

PRODUCTION CENTERS - 2023/2024 ACHIEVEMENTS

Improving the offer



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Copernicus
Marine Service



Copernicus
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COPERNICUS MARINE 8th **GENERAL ASSEMBLY**

- **Improving the offer**

Antonio Reppucci, MOI

Marina Tonani, MOI



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PROGRAMME OF
THE EUROPEAN UNION



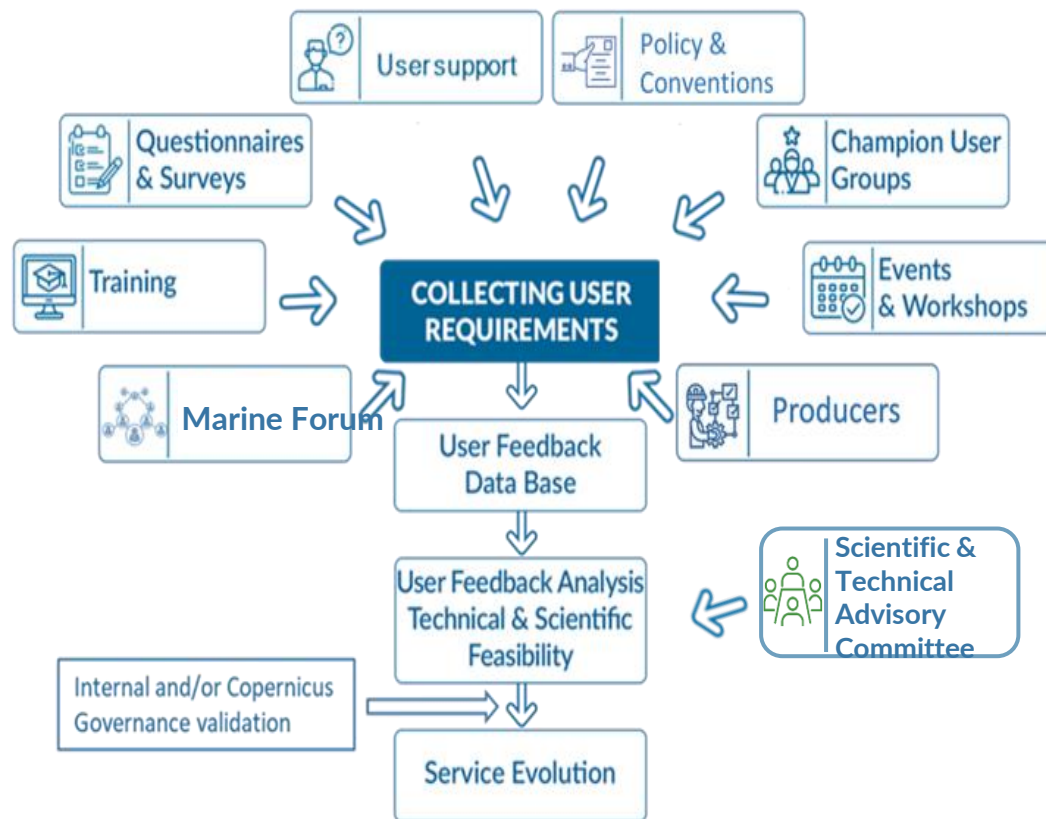
implemented by



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INTERNATIONAL

A USER AND POLICY DRIVEN SERVICE

USER FEEDBACK AND SERVICE EVOLUTION PROCESS



Translate User feedbacks into achievable service evolution objectives taking into account scientific&technological advances (observations, modelling, assimilation, AI, cloud and computing capabilities).



