



Novel automated quality control procedures for BGC data developed by the Copernicus Marine Service In-Situ TAC Team

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Copernicus Marine Service

In-situ Thematic Assembly Center



 Atmosphere Monitoring

 Climate Change

 **Marine Service (CMEMS)**

 Land Monitoring

 Security

 Emergency Management

Data producers

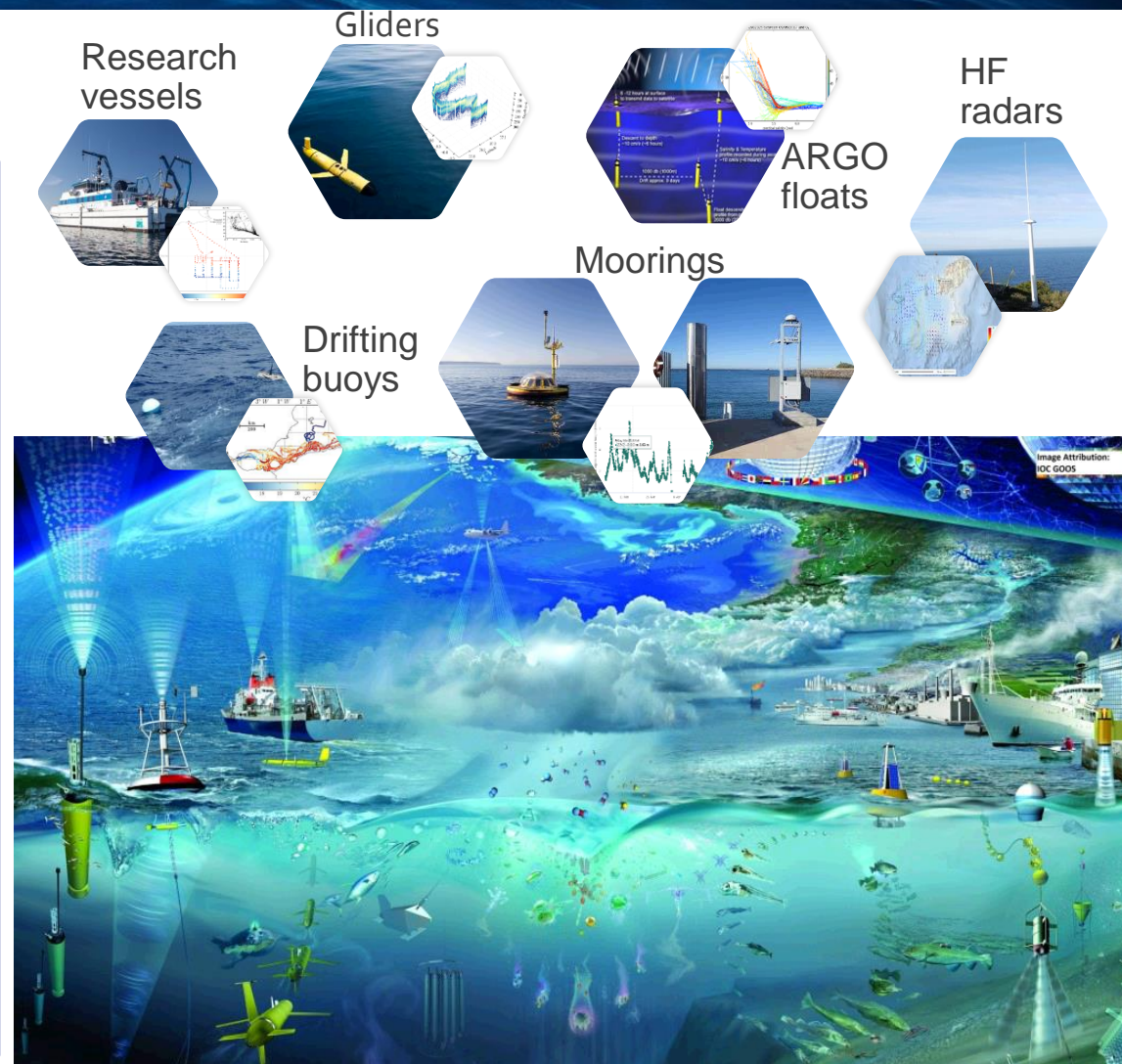
7 MFCs (Models)

- GLO MFC
- ARC MFC
- BAL MFC
- NWS MFC
- IBI MFC
- MED MFC
- BS MFC

8 TACs(Observations)

In Situ TAC

- 6 Space TACs:
 - SITAC
 - OCTAC ...
- 1 Multi Obs.



