



# SeaDataCloud

New Observational Products:  
Status D11.8

Feasibility analysis and definition of  
new observational products

N. Pinardi, M. Zavatarelli & WP11 partners

# Contribution Received

Name	Extended Name
SDC_GLO_DP1	Global gridded mixing index at ¼deg. Resolution (climatology 2003-2017).
SDC_GLO_DP2	Global gridded AOU at ¼ deg. Resolution (climatology 2003-2017).
SDC_GLO_DP3	Preformed nutrient concentrations along isopycnals or neutral surfaces at ¼ deg. resolution (climatology 2003-2017).
SDC_ARC_DP1	
SDC_NWS_DP1	
SDC_BAL_DP1	Baltic basin temperature and salinity statistics
SDC_NAT_DP1	North Atlantic Ocean Gridded monthly climatology for Mixed Layer Depth at 1/4°
SDC_MED_DP1	Mediterranean Sea Gridded monthly climatology for Mixed Layer Depth at 1/8°
SDC_MED_DP2	Mediterranean Sea Ocean Heat Content time series
SDC_BLS_DP1	Black Sea gridded monthly climatology for cold intermediate layer (CIL) cold content at 1/8°
SDC_BLS_DP2	Black Sea gridded decadal seasonal climatologies for CIL cold content at 1/8°
SDC_IBIC_DP1	Gridded HF radar currents from the Ibiza Channel

# Global Ocean

Name	Extended Name
SDC_GLO_DP1	Global gridded mixing index at ¼deg. Resolution (climatology 2003-2017).
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All products at 0.25 deg. Horizontal resolution and for the “recent” (2003-2017) time window.

## Global gridded mixing index at ¼ deg. Resolution (climatology 2003-2017).

$$Imx(x_i, y_i, t_j) = 100 \frac{\sum_{k=1}^N P(x_i, y_i, t_{jk})}{N},$$

$$P = 1 \text{ if } K > K_0,$$

$$P = -1 \text{ if } K < K_0.$$

$$K = \varepsilon \Gamma N^{-2} \quad (\text{m}^2 \text{s}^{-1})$$

$$K_0 = N_0^{-2} \varepsilon \Gamma$$

$$\varepsilon = 1.510^{-9} \text{m}^2 \text{s}^{-3}$$

$$T=0.2.$$

$$N_0=0.1 \cdot 10^{-3} \text{s}^{-2}$$

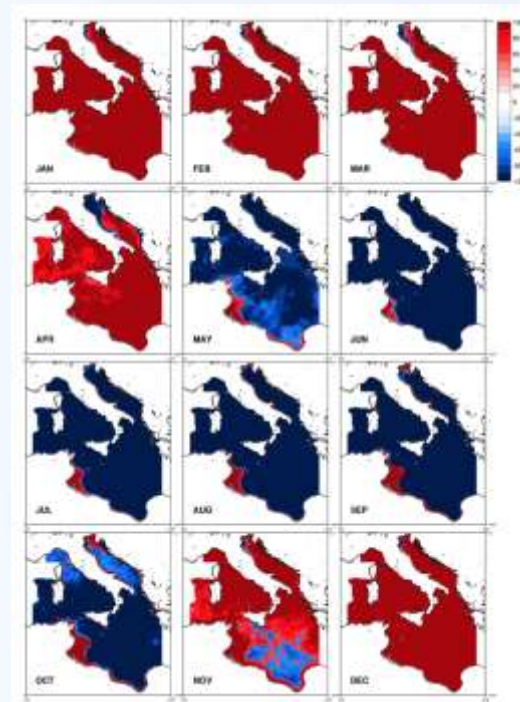
Product Name	Extended Name	Short description	Format
SDC_GLO_CLIM_T_V1_2	Gridded Global Temperature climatology 2003-2017 ¼ deg resolution	Integration of WOD and SDN data sets and ARGO GDAC	NetCDF files
SDC_GLO_CLIM_S_V1_2	Gridded Global Salinity climatology 2003-2017 ¼ deg resolution	Integration of WOD and SDN data sets and ARGO GDAC	NetCDF files

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<http://dx.doi.org/10.1080/1755876X.2015.11115634>