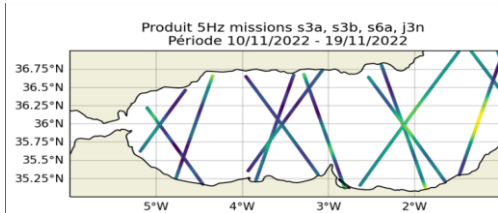
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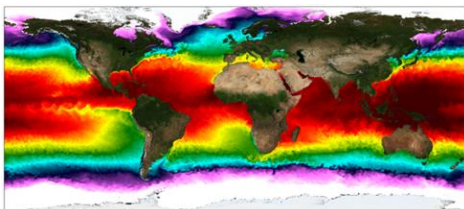
● Thematic Assembly Centres

Blue Ocean TACs Main Achievements

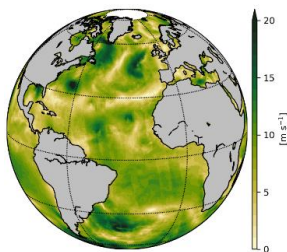
New Level-3 Sea Level products with ~1km posting rate (L3 5Hz)



New ODYSSEA Global SST



New Hourly Wind products



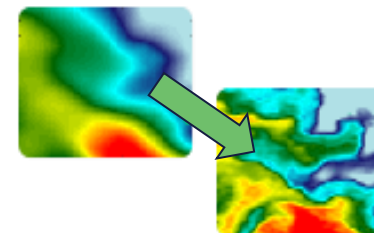
(psu)

2022

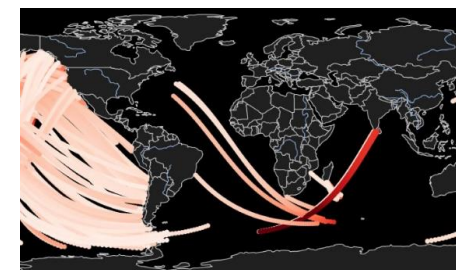
2023

2024

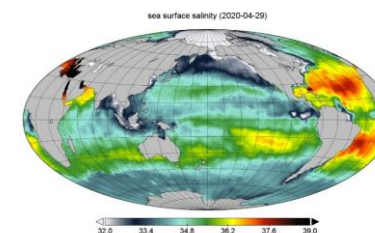
AI-based Super Resolution SST algorithms (MED/BS);



