Product Information Document (PIDoc)

SeaDataCloud Temperature and Salinity Climatology for the North Atlantic Ocean (Version 1)

SDC_NAT_CLIM_TS_V1

HORIZON ***2020***

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SeaDataCloud - Further developing the pan-European infrastructure for marine and ocean data management

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SDC_NAT_CLIM_TS_V1

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SeaDataCloud Temperature and Salinity Climatologies for the North Atlantic Ocean (Version 1)

Product DOI

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Short description

The SeaDataCloud Temperature and Salinity Climatologies have been processed from the historical Data Collection of the North Atlantic Ocean including temperature and salinity in situ data of the water column in the North Atlantic Ocean (from 10°N to 62°N for the east part and including the Labrador Sea for the western part) for period 1955 – 2015. Several versions are proposed in seasonal and monthly format for the period 1955-2015 and six decadal periods (1955-1964/1965-1974/1975-1984/1985-1994/1995-2004/2005-2015). A subset of the CORA dataset has been integrated as external data-source to improve the product' spatial and temporal coverage.

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	S. Simoncelli	30/05/2019	First revision
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V1.2	C. Coatanoan	11/07/2019	Final version
	M. Fichaut	23/07/2019	Addition of the "How to Cite" and "Product DOI" info

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Abstract

Summary of the product's characteristics

SeaDataCloud Temperature and Salinity Climatologies have been processed from the North Atlantic Ocean historical Data Collection including temperature and salinity in situ data of water column in the North Atlantic Ocean (from 10°N to 62°N for the east part and including the Labrador Sea for the west part) for period 1900-2015. Several versions are proposed in seasonal and monthly format for the period 1955-2015 and six decadal periods (1955-1964/1965-1974/1975-1984/1985-1994/1995-2004/2005-2015). A subset of the CORA dataset (Szekely et al., 2016) has been integrated to the SeaDataCloud aggregated dataset as external data-source to improve the spatial and temporal coverage.

1. Introduction

The input dataset for computation of the North Atlantic Ocean Temperature and Salinity climatological fields data retrieved from the SeaDataCloud internal data source – the SeaDataNet infrastructure – that were integrated with the data from external data source.

SDC_NAT_CLIM_TS_V1 product has been generated starting from the SeaDataCloud Temperature and Salinity Historical Data Collection for the North Atlantic Ocean (Coatanoan et al., 2018 - https://doi.org/10.12770/970bb3ba-aaf6-4066-9656-87c85da41dbb) released in June 2018. The Product Information Document (PIDoc) describes in details the Temperature and Salinity Historical data collection and the quality control performed on the dataset (Coatanoan and Simoncelli, 2018 - https://doi.org/10.13155/57037).

1.1. General description of the input data set

SDC_NAT_DATA_TS_V1 contains Temperature and Salinity observations between 10°N and 62°N of latitude for the east part, and includes data in the Labrador Sea till 70°N and the Gulf of Mexico for the western part. The spatial distribution and the data density maps of T and S observations are shown in Figure 1. Data distribution maps show a good geographical spread with the best coverage on the eastern part of the domain, mainly close to the areas off Ireland and in the Bay of Biscay.

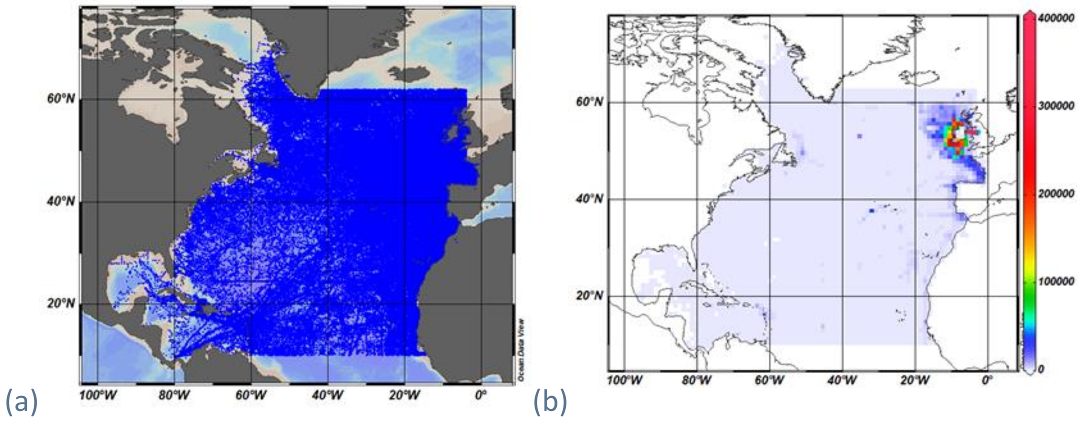


Figure 1. TS stations collection for the North Atlantic Ocean SDC_NAT_DATA_TS_V1: (a) data distribution map; (b) data density plot showing where the largest number of data have been sampled.

The selected data types to compute the climatology are described in the Table 1. Most of the data come from Thermosalinograph, CTD and water temperature sensor.

Instrument/Gear Type	# stations	%
Autoanalysers	1359	0.01
Bathythermograph	52806	0.56
Continuous water samplers	8552	0.09
CTD	686815	7.29
Discrete water samplers	94879	1.00
Salinity and Water temperature sensors	131534	1.39

Salinity sensor	6158	0.06
Thermistor chains	295674	3.14
Thermosalinographs	7240924	76.85
Transmissometers	19903	0.21
Water temperature sensor	883289	9.37
none info	75	0.0007
TOTAL	**9421968**	

Table 1. Description of the data types included in the SeaDataCloud dataset.

The spatial data distribution is shown in Figure 2. The stations with temperature and/or salinity data are mainly in the northeast part of the map. The distribution in time (Figure 3) is poor for the first 80 years, it slightly increases after 1980 until the end of 1990s, when it further increases. In the latest years there is a decrease in data which is caused by a natural time lag between sampling and data availablility in SeaDataNet infrastructure. Figure 3 (c) shows the seasonal distribution of data. Most of the data have been collected during spring, summer and autumn, with the largest peak during summer.

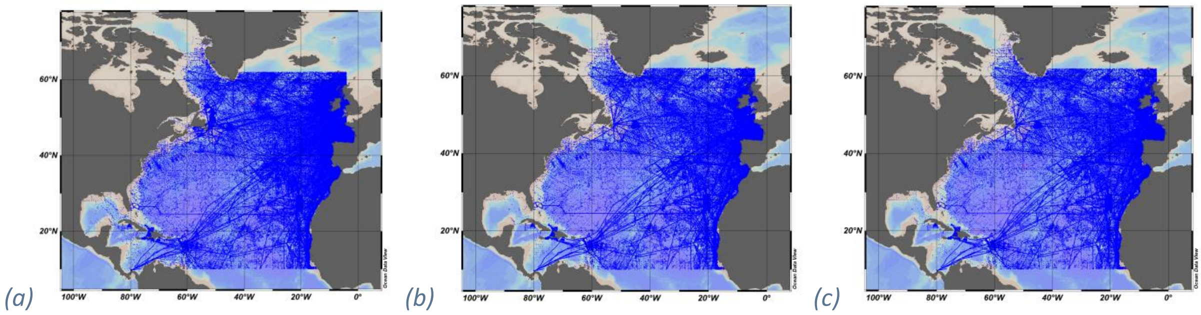


Figure 2. Spatial coverage for (a) temperature, (b) salinity and (c) couple of temperature and salinity.