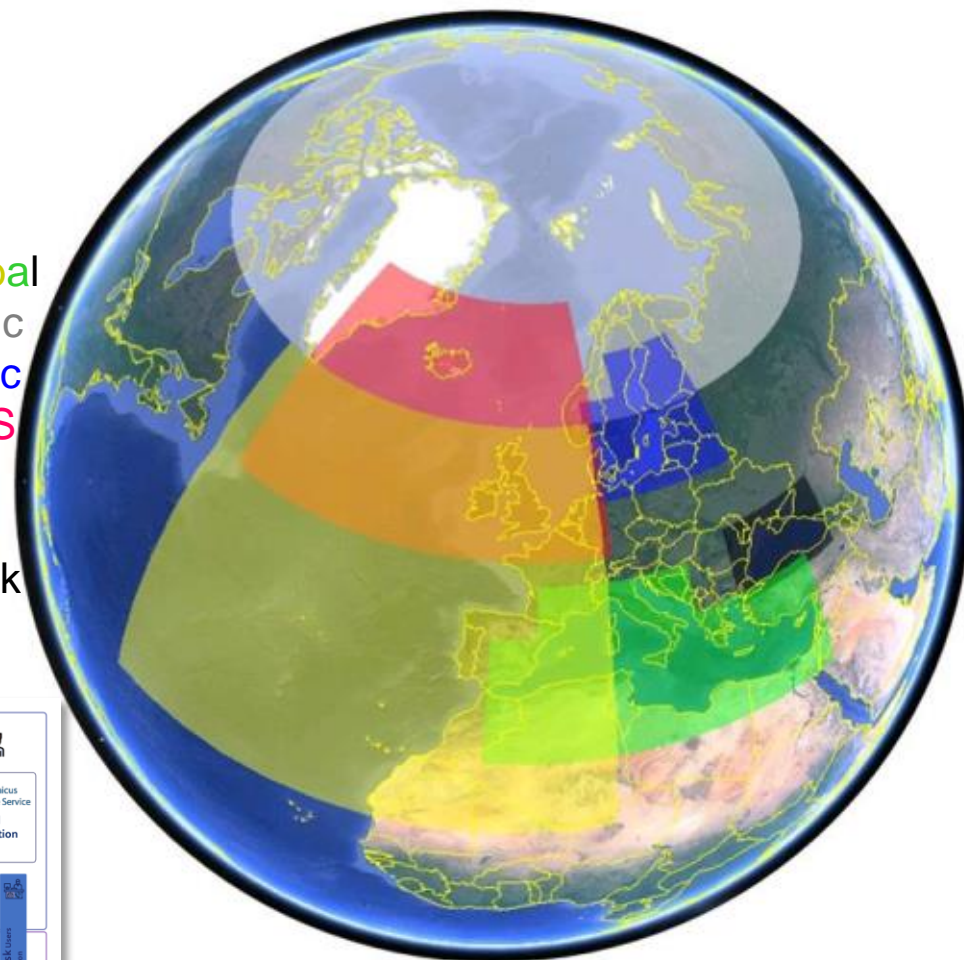


Copernicus Marine Service

- A regional approach

- ✓ Products tailored for specific regions through regional expertise
- Heterogeneous data sources
 - ✓ Homogeneous data quality through strong focus on internal consistency
- ✓ Documented and transparent
- ✓ Free & open data distribution through single data portal <http://marine.copernicus.eu>
- ✓ Long-term commitment from EC

Global
Arctic
Baltic
NWS
IBI
Med
Black Sea



QUALITY INFORMATION DOCUMENT

PRODUCT USER MANUAL

QUALITY INFORMATION DOCUMENT

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For Global Ocean Reprocessed in-situ Observations of Biogeochemical Products