New Ocean Waves Spectra from CFOSAT

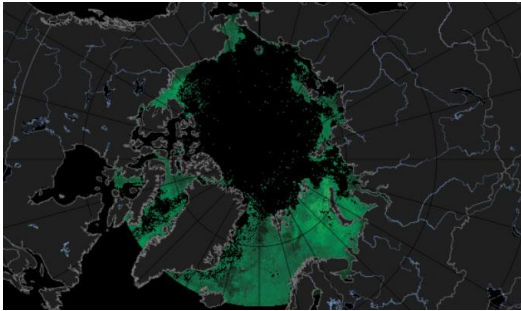


New SMOS Salinity products

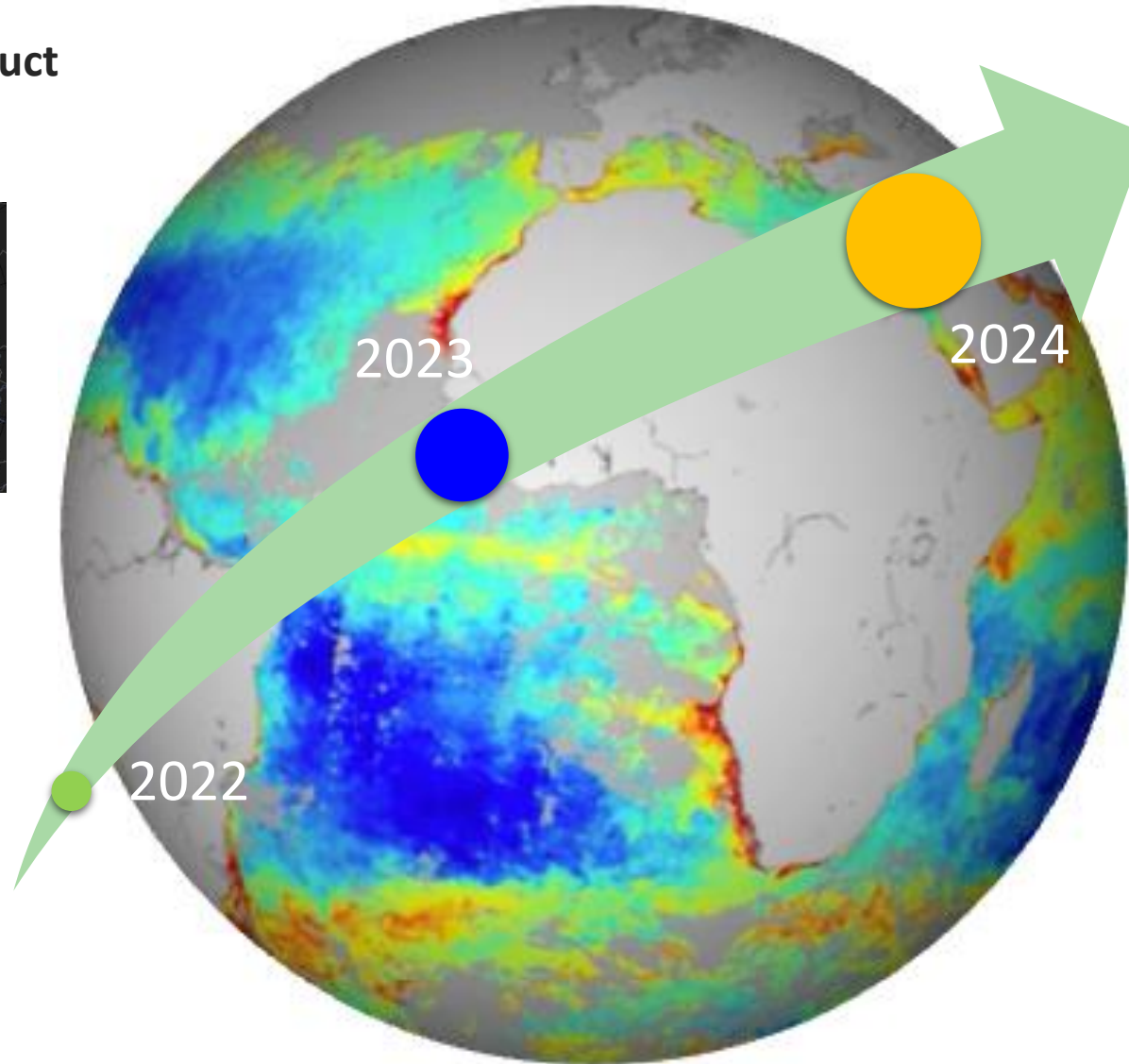
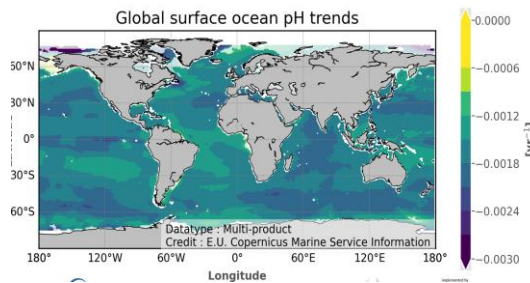


Green Ocean TACs Main Achievements

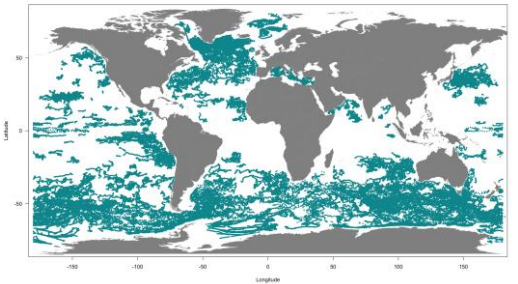
- New Arctic Ocean Colour product based on Machine Learning



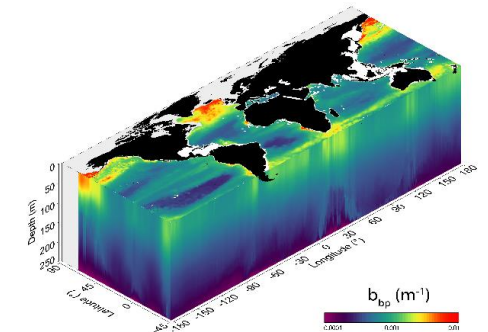
- Global map of sea water pH trend based on Machine Learning