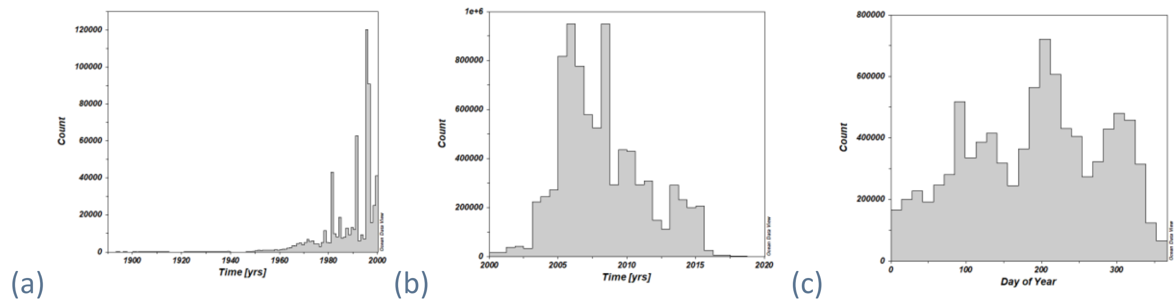
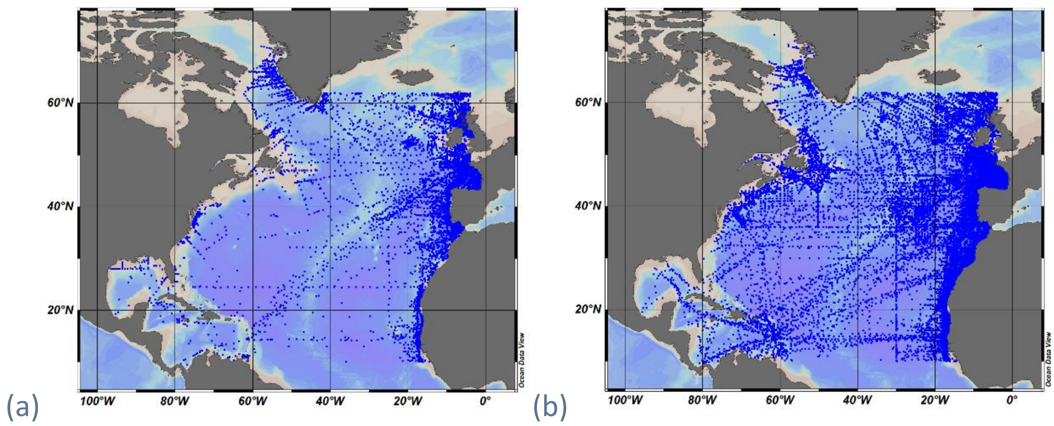


Figure 3. Time distribution for (a) the period 1890-1999, (b) the period 2000-2017 and (c) the seasonal distribution over the year for the entire data set.

The analysis of monthly and seasonal temperature distribution in the time period 1955-2015 shows a significant increase through the decades (Figure 4). The monthly distribution indicates a more important coverage during the summer months, the winter months having the smallest number of data. The distribution increases significantly after the '90s (Figure 5) and mainly on the east part of the North Atlantic Ocean.

Figure 4. Distribution of the SeaDataCloud dataset by decades, by month, by season. The number of data increases significantly after the decade 1995-2004, 2 plots have been proposed on the left top to distinguish more easily the distribution.



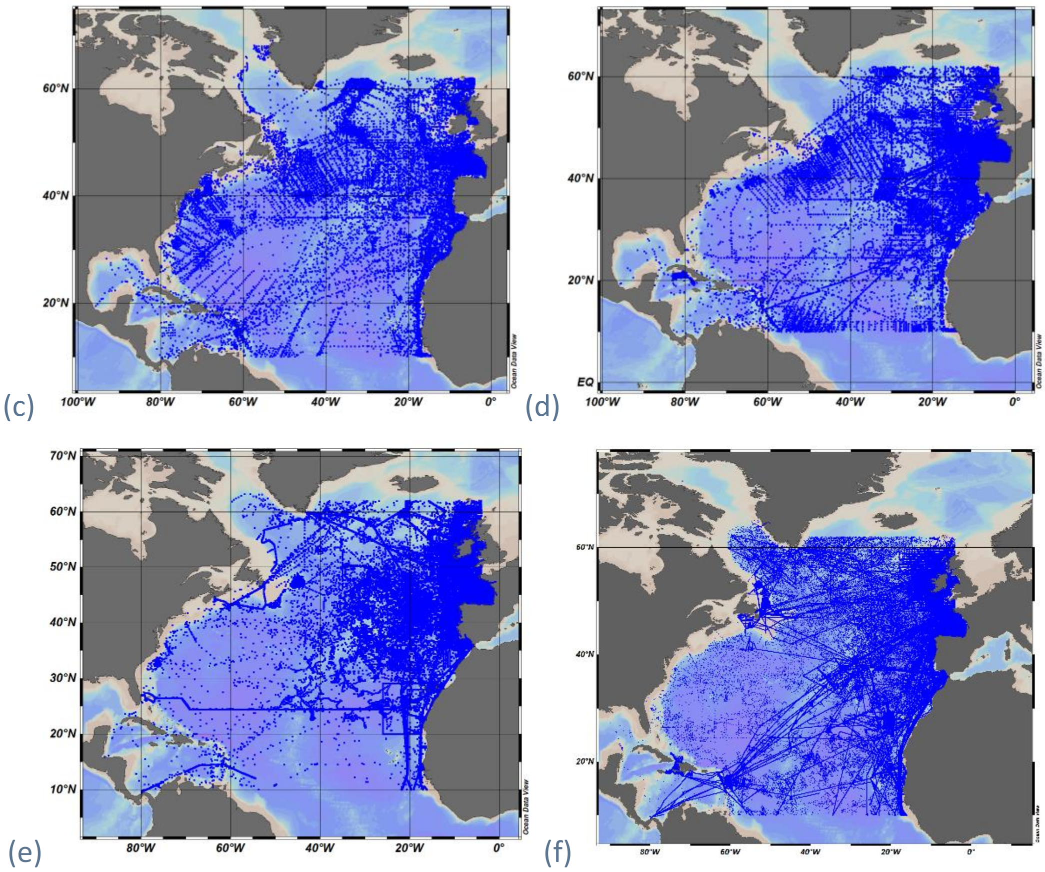


Figure 5. Temperature spatial coverage by decade: (a) 1955-1964, (b) 1965-1974, (c) 1975-1984, (d) 1985-1994, (e) 1995-2004 and (f) 2005-2015.

1.2. Integration of external data set

The CMEMS CORA dataset is an extraction of the Coriolis database at a given date each year. The CORA dataset (version 5.1) (Szekely et al., 2016) has been integrated into the SeaDataCloud dataset to address climatology. The extraction of the NetCDF files took into account the QC on the date and the position (Quality Flag =1 only) and exported adjusted parameters where they exist. The link to the CMEMS catalog is http://marine.copernicus.eu/services-portfolio/access-to-products/. The manual describing the dataset is available at http://marine.copernicus.eu/documents/PUM/CMEMS-INS-PUM-013-001-b.pdf.

CORA5.1 is a set of NetCDF files in Argo format. Data are ordered by date and type. The nomenclature of the files is CO_code_YYYYMMDD_PR_TT.nc where: code is the name of the analysis performed: DMQCGL01, YYYYMMDD is the date of the data, PR stands for vertical Profile, TS stands for TimeSeries. TT is the type of file (data).

Only a part of CORA5.1 dataset has been integrated with SDC collection, taking into account some specific types of instrument and selecting only profiles with both T and S measurements. The following data types have been used (CORA files : _PR_TT):

- ✓ CT: CTD data from research vessels but also data from sea mammals equipped with CTD and some Sea Gliders.

- ✓ OC: CTD and XCTD coming from the high resolution CTD dataset of the World Ocean Database
- ✓ ME: CTD from Sismer database, coming from the French oceanographic campaigns.
- ✓ IC: CTD from ICES dataset, those profiles complete the CTDs coverage in CORA on the period 1900-2011.
- ✓ OS: OceanSites data that are mostly CTD (Oceansites moorings are in TS_MO)
- ✓ PF: data from Argo floats directly received from the Argo DACs.
- ✓ SH: data from the SHOM database (most of them cover the period 1950-1990 period).

SH data were only supplied for the period 1955-1984, due to a significant quality control required for the following years. Regarding the instrument_type number in the CORA files (Figure 6), there is a lot of missing information (XX : 999). The large dataset coming from CORA is represented by the Argo floats.

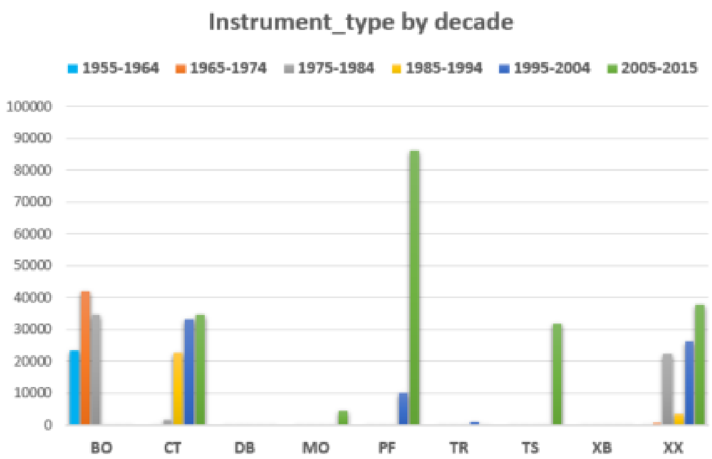


Figure 6. Instrument_type distribution by decade from the CORA part integrated in the dataset. BO : Hydrocast, CT : CTD, DB : Drifting buoy, MO : MyOcean time-series, PF : Argo floats, TR : Thermistor chain, TS : Recospeca and TSG trackob, XB : XBT, XX : unknown.