INSITU_GLO_BGC_REP_OBSERVATIONS_013_046

<http://doi.org/10.13155/54847>

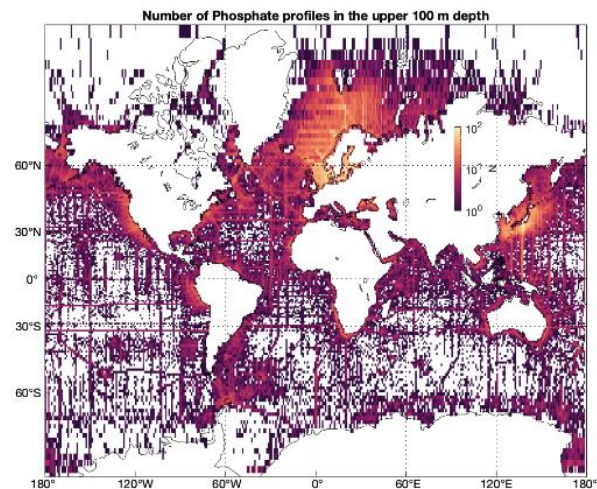
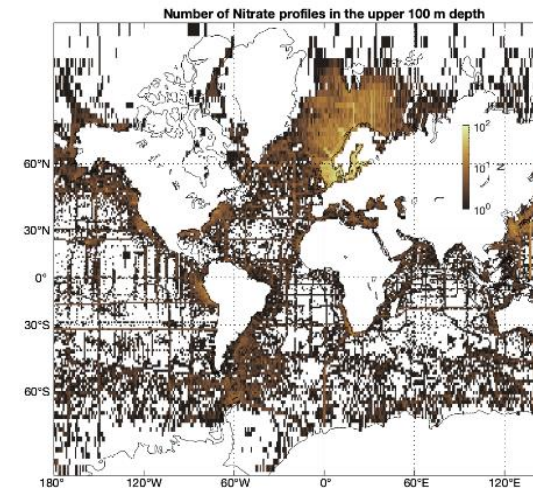
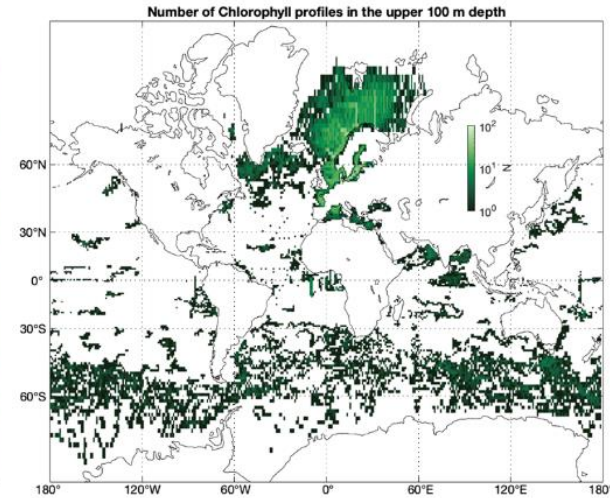
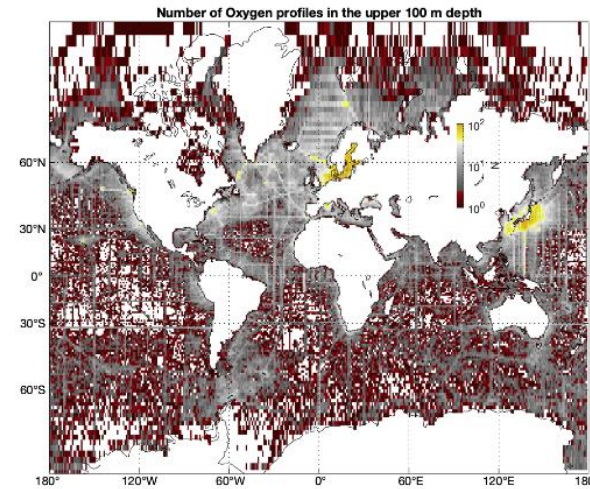


