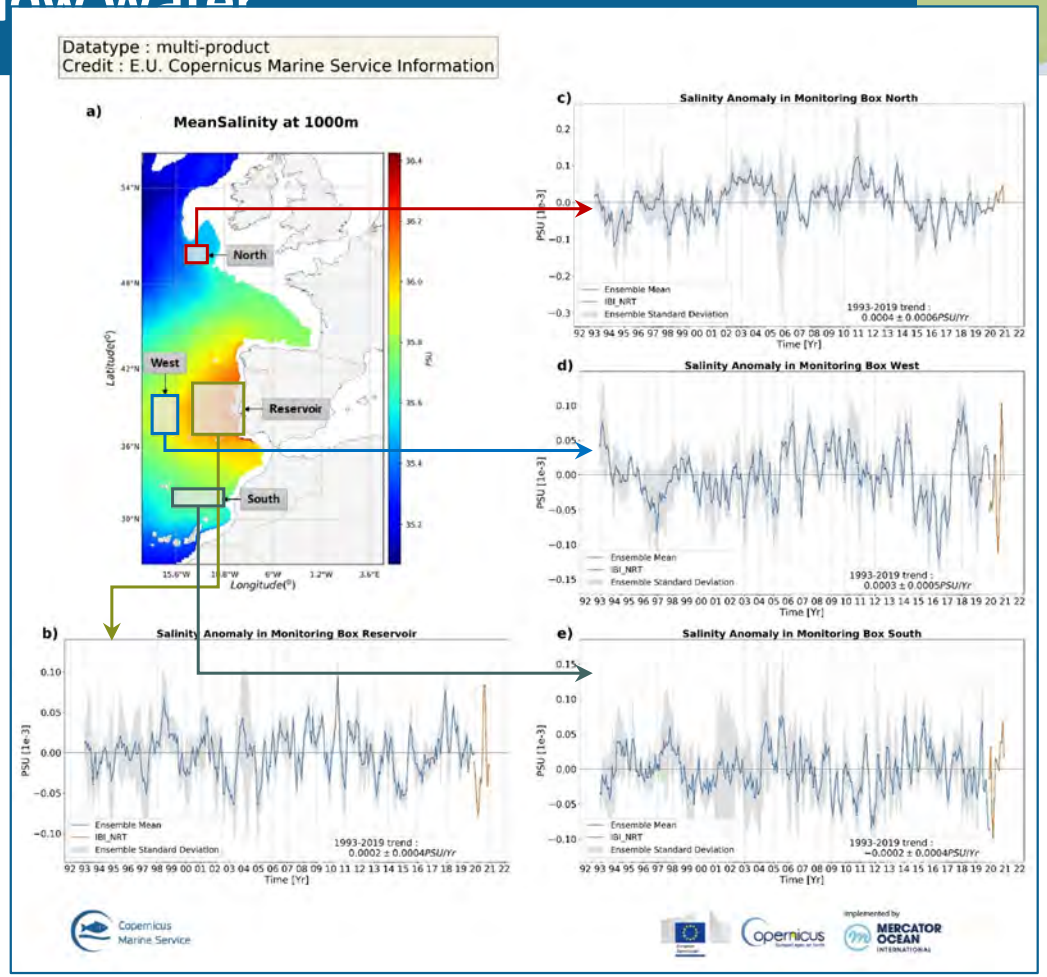
OSR#2:

Pascal et al., 2018



Ensemble product:
IBI-PHY-MY ? Model
IBI-PHY-NRT ? Model
GLO-PHY-MY ? Model
CORA ? Obs.
ARMOR3D ? Rep. obs.

Update:
Quarterly



MOW index: Defined as salinity anomaly at 1000m in each averaged in each monitoring box.

Analysis of extreme values of temperature and wave height

CMEMS product ID:

- OMI_TEMPSAL_extreme_var_temp_mean_and_anomaly
- OMI_SEASTATE_extreme_var_swh_mean and_anomaly

OSR#3:

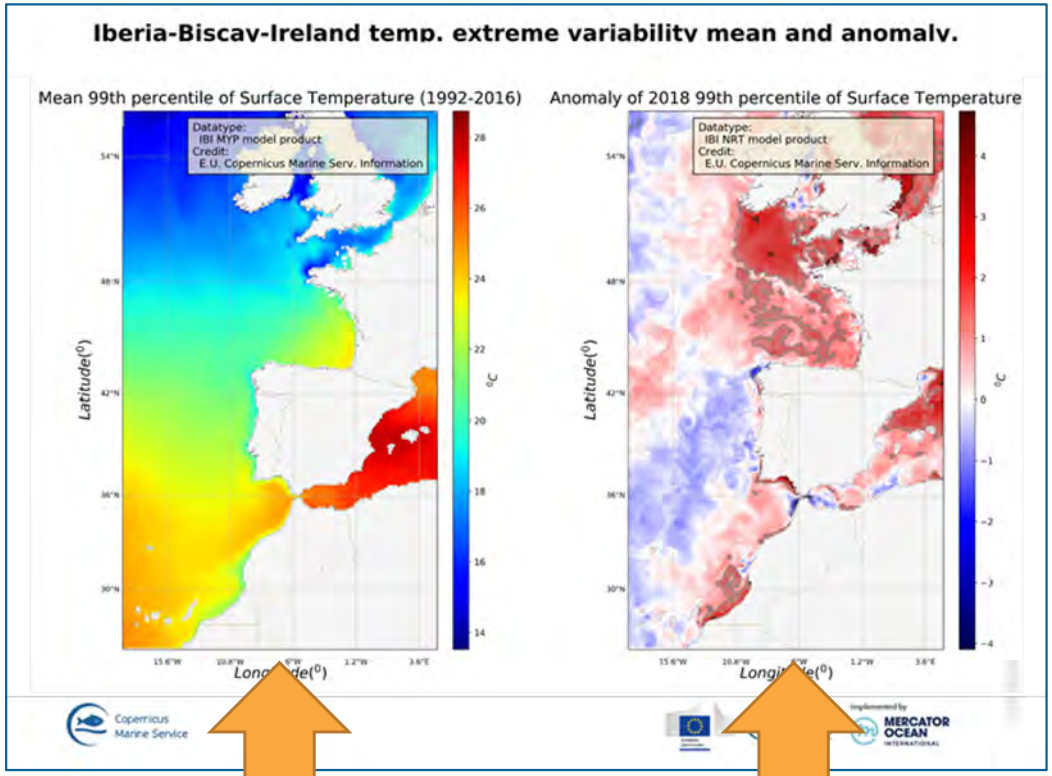
Pascual et al., 2018

Update: Annually

SST variability: IBI-PHY
SWH variability: IBI-WAV

Computed for other MFCs:

	PHY	WAV
IBI	✓	✓
MED	✓	✓
BLK	✓	✓
NWS	✓	X



Mean 99th percentile: Temporal average of 99th percentile computed on an annual basis from IBI-MY system.

Anomaly of target year: Anomaly of 99th percentile computed from IBI-NRT system and referenced to the IBI-MY mean percentile.

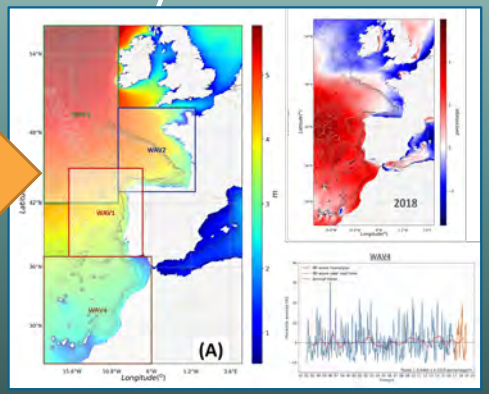
Future actions and incoming OMIs

Novel OMIs

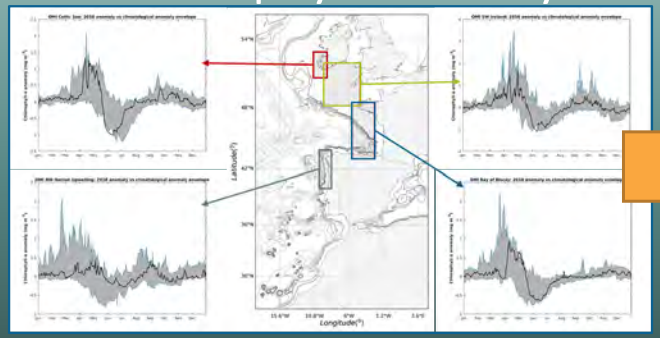
OSR#4:

Pascual et al., 2019

Stormy wave events.



Chlorophyll anomaly

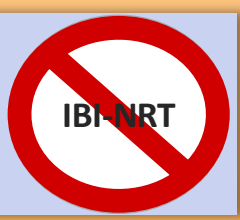


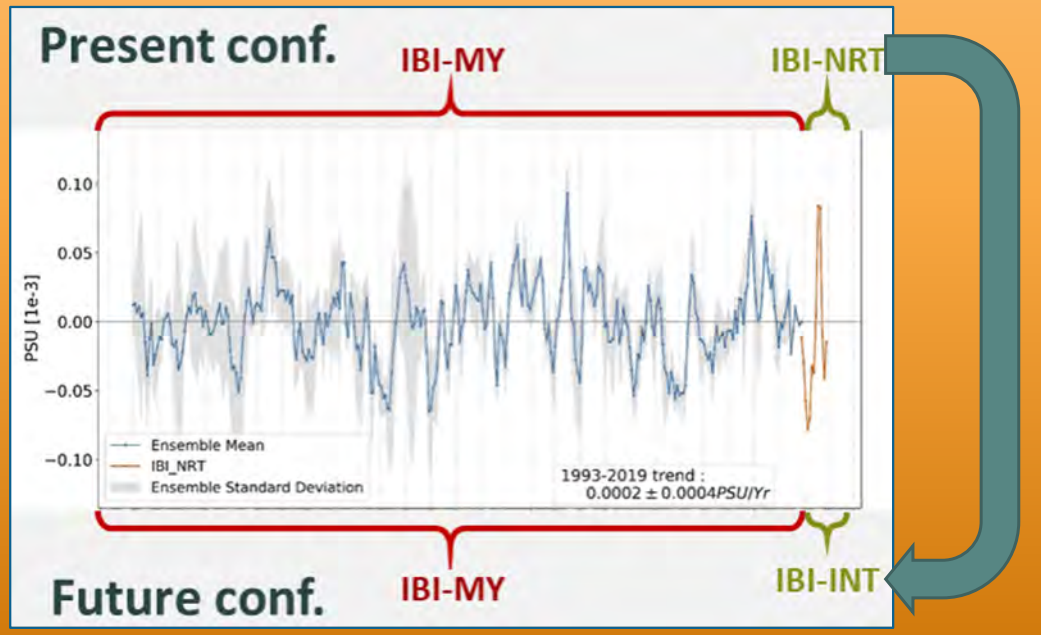
OSR#*:

Future improvements

Replacing of IBI-NRT for IBI-INTERIM:

- Avoid inhomogeneities in time series.
- Monthly update of OMI products.





Thanks for your attention!!

Marine Monitoring

European Commission | Copernicus Europe's eyes on Earth

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