Duplicates have been checked on a large criteria (time: 1 day, position: 0.01°).

CORA 5.1 dataset is very useful to complete the oldest decades (from 1955 to 1984) in SDC collection and it really improves the results for the climatology. Figure 7 shows both contributions in the final dataset.

Figure 7. Statistics (number of stations) about the data sources (SDC and CORA5.1) used for the production of NAT climatology. (a) all the decades. (b) zoom on the earliest decades; (c) data expressed in percentages.

The spatial coverage (for instance year 1955, Figure 8) shows CORA5.1's contribution to the SDC dataset. Duplicates with SDC are located in the eastern part while the new data are mainly located in the western part of the North Atlantic Ocean.

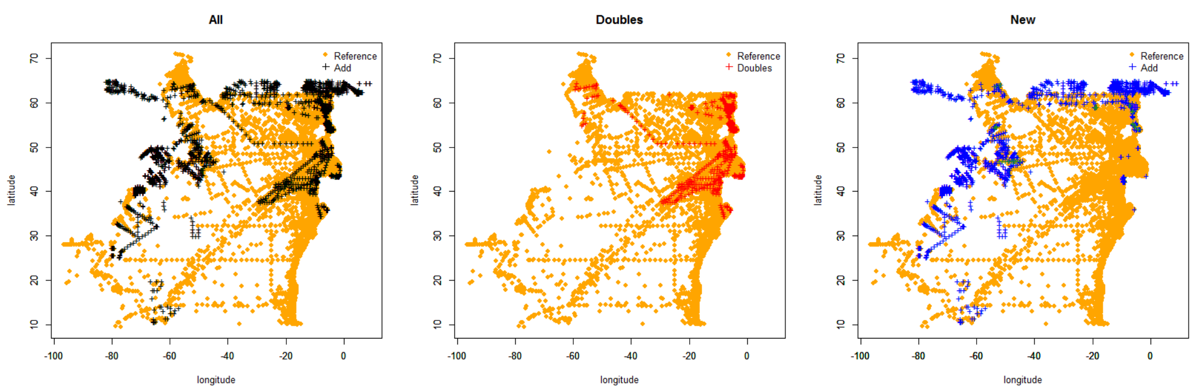


Figure 8. SeaDataCloud and CORA5.1 data distribution for the year 1955: yellow dots represent SDC stations (reference); black dots represent the selected CORA5.1 subset; red dots are the duplicates; blue dots represent the additional data from CORA5.1.

The external dataset supplied many data from Argo floats and CTD, mainly in the western part of the North Atlantic Ocean. Figure 9 shows the impact on gridded fields when including CORA5.1 subset. Temperature field appears (right panels) more realistic with the integration of the external data. There are not enough data to provide accurate fields for those decades considering only the SeaDataCloud dataset.

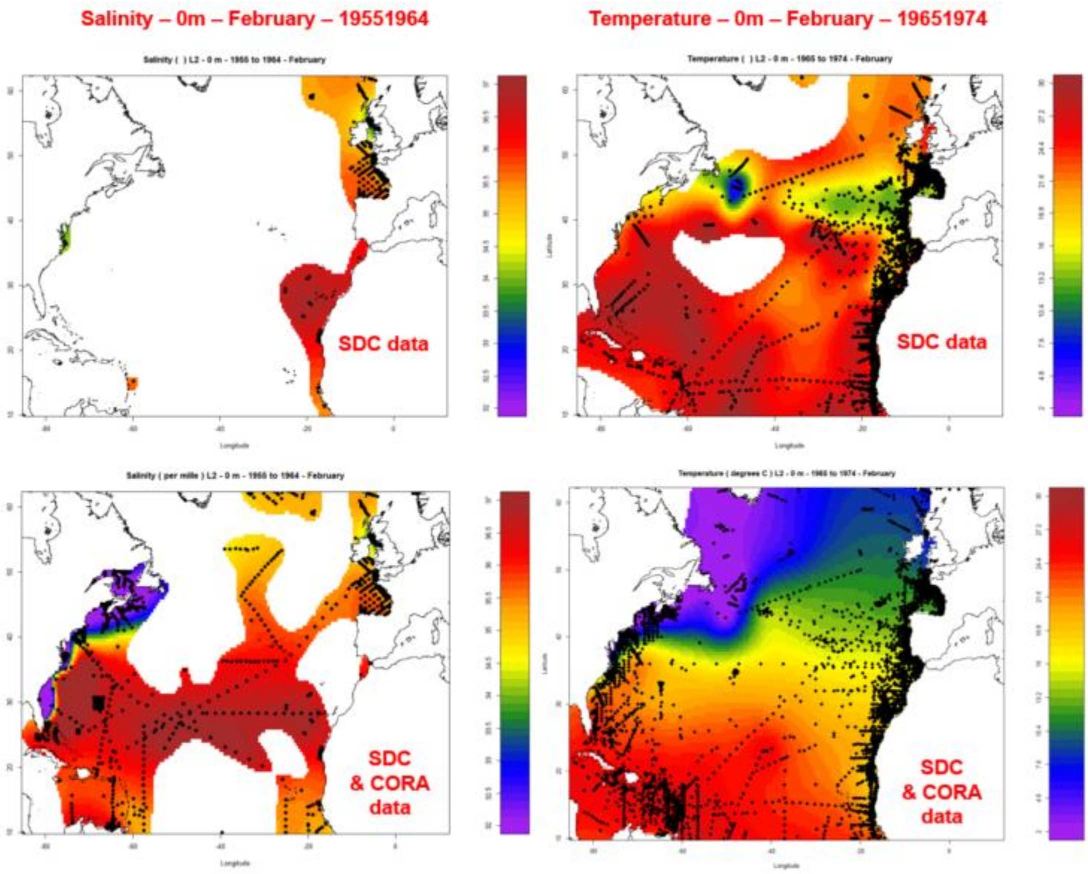


Figure 9. Comparison of results without and with CORA5.1 integration: (top-left panel) salinity field 1955-1964 obtained from SDC data only; (bottom-left panel) salinity field 1955-1964 obtained blending SDC and CORA5.1 data. (top-right panel) Temperature field 1965-1974 obtained from SDC data only; (bottom-left panel) Temperature field 1965-1974 obtained blending SDC and CORA5.1 data.

2. Methodology

2.1. Data QC

The quality control of the data has been performed with the help of ODV software. Data Quality Flags (QF) have been revised using recommended QC procedures defined within SeaDataNet2 project and further refined in the first phase of SeaDataClod. The QC procedure applied on the SDC aggregated dataset is described in Coatanoan and Simoncelli (2018).

Before adding the CORA subset in the SeaDataCloud collection, a quality control has been applied on the data using the ODV software. Additional QC has also been applied on data when looking at the results to remove anomalous bulks as shown in Figure 10.

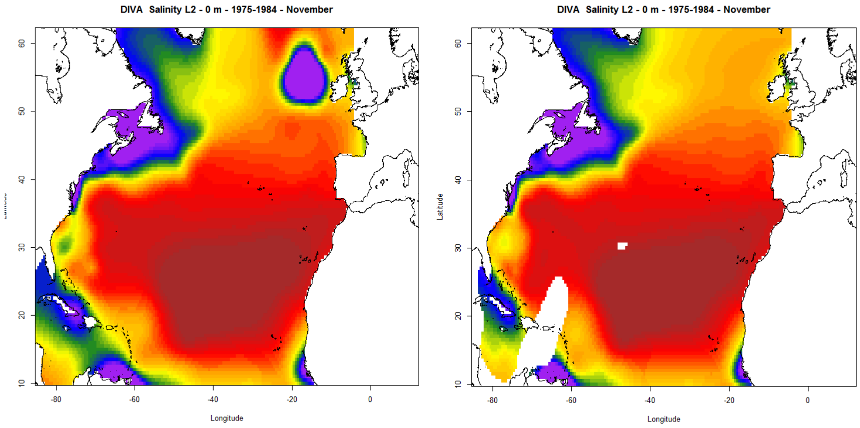


Figure 10. November salinity field at surface of the 1975-1984 run before and after quality control.

The name of the run on which the anomaly has been detected, allows to determine on which year period and month the quality check has to be done (Figure 11).

