



SeaDataCloud 2ndPleanary Meeting,
Barcelona 8-9 October 2018

SeaDataCloud Temperature and Salinity data collections

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Marine Data Value Chain



SUPPORT ACTIVITIES

Coordination and Communication

System Monitoring

Technology Infrastructure

Service Development

Create Knowledge,
Derive Products,
Develop
Applications and
Services,
Drive Predictive
Models,
Rapid
Environmental
Assessment

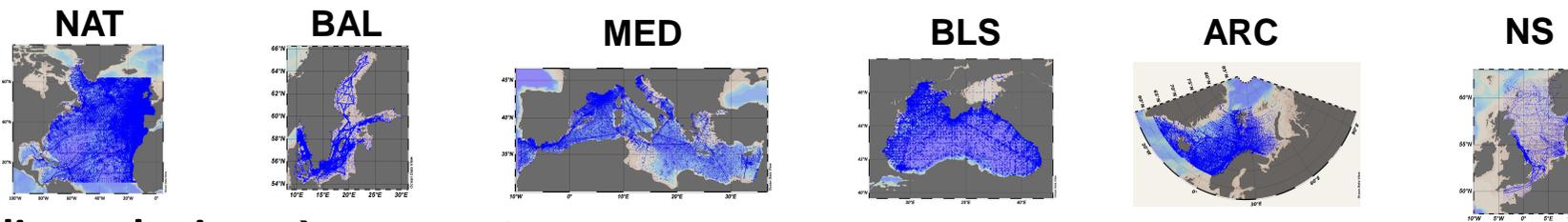
INNOVATION
EFFECTIVE &
TRANSPARENT
DECISION
SUPPORT
BLUE
SUSTAINABLE
GROWTH

FAIR guiding data management principle and linking data approach
Science support and supervision → Up to date QC procedures
User driven and provider/producer appreciative

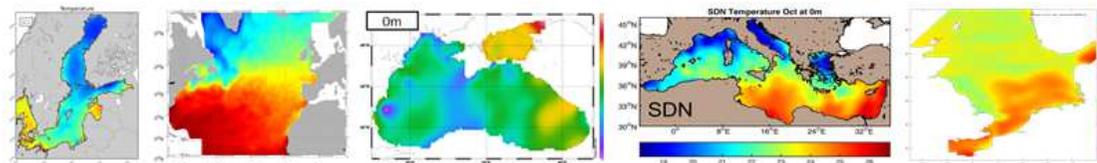
SeaDataCloud Products

GOAL: to provide the best **data products** from SeaDataNet at **regional and global scale** and serve diverse user communities (op. oceanography, climate, marine environment, institutional, academia)

- 1. Aggregated data sets EU marginal seas** → historical temperature and salinity data harvested from the central CDI and validated by regional leaders