- NRT Nutrients and associated carbonate system parameters based on Machine Learning



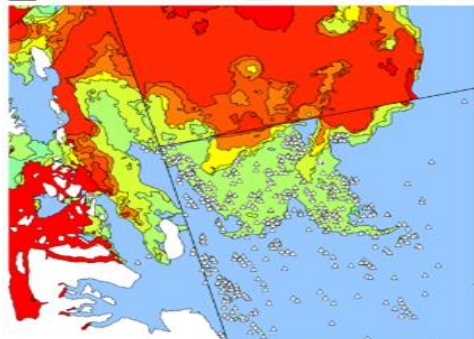
- Higher Resolution ($1/8^\circ$) 3D POC/bbp and Chla



White Ocean TACs Main Achievements

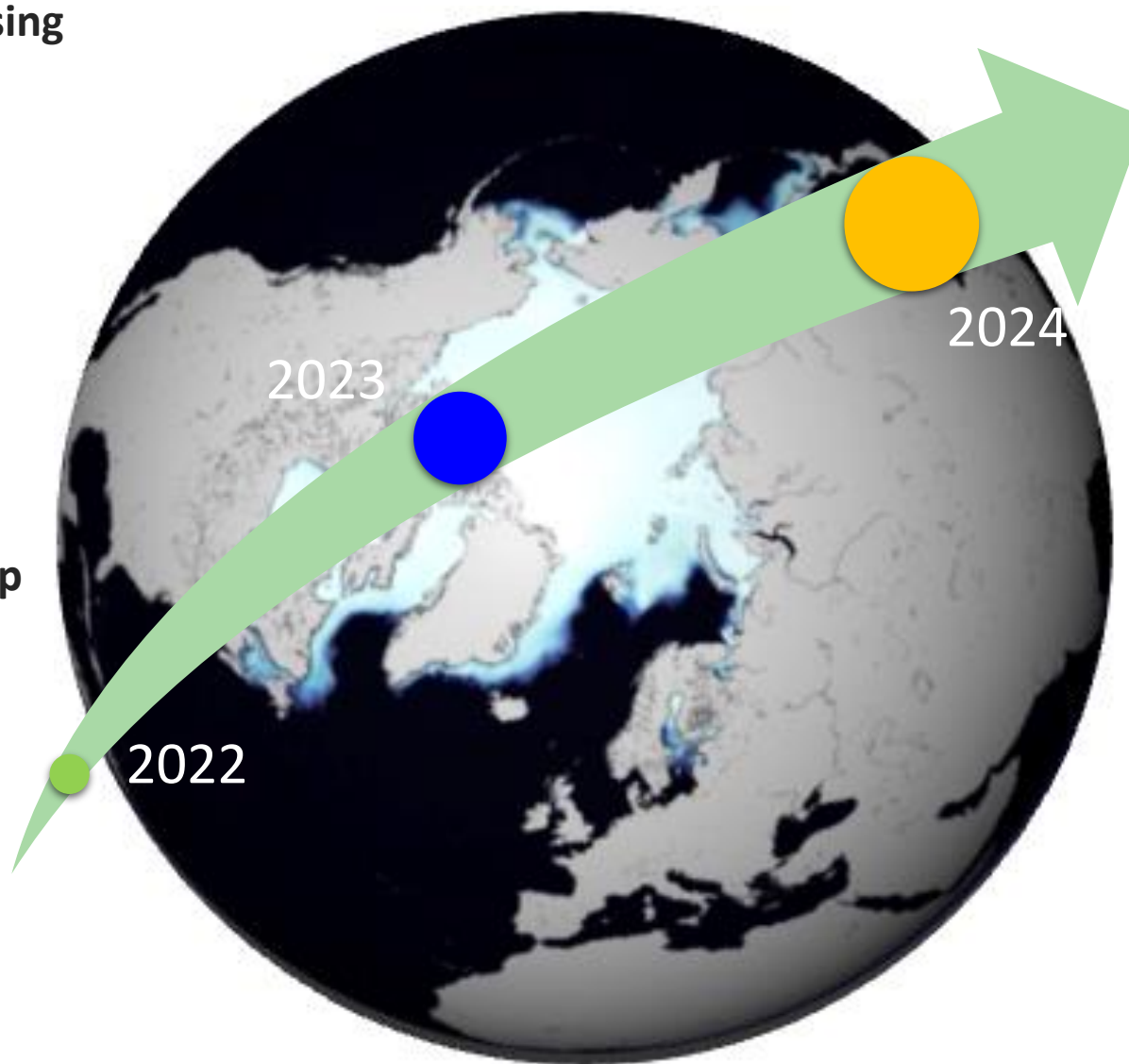
Improved Iceberg Detection using Automated Sea Ice Products