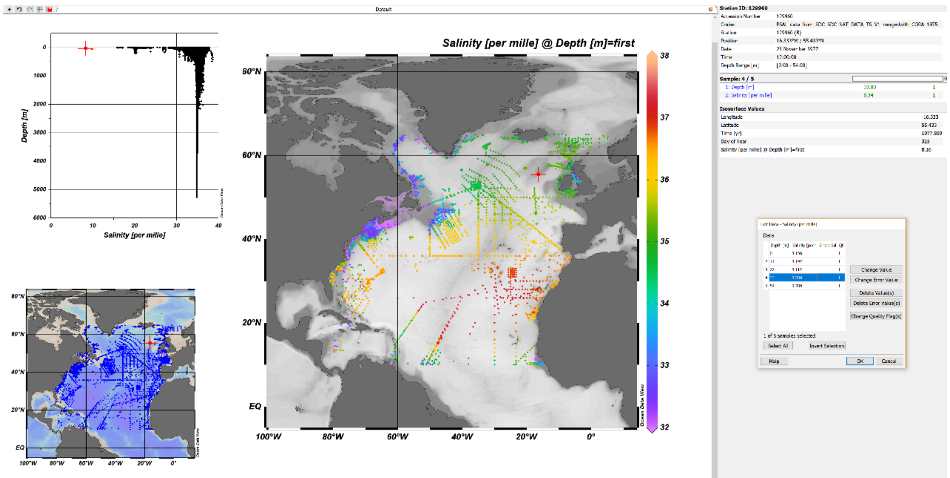


Figure 11. An example of quality control procedure on a specific selection, using ODV software.

2.2. DIVA implementation and settings

The studied area is the North Atlantic Ocean, starting at 10°N up to the boundary of the Artic Sea (62°N). On the western part, the longitude limit is 82°E running to the Mediterranean Sea and the North Sea. Only the output of the Labrador Sea is considered while a mask has been defined to not take into account North Sea, Artic Sea, Mediterranean Sea (Figure 12).

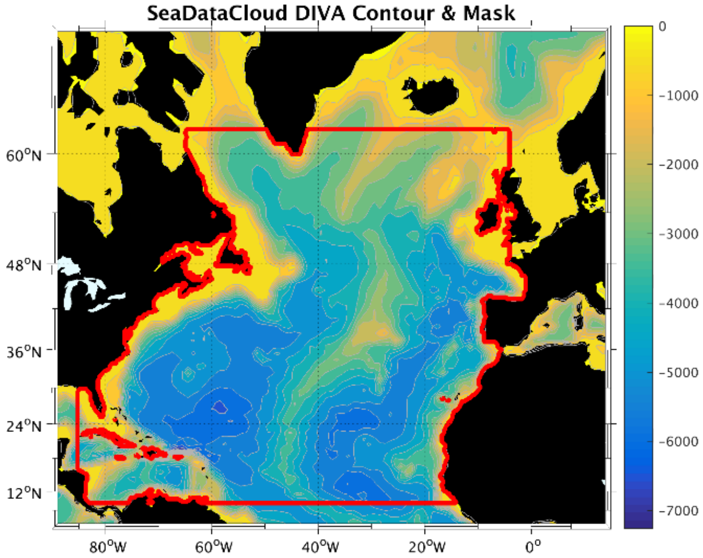


Figure 12. Domain definition and mask (red line) for the North Atlantic Ocean

The analysis has been performed for the time period 1955-2015. A first run was done at monthly scale and another one at seasonal scale (winter: 1202, spring: 0305, summer: 0608, autumn: 0911). A decadal analysis has been also processed (1955-1964/1965-1974/1975-1984/1985-1994/1995-2004/20052015).

The analyses have been processed at two horizontal resolutions:

- 1/2° for comparison with the CMEMS gridded product CORA INSITU_GLO_TS_OA_REP_OBSERVATIONS_013_002_B (http://marine.copernicus.eu/services-portfolio/access-to-products/?option=com_csw&view=details&product_id=INSITU_GLO_TS_OA_NRT_OBSERVATIONS_013_002_a) and,
- 1/4° for comparison with WOA18 (https://www.nodc.noaa.gov/OC5/woa18/).

The vertical levels have been defined equal to the WOA2018 ones:
0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100, 125, 150, 175, 200, 225, 250, 275, 300, 325, 350, 375, 400, 425, 450, 475, 500, 550, 600, 650, 700, 750, 800, 850, 900, 950, 1000, 1050, 1100, 1150, 1200, 1250, 1300, 1350, 1400, 1450, 1500, 1550, 1600, 1650, 1700, 1750, 1800, 1850, 1900, 1950, 2000, 2100, 2200, 2300, 2400, 2500, 2600, 2700, 2800, 2900, 3000, 3100, 3200, 3300, 3400, 3500, 3600, 3700, 3800, 3900, 4000, 4100, 4200, 4300, 4400, 4500, 4600, 4700, 4800, 4900, 5000, 5100, 5200, 5300, 5400, 5500, 5600, 5700, 5800, 5900, 6000 (meters).

The version of DIVA used for the NAT product is DIVA master 4.7.2. All the settings are described in the Table 2. None specific **background field** has been defined for for temperature and salinity fields but only the data mean value has been subtracted (ireg=1).
The "Clever poor mans" **error field** has been used.

Resolution ½°

Lc: correlation length	2	
Snr: signal to noise ratio	1	
Varbak	1	
Parameters estimation and vertical filtering	-10	correlation length parameters are to be estimated using data mean distance as a minimum and vertically filtered
Xori	-85	dx = 0.5 – nx = 195
Yori	10	dx = 0.5 – ny = 105
Vertical levels	107 levels	[6000:100:2000][1950:50:500][475:25:100][95:5:0]
Resolution ¼°		
Lc: correlation length	2	
Snr : signal to noise ratio	1	
Varbak	1	
Parameters estimation and vertical filtering	-10	correlation length parameters are to be estimated using data mean distance as a minimum and vertically filtered
Xori	-85	dx = 0.25 – nx = 389
Yori	10	dx = 0.25 – ny = 209
Vertical levels	107 levels	[6000:100:2000][1950:50:500][475:25:100][95:5:0]

Table 2. DIVA settings for the both resolution 0.5° and 0.25°.

Comparing the error field for two decades, the coverage of the data for the most recent decade allows decreasing significantly the error values (Figure 13). The highest values are observed in areas where data are scattered (mainly in southwest close to the Caribbean seas and close to East American coasts). Some bad data are still in the dataset and have to be removed for the next release.

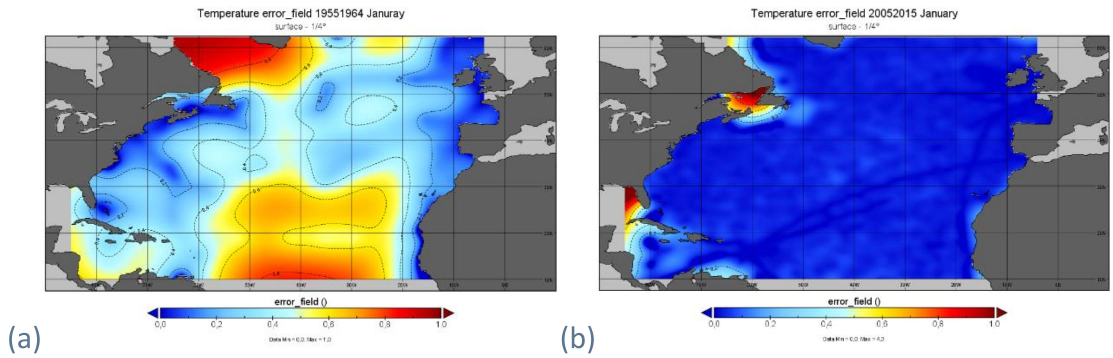


Figure 13. Temperature error field at the surface for the decades (a) 1955-1964 and (b) 2005-2015.

3. Climatology

3.1. Temperature

Fields at two vertical levels have been chosen at the surface and at 1000m of depth, to show respectively the resulting surface T and S distributions and the circulation of the Mediterranean Outflow Waters in the North Atlantic.

Temperature fields in January and July show differences; warmer surface currents and cold North Atlantic Deep Water (NADW) can be easily identified. The thermohaline circulation heats the North Atlantic and Northern Europe. It extends right up to the Greenland and Norwegian Seas, pushing back the winter sea ice margin (Figure 14).