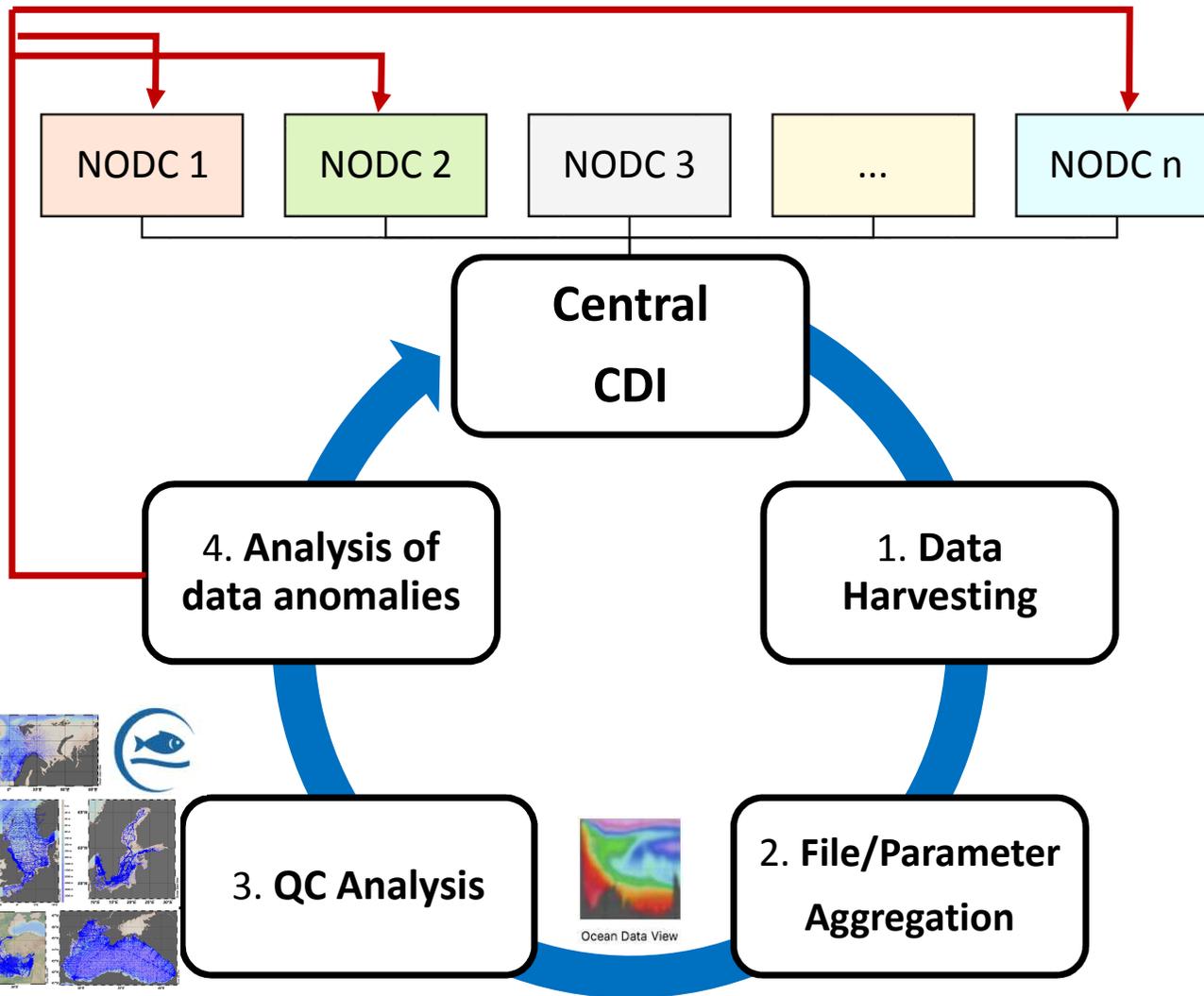


- 2. Climatologies** → gridded fields obtained through DIVA mapping tool and representing the climate of the ocean at **regional and global scale**



- 3. New data products** → multi-platform and multi-disciplinary approach combining in situ (e.g. gliders, Argo, ships, drifters, fixed platforms) and remote sensed observations, Ocean Monitoring Indicators for tracking ocean mechanisms and/or climate modes and trends

Quality Control Strategy (QCS)



GOAL: to improve the quality of SeaDataNet database content and create the best data products

→ **iterative approach** to facilitate the **upgrade** of the database and **versioning** of data products



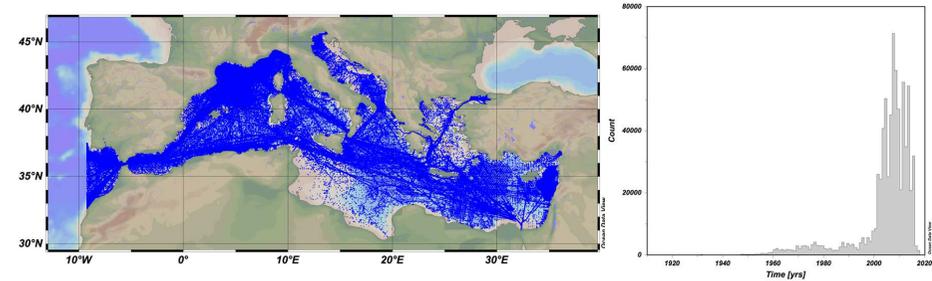
ODV5.0

Ocean Data View

Common guidelines

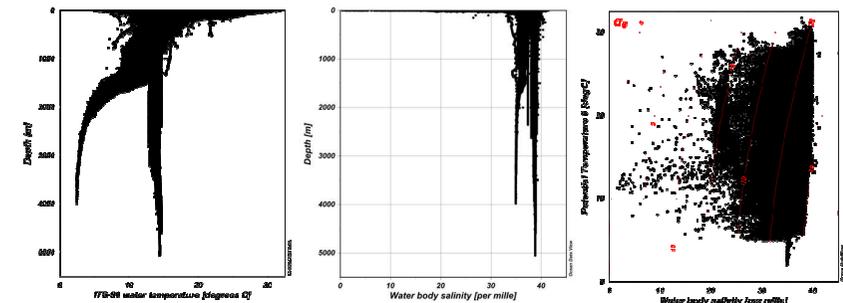
1. Spatial data distribution
2. Temporal data distribution (annual, seasonal and monthly)
3. Quality Flags statistics
4. Scatter plots of good/probably good (QF1/QF2) observations
5. Gross range check
6. Analysis of QF0 data (not checked) to disclose good data
7. Visual check to identify wrong profiles (spikes, outliers)
8. Identification of stations on land
9. Identification of wrong/missing data (time, measurements)
10. Stability check