□ 2021-10-03 07:55 / △ 2021-10-03 07:55

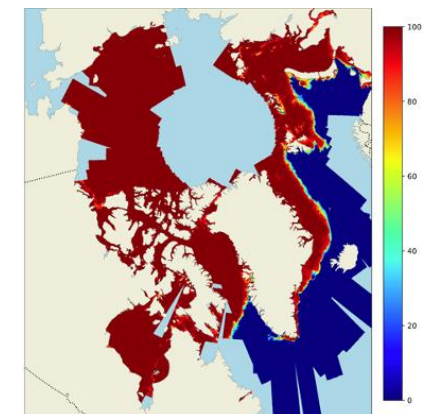


ASIP auto ice chart + icebergs

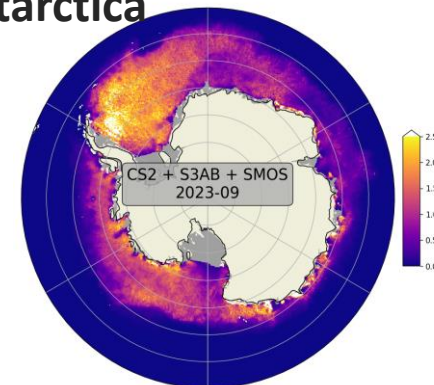
High resolution Sea Ice Concentration based on Deep Learning model