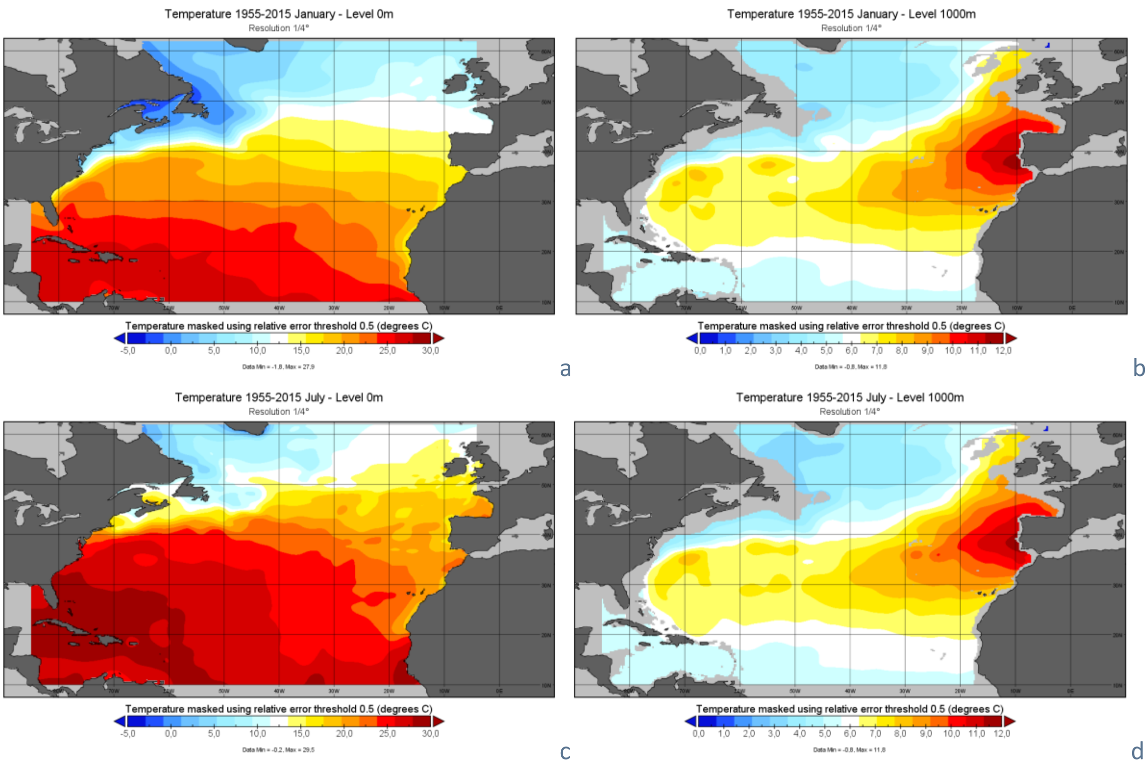


Figure 14. Temperature fields: a) January at the surface; b) January at 1000m; c) July at the surface; c) July at 1000m depth.

Surface currents can be identified according to the sketch in Figure 15, with variations according to the season. The Gulf Stream is represented by a band of warm water.

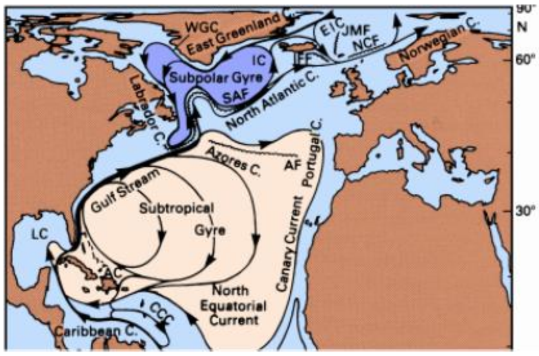


Figure 15. Surface currents of the Atlantic Ocean. SAF: Sub-Antarctic Front, Antilles (AC) Currents and the Caribbean Counter current (CCC), AF: Azores Front (from Tomczak et al., 2003).

Figure 16 and Figure 17 display the decadal fields at seasonal resolution, from decade 1955-1964 to decade 2005-2015, the temperature structure becomes finer due to the increasing data coverage with time.

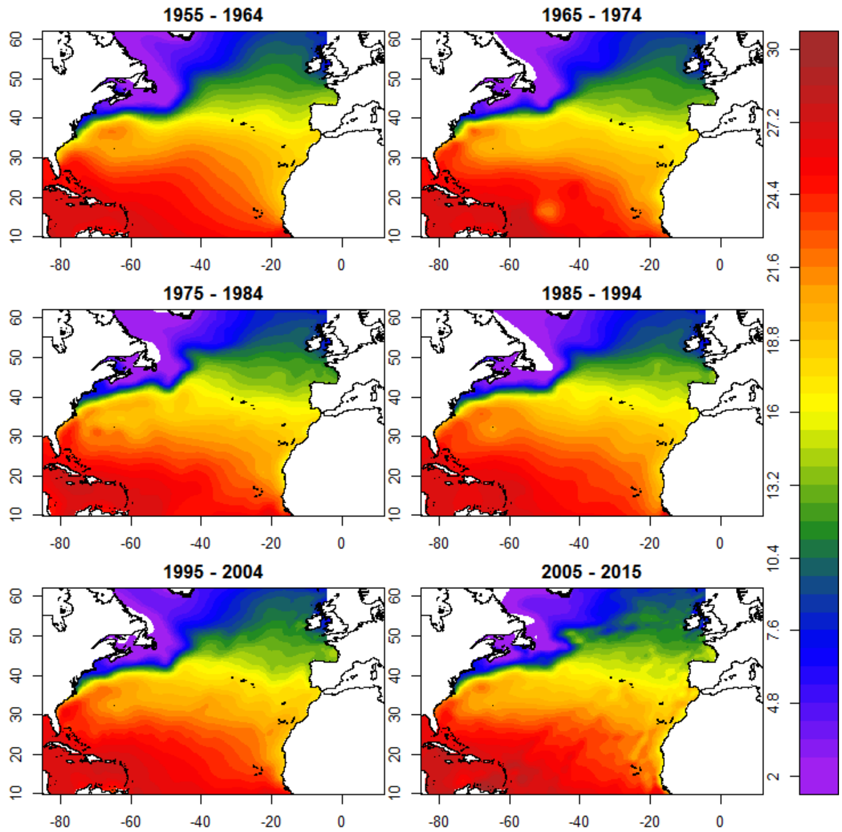


Figure 16. Temperature map at the surface for the 6 decades in Spring (from March to May).

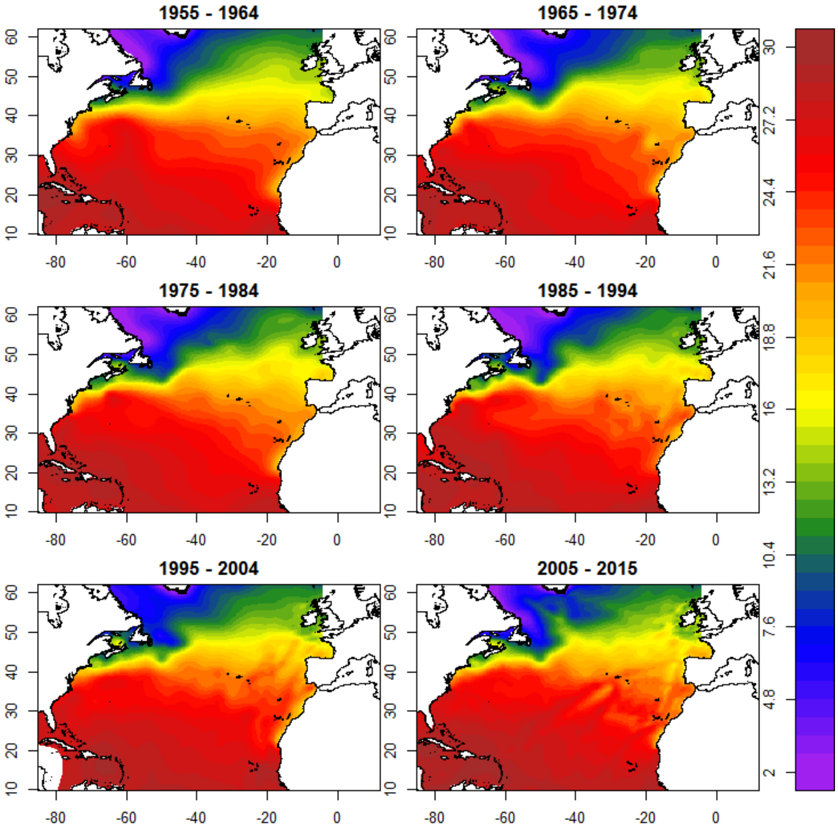


Figure 17. Temperature map at the surface for the 6 decades Autumn (from September to November).