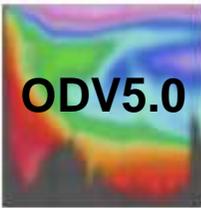
Quality Control Analysis



par	# stations	%	# samples
total	739784		
T	737102	99,6	41223938
S	667232	90,2	28518744
TS	665388	89,9	28119926

%	QF0	QF1-2	Q3-4
dpt	3.0→0	96.9→99.8	0.1
T	2.7→0	97.0→99.8	0.3
S	4.5→0	94.6→99.2	0.9
dpt&T&S	3.0	94,4	0.3





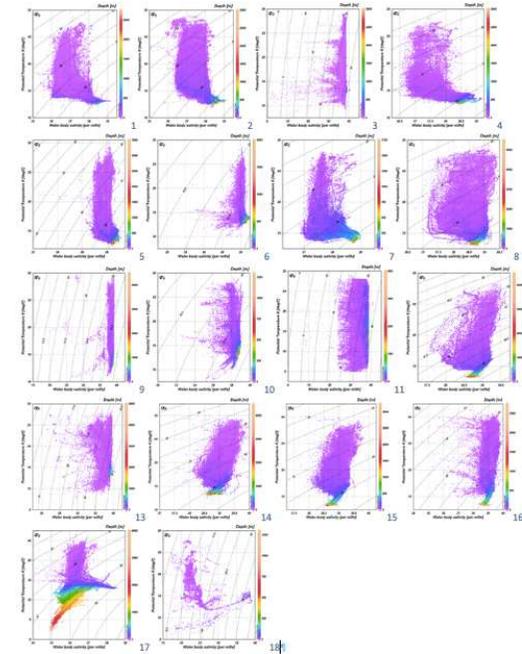
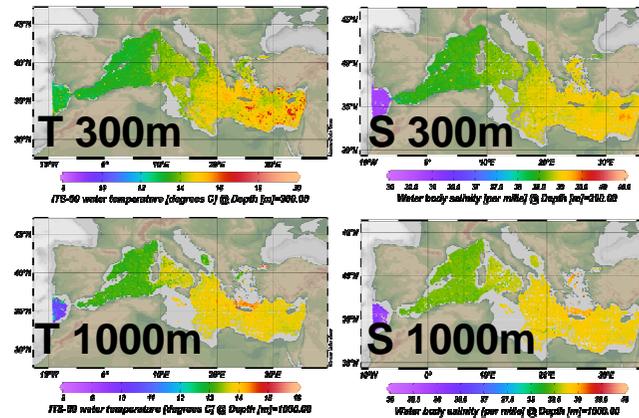
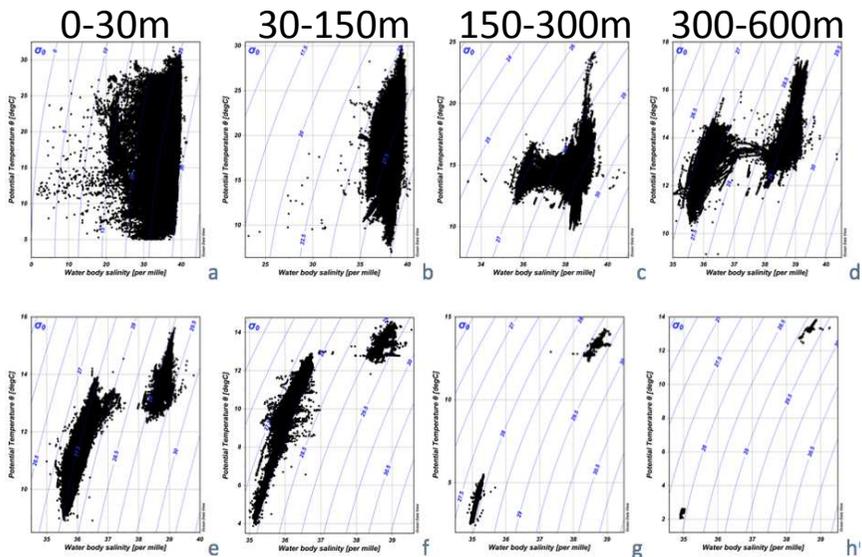
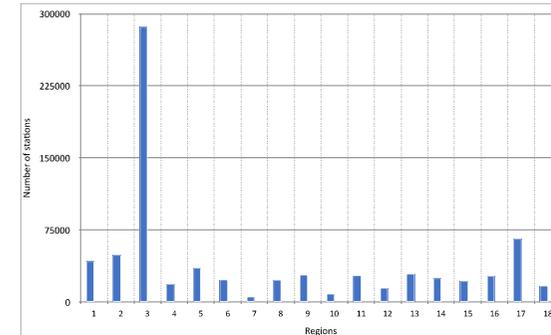
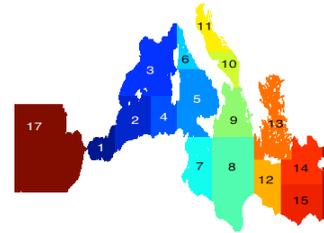
ODV5.0