Pan-Arctic sea ice products based on Deep Learning model

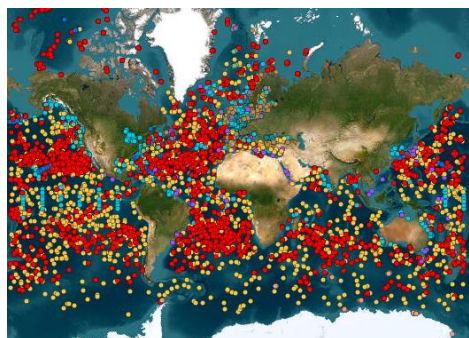


Sea Ice Thickness in Antarctica

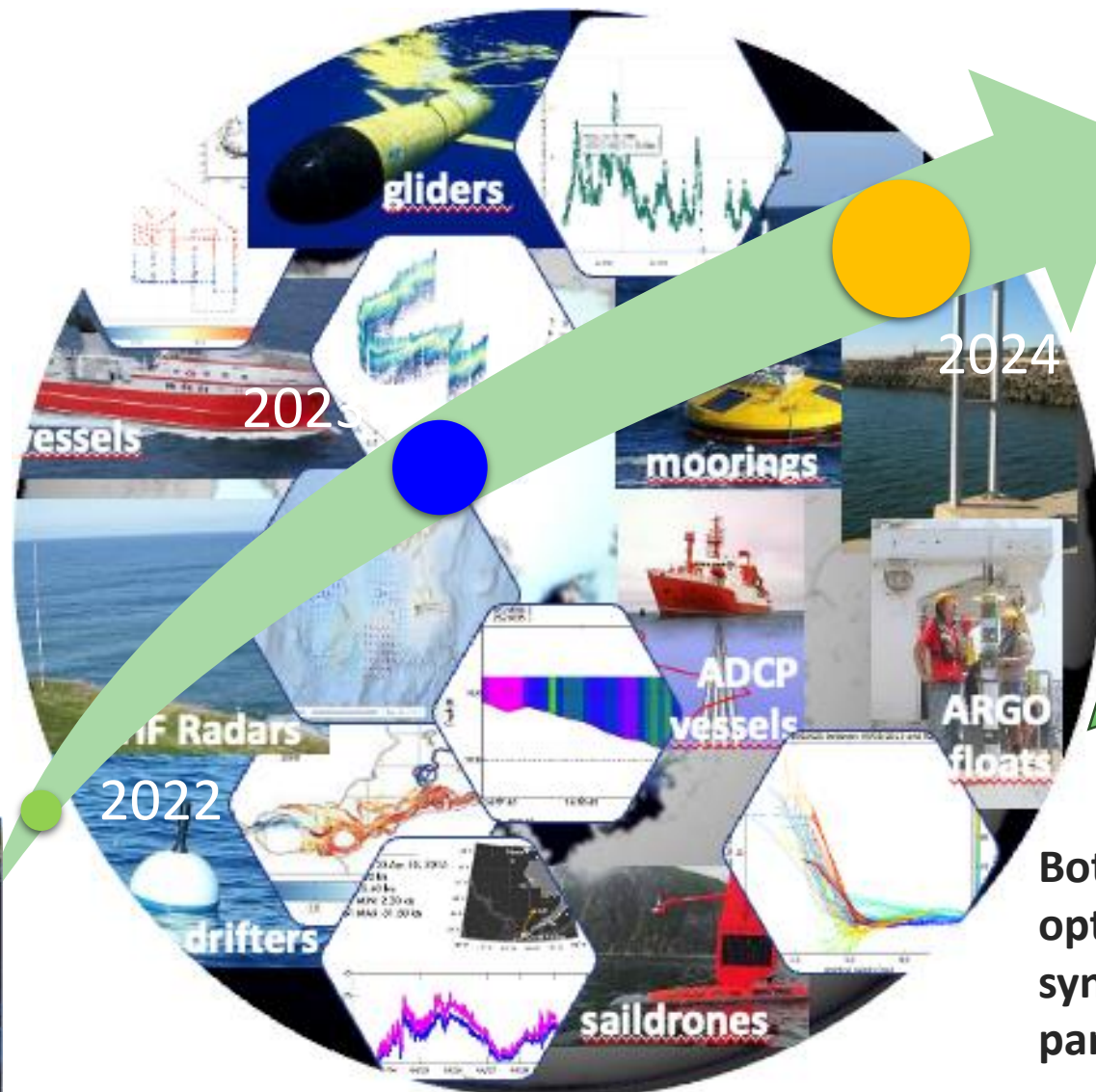


In Situ Observation Main Achievements

● Temperature & salinity product down to 5500m (now to 2000m)



● New multiyear sea level global product



Copernicus Marine Service and EMODnet form the backbone for the European marine knowledge



EMODnet
European Marine Observation and Data Network

Both data services work together to optimize data flows, coordination and synergies of the in situ marine data parameters required by both services.