3.2. Salinity

The distribution of the salinity fields at two depth levels have been chosen in Figure 18 to focus on the surface patterns and at 1000m where the circulation of the Mediterranean Outflow Waters can be tracked in the Atlantic Ocean due to a salinity maximum. The decrease of salinity in the North Atlantic Ocean is concentrated in the west and linked with advection by the East and West Greenland Currents and the Labrador Current. Subsurface salinity minima (S<34.95) originating from the Labrador Sea Water (LSW) core are observed on the American continental slope. These minima are traces of the LSW flowing southward along the upper bound of the NADW water mass (Figure 18). LSW is characterized by a minimum of salinity and this signature is found in the western and eastern subpolar North Atlantic. Three major pathways have been identified for LSW: spreading from the formation region to the northeast into the Irminger Sea, spreading eastward into the eastern North Atlantic, and spreading southeastward with the deep western boundary current (Rhein et al, 2000).

Both salinity and temperature maxima are observed at 1000 m depth near the upper distribution limit of NADW, this is the sign of the Mediterranean Outflow Water, which is carried northward along the Portuguese shelf and mixes into the subtropical gyre circulation.

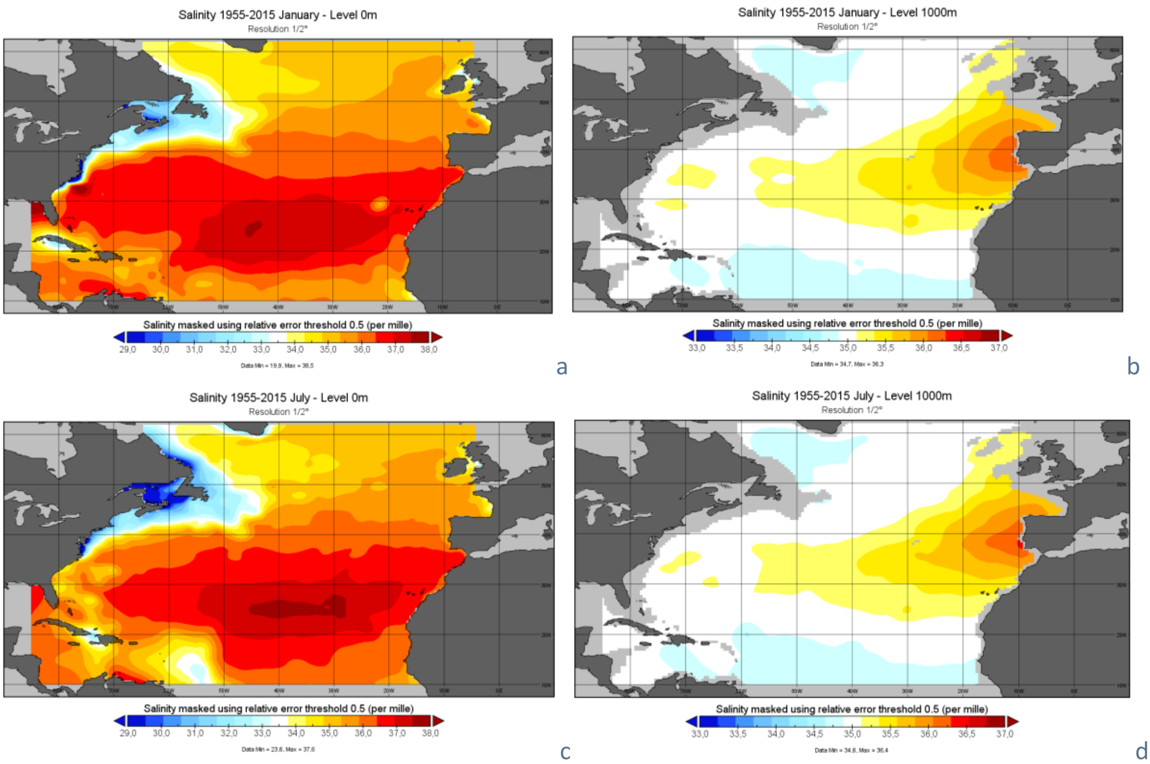


Figure 18. Salinity fields: a) January at the surface; b) January at 1000m; c) July at the surface; c) July at 1000m depth.

Decadal salinity at seasonal resolution in winter Figure 19 and in summer Figure 20 show the spatial structures become finer due to the increasing data coverage with time.

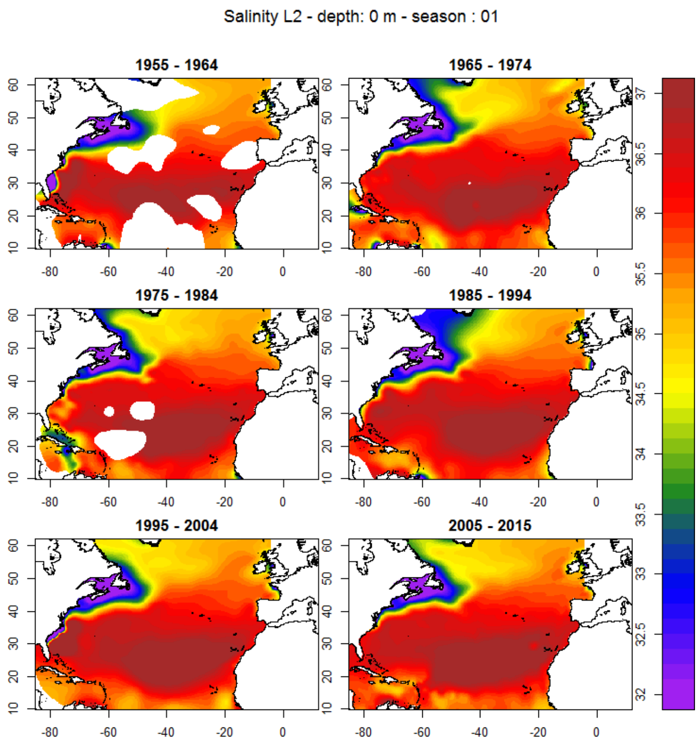


Figure 19. Winter salinity maps at the surface for the 6 decades (from December to February).

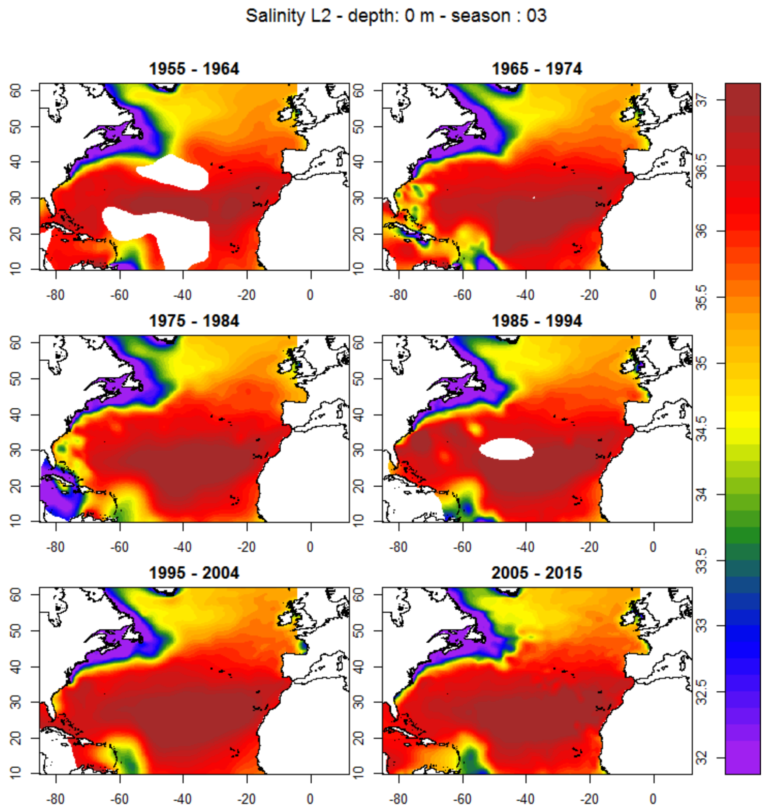


Figure 20. Salinity map at the surface for the 6 decades in Summer (from June to August).

4. Consistency analysis

A preliminary consistency analysis of climatological fields versus a reference product like the World Ocean Atlas (2018) has been performed in order to visualize the main differences and highlight the different products' characteristics.

The World Ocean Atlas 2018 (WOA18) has been chosen as reference data set to perform the consistency analysis. The WOA18, released in September 2018, updates the previous versions of the World Ocean Atlas and includes approximately 3 million new oceanographic casts added to the World Ocean Database (WOD) and a renewed and updated quality control procedure. The WOA18 temperature and salinity fields are being released as preliminary in order to take advantage of community-wide quality assurance.