IMDIS 12-14 April 2021

BioGeoChemical products

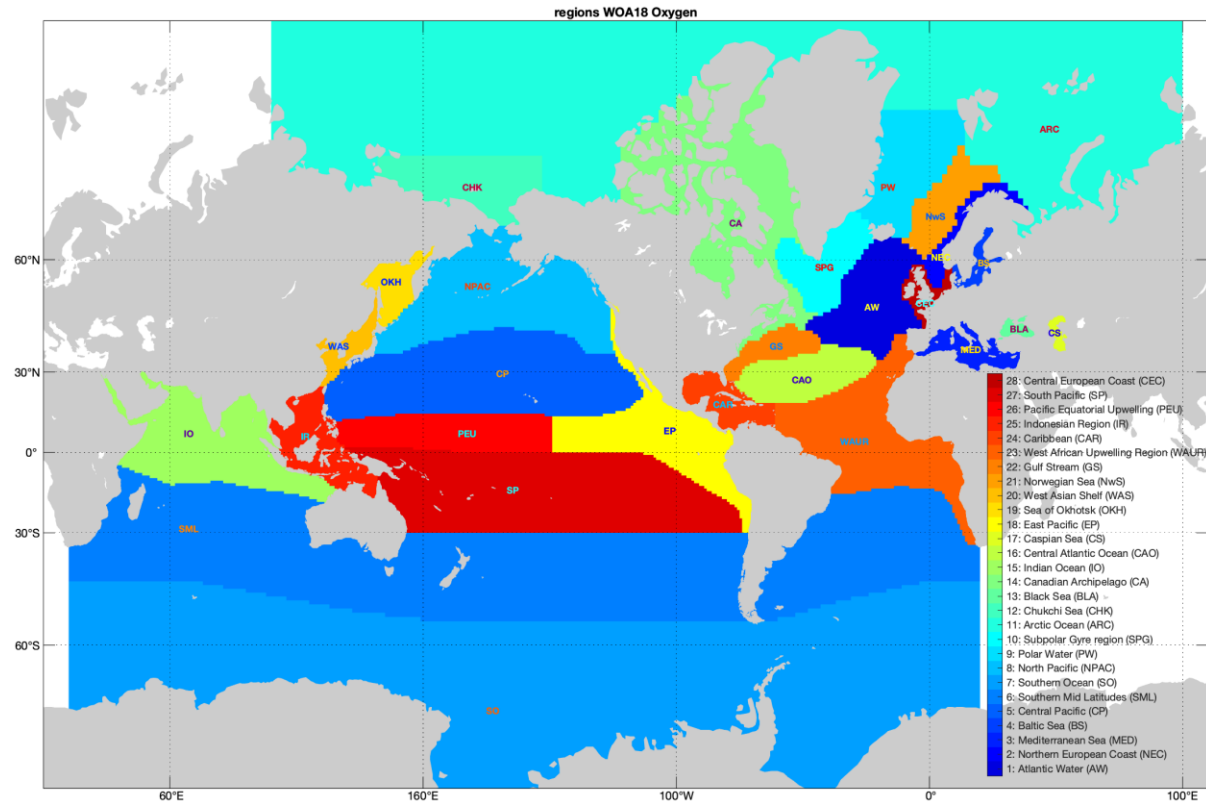
BGC datasets reprocessed through automated quality control procedures and visual inspection of doubtful observations

- ✓ World-wide historical datasets of chlorophyll, oxygen and nutrients
- ✓ Delayed-mode quality-controlled data included when possible
- ✓ Automated quality testing greatly reduces workload
- ✓ Extended by 6 months two times every year
- ✓ Reprocessing quality control procedures are transparent and documented
- ✓ Automated quality control procedures applied to Near-Real Time dataflow when possible
 - E.g.: Point-on-land test for validating observations in fjords
- Inclusion of EMODnet chemistry 2018 (Dec 2021)