### Operational oceanography for the Marine Strategy Framework Directive: the case of the mixing indicator

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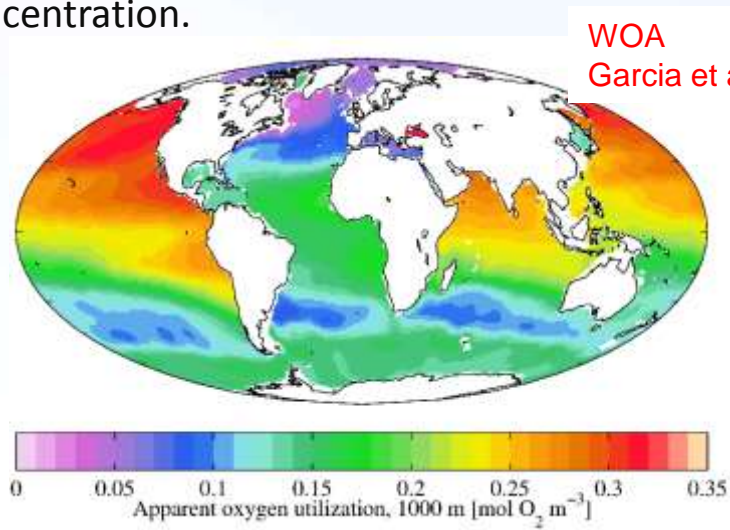


## Global gridded AOU at ¼ deg. Resolution (climatology 2003-2017).

*AOU is the concentration difference between the measured dissolved oxygen concentration and its equilibrium saturation concentration in water with the same physical and chemical properties. This product will provide “recent” (2003-2017) climatologies of the “Apparent Oxygen Utilization, AOU” of the deep global Ocean providing general information on the oxygenation state.*

Gridded climatologies of oxygen concentration will be produced using the same procedure used for the Temperature and Salinity climatologies (see deliverable D11.2).

The gridded Temperature and Salinity maps will be used also to compute the oxygen saturation concentration.



2003-2017 climatologies to be compared with the World Ocean Atlas long term climatologies

Preformed nutrient concentrations along isopycnals or neutral surfaces at ¼ deg. resolution (climatology 2003-2017).

This product will provide “recent” (2003-2017) climatologies of the “Preformed phosphate” (a conservative property) on isopycnal or surfaces of the deep global Ocean (as defined by Broecker and Peng., 1982) providing general information on the thermohaline circulation.

Gridded climatologies of phosphate concentration will be produced using the same procedure used for the Temperature and Salinity climatologies.

The computation of the preformed phosphate concentration requires also the information about apparent oxygen utilisation (AOU).

The preformed nutrient concentration  $\rightarrow P_{\text{preformed}} = P - P_{\text{regenerated}}$

P= Phosphate “in situ” concentration

$P_{\text{regenerated}} = R_{\text{P-O}_2} \text{AOU}$

$R_{\text{P-O}_2}$  = P. Oxidation ratio (1/170 according to Anderson and Sarmiento, 1994)

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SDC_GLO_CLIM_T_V1_2	Gridded Global Temperature climatology 2003-2017 ¼ deg resolution	Integration of WOD and SDN data sets and ARGO GDAC	NetCDF files
SDC_GLO_CLIM_S_V1_2	Gridded Global Salinity climatology 2003-2017 ¼ deg resolution	Integration of WOD and SDN data sets and ARGO GDAC	NetCDF files
SDC_GLO_DP2	Gridded Global AOU climatology 2003-2017 ¼ deg resolution	Integration of WOD and SDN data sets	NetCDF files

# Baltic Sea

Name	Extended Name
SDC_GLO_DP1	Global gridded mixing index at ¼deg. Resolution (climatology 2003-2017).
SDC_GLO_DP2	Global gridded AOU at ¼ deg. Resolution (climatology 2003-2017).
SDC_GLO_DP3	Preformed nutrient concentrations along isopycnals or neutral surfaces at ¼ deg. resolution (climatology 2003-2017).
SDC_ARC_DP1	
SDC_NWS_DP1	
SDC_BAL_DP1	<b>Baltic basin temperature and salinity statistics</b>
SDC_NAT_DP1	North Atlantic Ocean Gridded monthly climatology for Mixed Layer Depth at 1/4°
SDC_MED_DP1	Mediterranean Sea Gridded monthly climatology for Mixed Layer Depth at 1/8°
SDC_MED_DP2	Mediterranean Sea Ocean Heat Content time series
SDC_BLS_DP1	Black Sea gridded monthly climatology for cold intermediate layer (CIL) cold content at 1/8°
SDC_BLS_DP2	Black Sea gridded decadal seasonal climatologies for CIL cold content at 1/8°
SDC_IBIC_DP1	Gridded HF radar currents from the Ibiza Channel



## Baltic basin temperature and salinity statistics

Calculate monthly temperature and salinity statistics for Baltic subregions/basins.