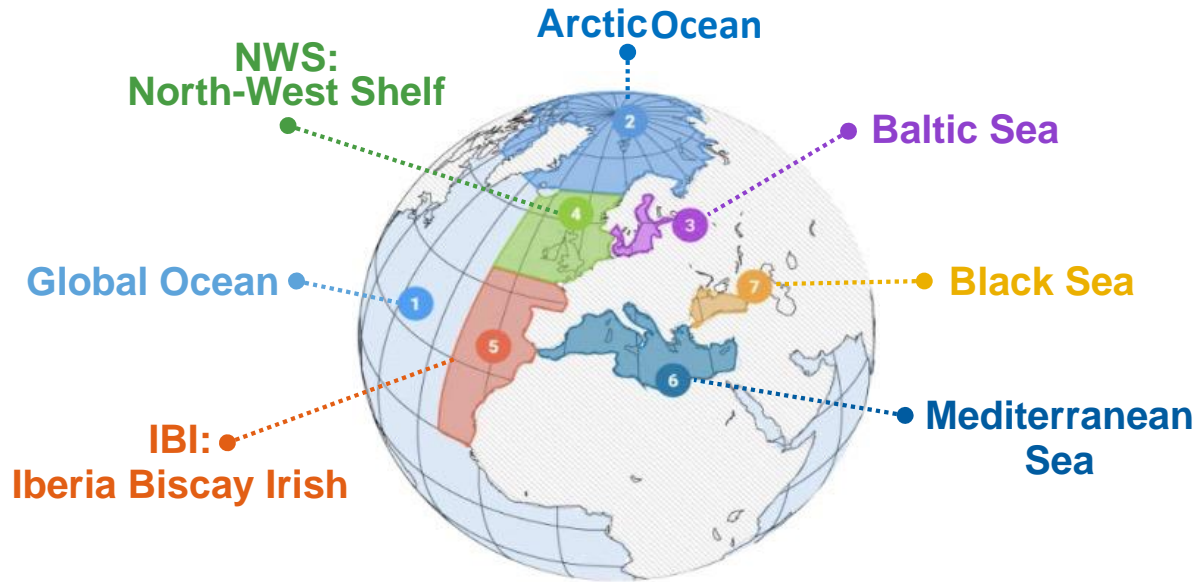


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The background features a large, detailed image of a breaking ocean wave. Overlaid on this are two diagonal bands: a light blue one on the left and a green one on the right. A thin green horizontal line extends from the left edge, ending in a small green circle that points towards the text.

Monitoring and Forecasting Centres

What are the modelling products?



Numerical models with data assimilation scheme

- The Global Ocean
- The Arctic Ocean
- The European regional seas

b'geos

AKKA



CECMWF



CESCA



TAL TECH

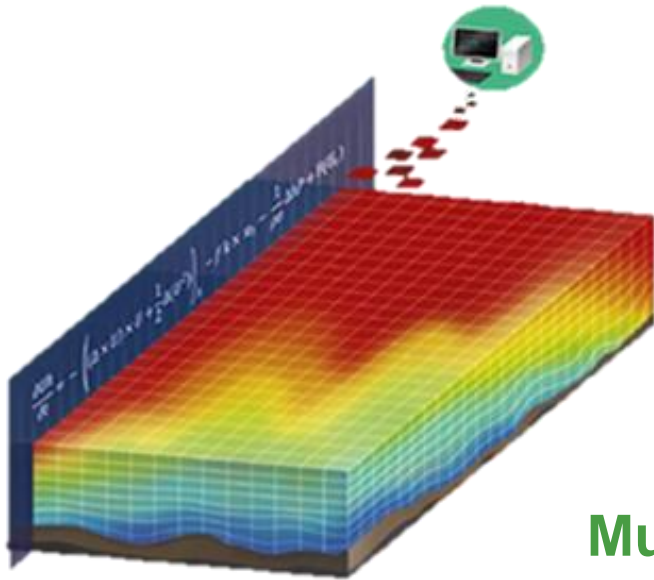


CMCC

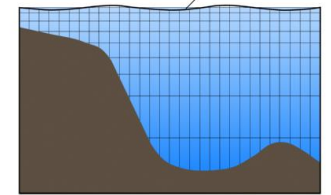


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Main characteristics



$\Delta x, y \sim 1 - 10 \text{ km}$
 $\Delta z \sim 1 - 500 \text{ m}$



**Multi
Year**



Reanalysis: last decades

Interim: up to m-1



**Near Real
Time**



Analysis: - 2 years

Forecast: 10 days



Products

Forecast:

- Deterministic
- Daily cycle (twice a day)
- Lead time 10 days

Multi-Year:

- (1980)1992 → 1 -2 years before present
- New time series every 3-5 years
- Timeseries regularly extended