Comparison of fields between SeaDataCloud and WOA18 is done for the resolution ½° and WOA 1°. For providing differences between both fields, a calculation has been processed on the SeaDataCloud field to fit with the WOA resolution, (the WOA2018 available resolution is 5°, 1° and ¼°). Maps with the gridded field have been generated from SDC and WOA. Anomalies between both fields have also been computed and are presented in Figure 23.

Comparison of SeaDataCloud Climatologies with WOA18 for Temperature in April (**Figure 21**, **Figure 22**) shows that the results match very well, same kind of structures are observed on both maps.

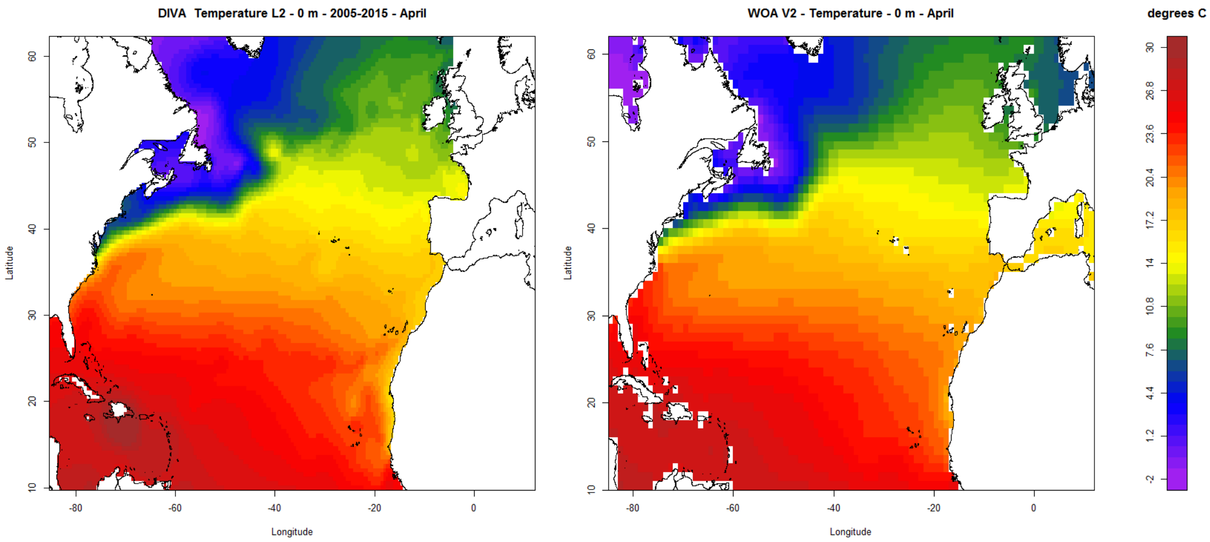


Figure 21. Comparison for surface Temperature in April for the period 2005-2015 (SDC) and 2005-2017 (WOA18) between SeaDataCloud at 1/2° (left) and WOA18 at 1° (right).

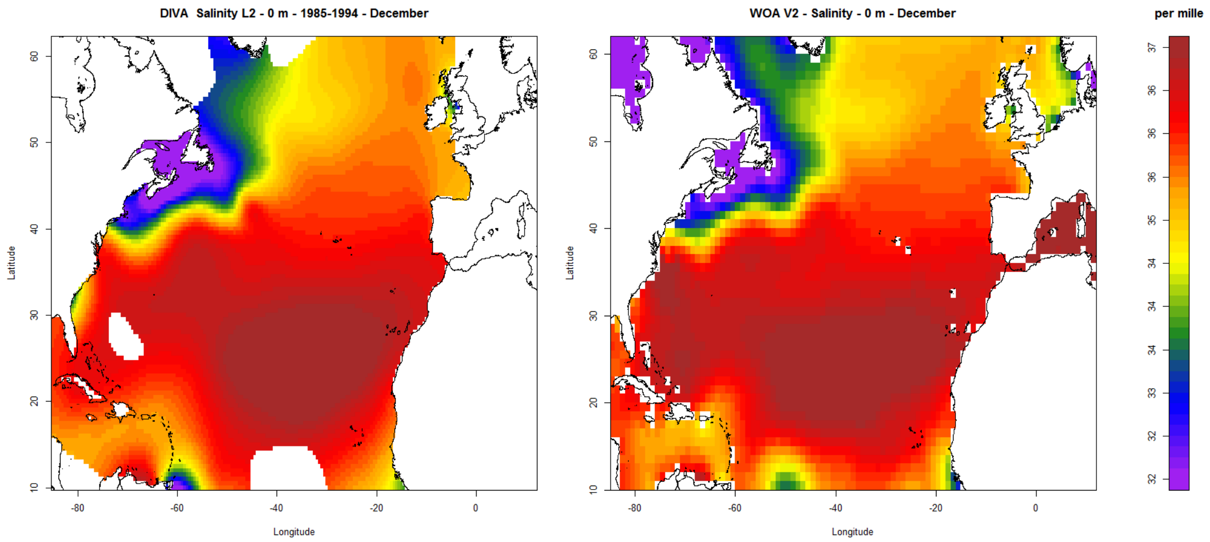
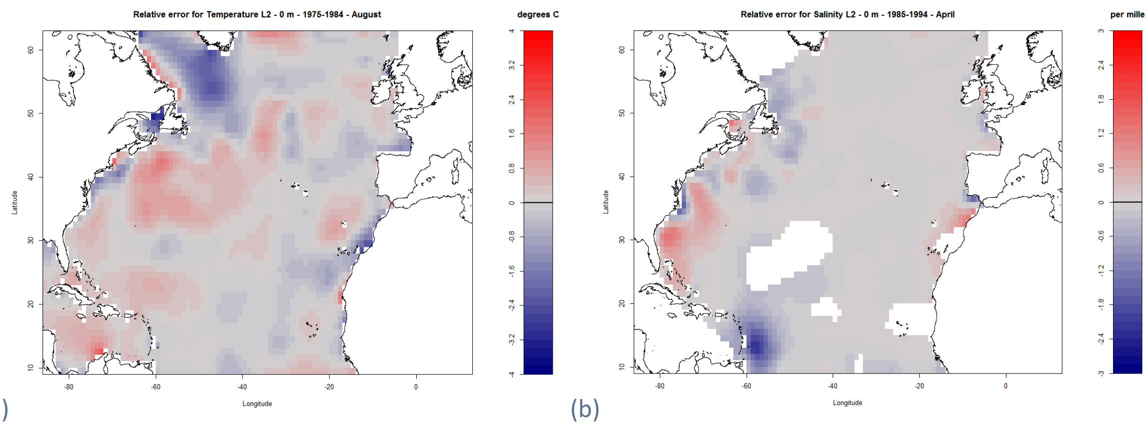


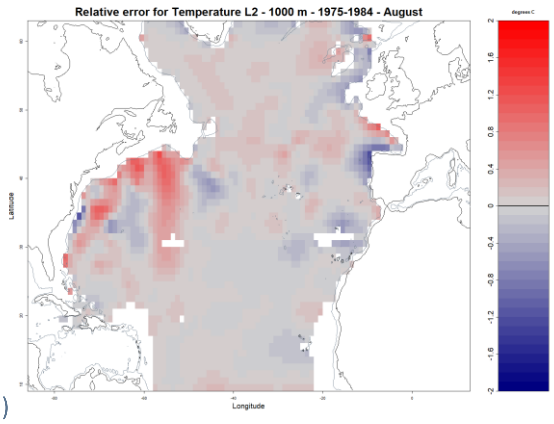
Figure 22. Comparison for surface Salinity in December for the period 1985-1994 between SeaDataCloud at ½° (left) and WOA18 at 1° (right).

Difference between the SDC and WOA18 for temperature and salinity fields is presented in following plots (Figure 23). The mean of the SDC temperature and salinity fields (0.5° resolution) has been calculated to fit with the WOA19 resolution (1°). At surface, large differences are found where the SDC data distribution is sparse. Those differences decrease with depth (Figure 24).