Temperature and salinity monthly statistics computed (possibly) for the HELCOM SubBasins





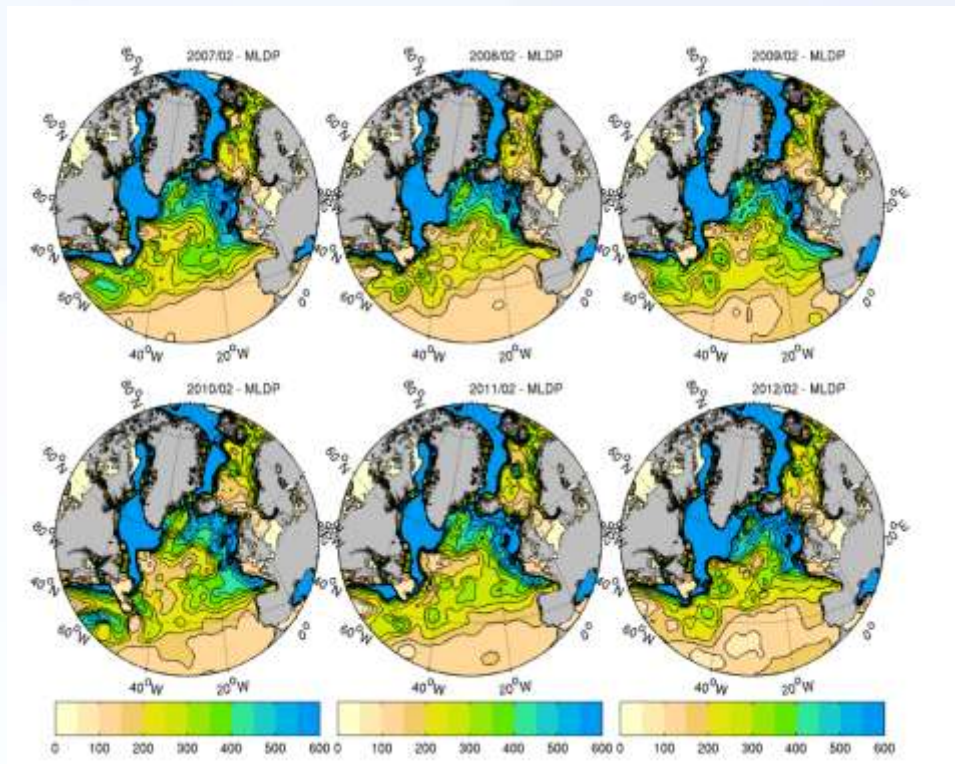
# North Atlantic

Name	Extended Name
SDC_GLO_DP1	Global gridded mixing index at ¼deg. Resolution (climatology 2003-2017).
SDC_GLO_DP2	Global gridded AOU at ¼ deg. Resolution (climatology 2003-2017).
SDC_GLO_DP3	Preformed nutrient concentrations along isopycnals or neutral surfaces at ¼ deg. resolution (climatology 2003-2017).
SDC_ARC_DP1	
SDC_NWS_DP1	
SDC_BAL_DP1	Baltic basin temperature and salinity statistics
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SDC_IBIC_DP1	Gridded HF radar currents from the Ibiza Channel

Products at 0.25 deg. Horizontal resolution

## North Atlantic Ocean Gridded monthly climatology for Mixed Layer Depth at 1/4°

A North Atlantic Ocean climatology (1/4° 12 months) of the Mixed Layer Depth based on a comprehensive collection of temperature and salinity profiles spanning 60 years (1955–2015).



# Mediterranean

Name	Extended Name
SDC_GLO_DP1	Global gridded mixing index at ¼deg. Resolution (climatology 2003-2017).
SDC_GLO_DP2	Global gridded AOU at ¼ deg. Resolution (climatology 2003-2017).
SDC_GLO_DP3	Preformed nutrient concentrations along isopycnals or neutral surfaces at ¼ deg. resolution (climatology 2003-2017).
SDC_ARC_DP1	
SDC_NWS_DP1	
SDC_BAL_DP1	Baltic basin temperature and salinity statistics
SDC_NAT_DP1	North Atlantic Ocean Gridded monthly climatology for Mixed Layer Depth at 1/4°
SDC_MED_DP1	Mediterranean Sea Gridded monthly climatology for Mixed Layer Depth at 1/8°
SDC_MED_DP2	Mediterranean Sea Ocean Heat Content time series
SDC_BLS_DP1	Black Sea gridded monthly climatology for cold intermediate layer (CIL) cold content at 1/8°
SDC_BLS_DP2	Black Sea gridded decadal seasonal climatologies for CIL cold content at 1/8°
SDC_IBIC_DP1	Gridded HF radar currents from the Ibiza Channel

## Mediterranean Sea Gridded monthly climatology for Mixed Layer Depth at 1/8°

A Mediterranean climatology (1/8° 1/8° 12 months) of the Mixed Layer Depth based on a comprehensive collection of temperature and salinity profiles spanning 60 years (1955–2015)

The SDC historical data collection for the Mediterranean Sea will be complemented with:  
 CMEMS INSITU\_MED\_TS\_REP\_OBSERVATIONS\_013\_041 Mediterranean In-situ Observations in Delayed Mode (1990-2015);

CMEMS INSITU\_GLO\_TS\_REP\_OBSERVATIONS\_013\_001\_b Global Ocean- CORA- In-situ Observations Yearly Delivery in Delayed Mode (1950-2015);

World Ocean Database (WOD) contains the World Ocean Database 2013 (WOD13)

Density profiles will be computed from T and S profiles applying the density criteria  $\Delta\rho$  equal to 0.01 kg/m<sup>3</sup> between the surface and the base of the MLD. DIVA software will be used for mapping the MLD on the 1/8° grid.