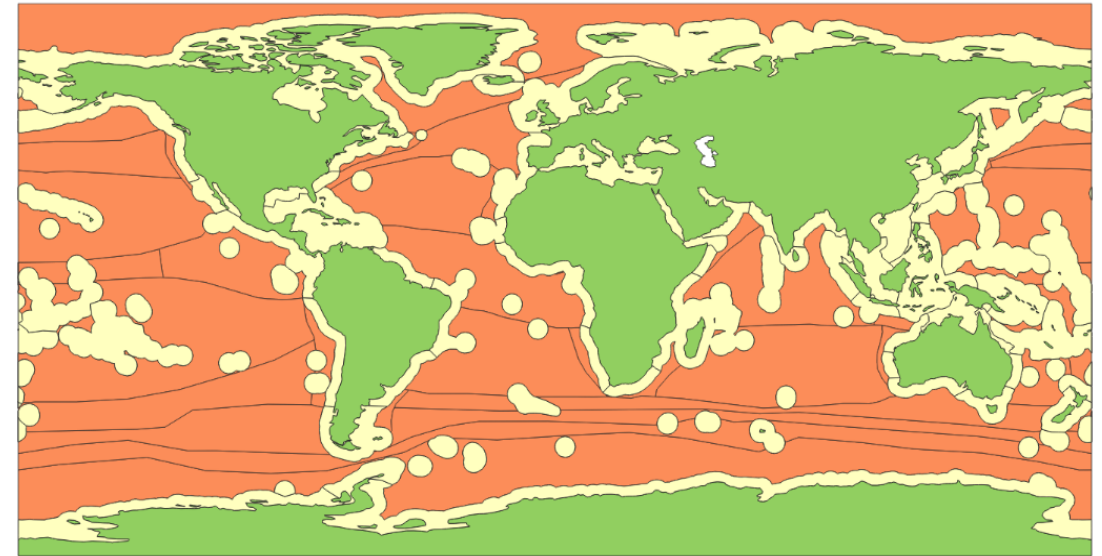
Oxygen

- ✓ Refined regions (28) for regional range testing
- ✓ Baltic Sea and Mediterranean treated separately with additional tests (including *flow test* for ferryboxes, *frozen value test*, *maximum dissolved oxygen concentration test*)
- ✓ Additional product *Easy-Oxygen*: unit standardization for modelers ($\mu\text{mol/l}$) or oceanic application and monitoring purposes ($\mu\text{mol/kg}$)