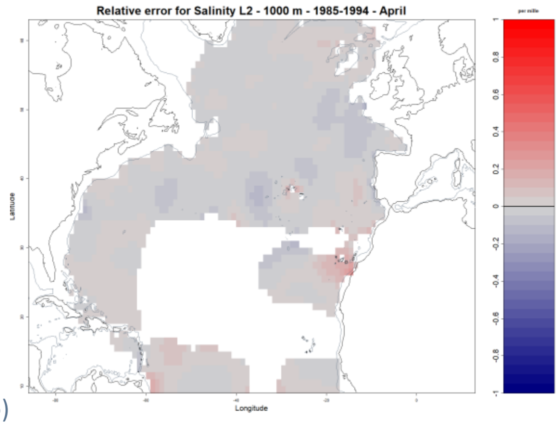


(a) (b)

Figure 23. Difference at the surface between SDC and WOA18 for temperature, period 1975-1984 (a) and salinity, period 1985-1994 (b).



(a)



(b)

Figure 24. Difference at 1000m between SDC and WOA18 for temperature, period 1975-1984 (a) and salinity, period 1985-1994 (b).

5. Technical Specifications

5.1. Product Format

The product is delivered in 2x28 files in NetCDF format (28 by resolution : ½° (050) and ¼° (025). Each NetCDF file contains 4D arrays (3 space dimensions + 1 time dimension) named according the the following rule:

- *Parameter_Name* – 4d array for a parameter,
- *Parameter_Name_L1* – … parameter masked using relative error threshold 0.3,
- *Parameter_Name_L2* – … parameter masked using relative error threshold 0.5,
- *Parameter_Name_relerr* – relative error of parameter.

1. The content of the NetCDF Files is described as follow (only few ex. are shown): SDC_NAT_CLIM_T_1955_2015_050_monthly.nc contains monthly climatic fields for the parameter temperature for the period 1955 to 2015.
2. SDC_NAT_CLIM_T_1955_2015_050_seasonal.nc contains seasonal climatic fields for the parameter temperature for the period 1955 to 2015. Seasons are defined as it follows: 1202 winter; 0305 spring; 0608 summer and 0911 autumn.
3. SDC_NAT_CLIM_T_1955_1964_050_monthly.nc contains monthly climatic fields for the parameter temperature for the first decade 1955-1964 [same files for the other decades 1965-1974/1975-1984/1985-1994/1995-2004/2005-2015]
4. SDC_NAT_CLIM_T_1955_1964_050_seasonal.nc contains seasonal climatic fields for the parameter temperature for the first decade 1955-1964 [same files for the other decades 1965-1974/1975-1984/1985-1994/1995-2004/2005-2015]. Seasons are defined as it follows: 1202 winter; 0305 spring; 0608 summer and 0911 autumn.

This description is shown for the parameter temperature and the resolution ½° (050). Same files have been produced for salinity and the resolution ¼° (025). See the table in the Annex 1 for the naming convention of the products.

5.2. Product Usability

The climatic fields can be used as to support the general oceanographic studies, ocean modelling and forecast, processes studies, climate change studies etc. They can be used, for example, for initialization and verification of different ocean models, for investigation of climatic trends.

5.3. Product drawbacks

Due to the merging with the external data sources, anomalies can be still observed in the gridded fields at certain levels. Some improvements in the quality control will be performed for the next release. The quality of the data products depends highly on the distribution of the available data (in space and time) and cannot be assumed as uniform. In particular the uncertainty of the data products for the decades 1955-1964 and 1965-1974 is higher than for the following decades.

5.4. Changes since previous version

In this version, a subset of the CORA external dataset has been integrated allowing to improve the product mainly for the older years where a small amount of data was available. An improvement can also be observed for some regions, mainly in the western part of the North Atlantic Ocean, where not as much data from European data centres is available. For the first time, products are also provided in a decadal temporal scale.

Annex 1 – Naming convention for SeaDataCloud climatologies

File naming conventions: [PRO]_[REG]_[PROD]_[V]_[YYYY1]_[YYYY2]_[T], where:

1. [PRO] - project
2. [REG] - region
3. [PROD] - product
4. [V] - variable
5. [YYYY1]_[YYYY2] - time coverage
6. [T] - temporal resolution (m=monthly, s=seasonal, a=annual)

Resolution ½° and resolution ¼° =>
<R> in the table is replaced by 050 for ½° and 025 for ¼°

Project	Region	Product	Var	Time Coverage	Time Res	Full Name
SDC	NAT	CLIM	T	1955-2015	m	SDC_NAT_CLIM_T_1955_2015_<R>_monthly
SDC	NAT	CLIM	S	1955-2015	m	SDC_NAT_CLIM_S_1955_2015_<R>_monthly
SDC	NAT	CLIM	T	1955-2015	s	SDC_NAT_CLIM_T_1955_2015_<R>_seasonal
SDC	NAT	CLIM	S	1955-2015	s	SDC_NAT_CLIM_S_1955_2015_<R>_seasonal
SDC	NAT	CLIM	T	1955-1964	m	SDC_NAT_CLIM_T_1955_1964_<R>_monthly
SDC	NAT	CLIM	T	1965-1974	m	SDC_NAT_CLIM_T_1965_1974_<R>_monthly
SDC	NAT	CLIM	T	1975-1984	m	SDC_NAT_CLIM_T_1975_1984_<R>_monthly
SDC	NAT	CLIM	T	1985-1994	m	SDC_NAT_CLIM_T_1985_1994_<R>_monthly
SDC	NAT	CLIM	T	1995-2004	m	SDC_NAT_CLIM_T_1995_2004_<R>_monthly
SDC	NAT	CLIM	T	2005-2015	m	SDC_NAT_CLIM_T_1995_2015_<R>_monthly
SDC	NAT	CLIM	S	1955-1964	m	SDC_NAT_CLIM_S_1955_1964_<R>_monthly
SDC	NAT	CLIM	S	1965-1974	m	SDC_NAT_CLIM_S_1965_1974_<R>_monthly
SDC	NAT	CLIM	S	1975-1984	m	SDC_NAT_CLIM_S_1975_1984_<R>_monthly
SDC	NAT	CLIM	S	1985-1994	m	SDC_NAT_CLIM_S_1985_1994_<R>_monthly
SDC	NAT	CLIM	S	1995-2004	m	SDC_NAT_CLIM_S_1995_2004_<R>_monthly
SDC	NAT	CLIM	S	2005-2015	m	SDC_NAT_CLIM_S_1995_2015_<R>_monthly
SDC	NAT	CLIM	T	1955-1964	s	SDC_NAT_CLIM_T_1955_1964_<R>_seasonal
SDC	NAT	CLIM	T	1965-1974	s	SDC_NAT_CLIM_T_1965_1974_<R>_seasonal
SDC	NAT	CLIM	T	1975-1984	s	SDC_NAT_CLIM_T_1975_1984_<R>_seasonal
SDC	NAT	CLIM	T	1985-1994	s	SDC_NAT_CLIM_T_1985_1994_<R>_seasonal
SDC	NAT	CLIM	T	1995-2004	s	SDC_NAT_CLIM_T_1995_2004_<R>_seasonal
SDC	NAT	CLIM	T	2005-2015	s	SDC_NAT_CLIM_T_1995_2015_<R>_seasonal
SDC	NAT	CLIM	S	1955-1964	s	SDC_NAT_CLIM_S_1955_1964_<R>_seasonal
SDC	NAT	CLIM	S	1965-1974	s	SDC_NAT_CLIM_S_1965_1974_<R>_seasonal
SDC	NAT	CLIM	S	1975-1984	s	SDC_NAT_CLIM_S_1975_1984_<R>__seasonal
SDC	NAT	CLIM	S	1985-1994	s	SDC_NAT_CLIM_S_1985_1994_<R>_seasonal
SDC	NAT	CLIM	S	1995-2004	s	SDC_NAT_CLIM_S_1995_2004_<R>__seasonal
SDC	NAT	CLIM	S	2005-2015	s	SDC_NAT_CLIM_S_1995_2015_<R>_seasonal

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List of acronyms

Acronym	Definition
ARC	Arctic ocean
BAL	Baltic Sea
BLS	Black Sea
CDI	Common Data Index
CLIM	Climatology
CMEMS	Copernicus Marine Environment Monitoring Service
CORA	COriolis-ReAnalysis
DATA	Aggregated Dataset
DIVA	Data-Interpolating Variational Analysis (software)
DOI	Digital Object Identifier
EC	European Commission
EDMO	European Directory of Marine Organisations (SeaDataNet catalogue)
GLO	GLobal Ocean
IOC	Intergovernmental Oceanographic Commission
IODE	International Oceanographic Data and Information Exchange (IOC)
MED	Mediterranean Sea
NAT	North Atlantic Ocean
NWS	North West Shelf
ODV	Ocean Data View Software
QC	Quality Checks
QF	Quality Flags
SDC	SeaDataCloud
SDN	SeaDataNet
TS	Temperature and Salinity
WOA	World Ocean Atlas
WP	Work Package