Temperature
Salinity



Currents



Sea Level



Mixed layer depth



Waves



Nekton



Plankton



Organic carbon



Nutrients



Oxygen



Carbonate System



Optics



Sea Ice Concentration
Sea Ice Extent
Sea Ice Thickness



Sea Ice Type



Sea Ice Velocity



Snow thickness

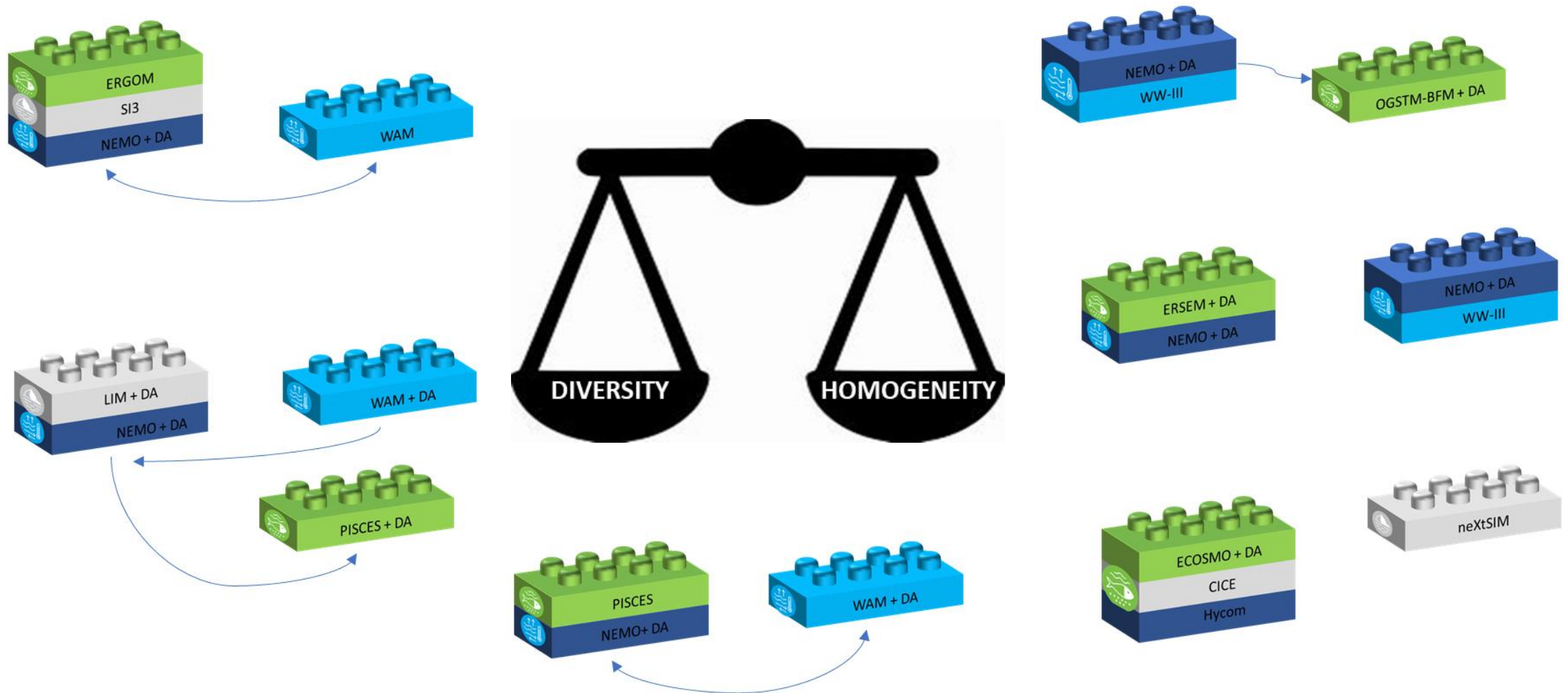


Sea Ice Albedo



Sea Ice Age

What are the components of the MFCs?



Evolution of the offer

ACCURACY

Model
parameterization
and processes
Data assimilation
and observations



SEAMLESS

Boundaries from
neighbouring MFCs
Forecast and **MY**
system **similar**
Same **observations**



PORTFOLIO

New
products/variables
Longer timeseries
Extension of
forecast lead time



Conclusion

Continuous improvement of all the components →
delivery of better and more products

Increased the harmonization across MFCs
→ **ease of use for users**