Chlorophyll

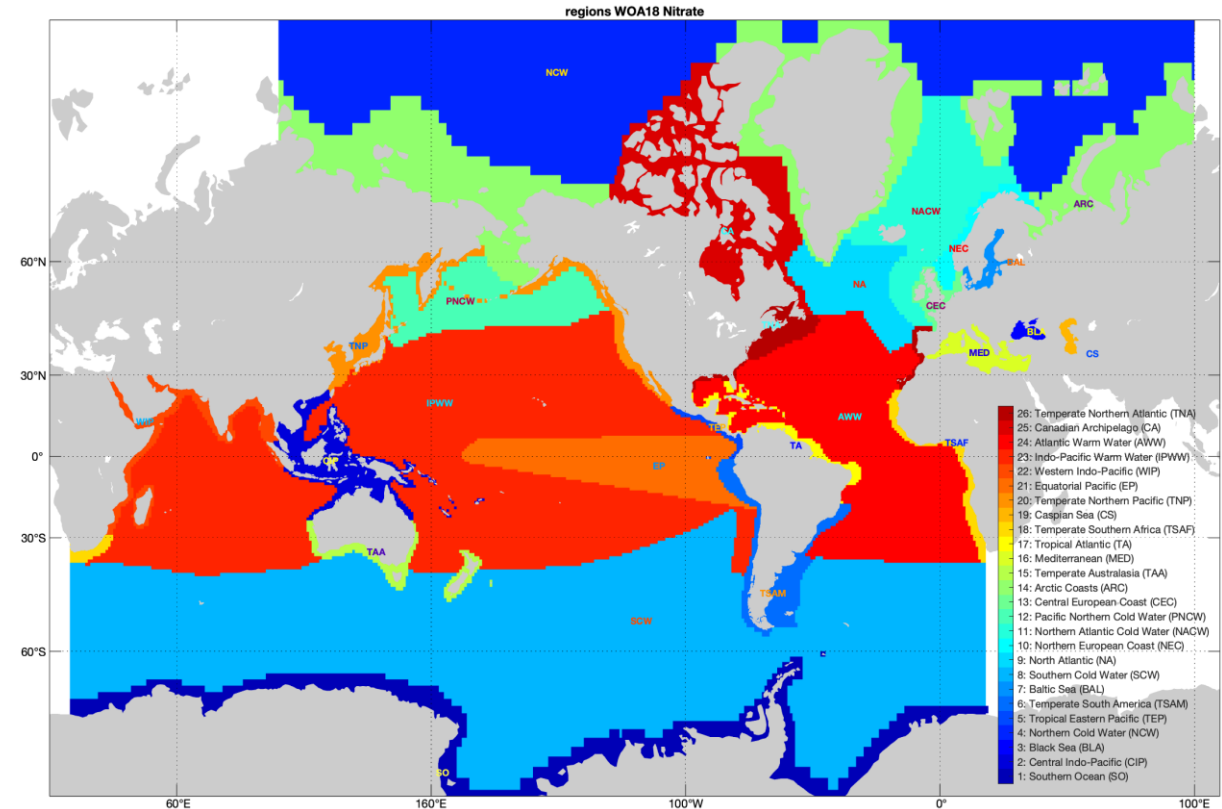
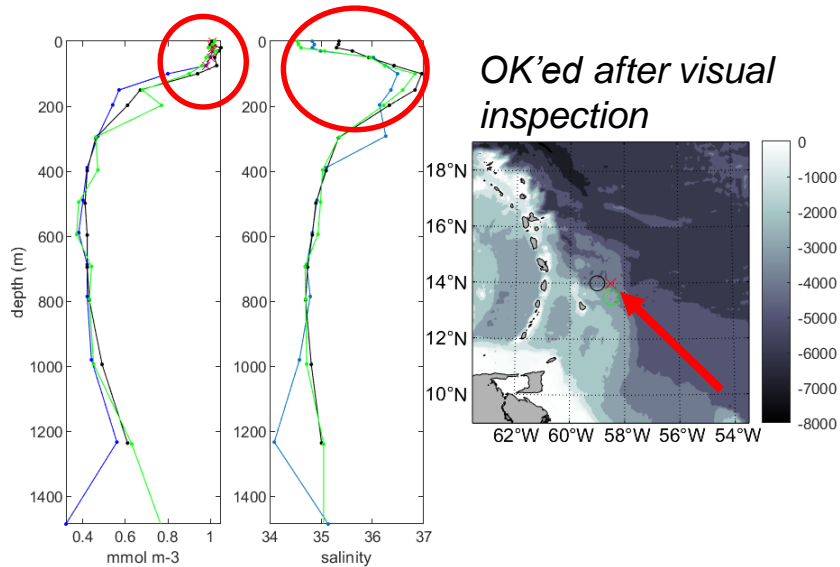
- ✓ Data separated into coastal and pelagic eco-regions and euphotic zone (0-100 m and 100-200 m) and deep ocean (>200 m) prior to quality control
- ✓ Purely statistical approach: Data outside 99th percentile (3 std) within each separate eco-region and depth interval marked as doubtful, to be inspected visually
- ✓ Baltic Sea treated separately with additional tests (including *flow test* and *frozen value test* for ferryboxes)



Eco-regions based on Spalding et al., 2007

Nitrate - Silicate - Phosphate

- ✓ Refined regions (26) for regional range testing
- ✓ Automated outlier detection and visual inspection of doubtful profiles
 - ✓ Vertical profile test: Surface concentrations below intermediate layer concentrations



Summary

The Copernicus Symbiosis

Your Data Improves The Products We Provide You!

Copernicus Marine Environment Monitoring Service

- ✓ Products tailored for specific regions through regional expertise
- ✓ Homogeneous data quality through focus on internal consistency
- ✓ Free, open and transparent data distribution through single data portal (<http://marine.copernicus.eu>)
- ✓ World-wide historical datasets of chlorophyll, oxygen and nutrients
- ✓ Long-term commitment from EC
- ✓ Growing user base