Product Name	Extended Name	Short description	Format
SDC_MED_DP1	Mediterranean Sea Gridded monthly climatology for Mixed Layer Depth at 1/8°	Mediterranean monthly climatology of the Mixed Layer Depth (MLD) at 1/8° based on a comprehensive collection of temperature and salinity profiles spanning 60 years (1955–2015)	NetCDF files

## Mediterranean Sea Ocean Heat Content time series

monthly/seasonal/annual time series of basin OHC for the Mediterranean Sea, from 1955 to 2015 for 0-700m layer and the 0-2000m layer.

- The SDC historical data collection for the Mediterranean Sea will be complemented with:
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- CMEMS INSITU\_GLO\_TS\_REP\_OBSERVATIONS\_013\_001\_b Global Ocean- CORA- In-situ Observations Yearly Delivery in Delayed Mode (1950-2015);
- World Ocean Database (WOD) contains the World Ocean Database 2013 (WOD13)

Product Name	Extended Name	Short description	Format
SDC_MED_DP2	Mediterranean Sea Ocean Heat Content time series	Monthly/seasonal/annual time series of Ocean Heat Content basin estimate covering the 1955-2015 time period over the 0-700m layer and the 0-2000m layer	NetCDF files

# Black Sea

Name	Extended Name
SDC_GLO_DP1	Global gridded mixing index at ¼deg. Resolution (climatology 2003-2017).
SDC_GLO_DP2	Global gridded AOU at ¼ deg. Resolution (climatology 2003-2017).
SDC_GLO_DP3	Preformed nutrient concentrations along isopycnals or neutral surfaces at ¼ deg. resolution (climatology 2003-2017).
SDC_ARC_DP1	
SDC_NWS_DP1	
SDC_BAL_DP1	Baltic basin temperature and salinity statistics
SDC_NAT_DP1	North Atlantic Ocean Gridded monthly climatology for Mixed Layer Depth at 1/4°
SDC_MED_DP1	Mediterranean Sea Gridded monthly climatology for Mixed Layer Depth at 1/8°
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Black Sea gridded monthly climatology for cold intermediate layer (CIL) cold content at 1/8° (

Black Sea CIL cold content:

$$CIL\ cold\ content = C_p \rho \int_{z_1}^{z_2} [T - T_{CiL}] dz$$

where  $\rho$  is the density and  $C_p$  the heat capacity

DIVA software will be used for mapping the CIL cold content on the 1/8° grid.

$$C_p \rho \int_{z_1}^{z_2} [T - T_{CiL}] dz$$

The SDC historical data collection for the Black Sea will be complemented with:

CMEMS INSITU\_GLO\_TS\_REP\_OBSERVATIONS\_013\_001\_b Global Ocean- CORA- In-situ Observations Yearly Delivery in Delayed Mode (1950-2015);

World Ocean Database (WOD) contains the World Ocean Database 2013 (WOD13)

CMEMS INSITU\_BS\_TS\_REP\_OBSERVATIONS\_013\_041 Black Sea In-situ Observations in Delayed Mode (1990-2015);



## Black Sea gridded decadal seasonal climatologies for CIL cold content at $1/8^\circ$

Compute 52 decadal seasonal climatologies of CIL cold content at  $1/8^\circ$  centered on each year for period 1955-2015. The product can be for analysis of CIL anomalies and evolution through 60 years.

The SDC historical data collection for the Black Sea will be complemented with:

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World Ocean Database (WOD) contains the World Ocean Database 2013 (WOD13)

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# Ibiza Channel

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## Gridded HF radar currents from the Ibiza Channel

Hourly gridded zonal and meridional currents at  $1/30^\circ$  resolution from the Ibiza Channel based on the radial High-Frequency (HF) radar data from SOCIB for the month October 2014.

Geosci. Model Dev., 7, 225–241, 2014  
 www.geosci-model-dev.net/7/225/2014/  
 doi:10.5194/gmd-7-225-2014  
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Geoscientific  
 Model Development  
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### divand-1.0: $n$ -dimensional variational data analysis for ocean observations

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