Quality Control Analysis

Ocean Data View

Specific checks per

- **areas** (similar hydrodynamic characteristics)
- **layers** (surface, intermediate, bottom)
- **time periods** (decades or specific periods)
- **Instrument type** (consistency issue of historical data)



ODV5.0

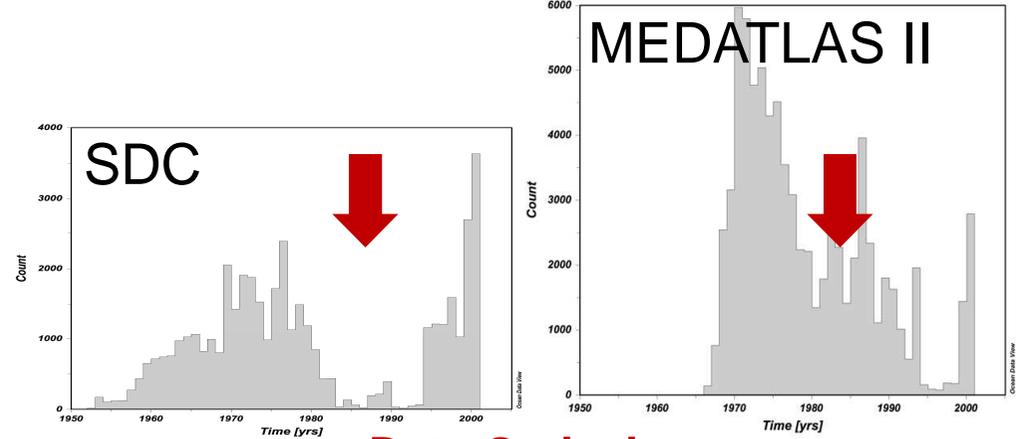
Ocean Data View

Metadata Analysis

- New **data distributors/originators statistics** → QC filtering by EDMO code → detection of systematic (format, flagging) errors
- New **instrument type statistics** → analysis of monitoring space-time coverage → detection of data omissions

Instrument/Gear Type	# stations	%
CTD	52031	7
bathythermograph	56558	8
discrete water sampler	32258	4
thermosalinograph	555269	75
thermistor chains	22	0
continuous water sampler	1577	0
salinity sensor; water temperature sensor	19852	3
salinometers	100	0
salinity sensor	143	0
water temperature sensor	1	0
none info	21973	3

MED XBTs 1950-2000



Data Omission

!!!Actions needed to ingest missing XBTs!!!

!!!Actions needed to complete crucial metadata information!!!





ODV5.0

Ocean Data View

Metadata Analysis

- New **data distributors/originators statistics** → QC filtering by EDMO code → detection of systematic (format, flagging) errors
- New **instrument type statistics** → analysis of monitoring space-time coverage → detection of data omissions

Instrument Info	Probe	# stations	%
"		26162	46
'SDN:P01::ADEPZZ01 SDN:L22::TOOL0262 SDN:L33::011 SDN:P01::TEMPET01 SDN:L22::TOOL0262'	T-5 XBT	1239	2
'SDN:P01::ADEPZZ01 SDN:L22::TOOL0263 SDN:L33::041 SDN:P01::TEMPET01 SDN:L22::TOOL0263'	T-7 XBT	9995	18
'SDN:P01::ADEPZZ01 SDN:L22::TOOL0263 SDN:L33::041 SDN:P01::TEMPPR01 SDN:L22::TOOL0263'	T-7 XBT	14	0
'SDN:P01::ADEPZZ01 SDN:L22::TOOL0435 SDN:L33::001 SDN:P01::TEMPET01 SDN:L22::TOOL0435'	T-4 XBT	16732	30
'SDN:P01::ADEPZZ01 SDN:L22::TOOL0592 SDN:L33::710 SDN:P01::TEMPET01 SDN:L22::TOOL0592'	XCTD-2	6	0
'SDN:P01::ADEPZZ01 SDN:L22::TOOL0718 SDN:L33::061 SDN:P01::TEMPET01 SDN:L22::TOOL0718'	T-10 XBT	2126	4

!!!Actions needed to complete crucial metadata information!!!

Data and Metadata Omissions: MED XBTs

	EDMO	# stations	%
OGS	120	491	1
ENEA	136	10488	19
HCMR	269	869	2
Ifremer	486	13549	24
SHOM	540	30876	55
MHI	727	1	0

ENEA, OGS and Ifremer have been informed:

- ENEA will insert all the probe info available and missing metadata
- Ifremer checked and added additional available metadata and ~91k French XBTs
- OGS will insert missing probe and instrument type info

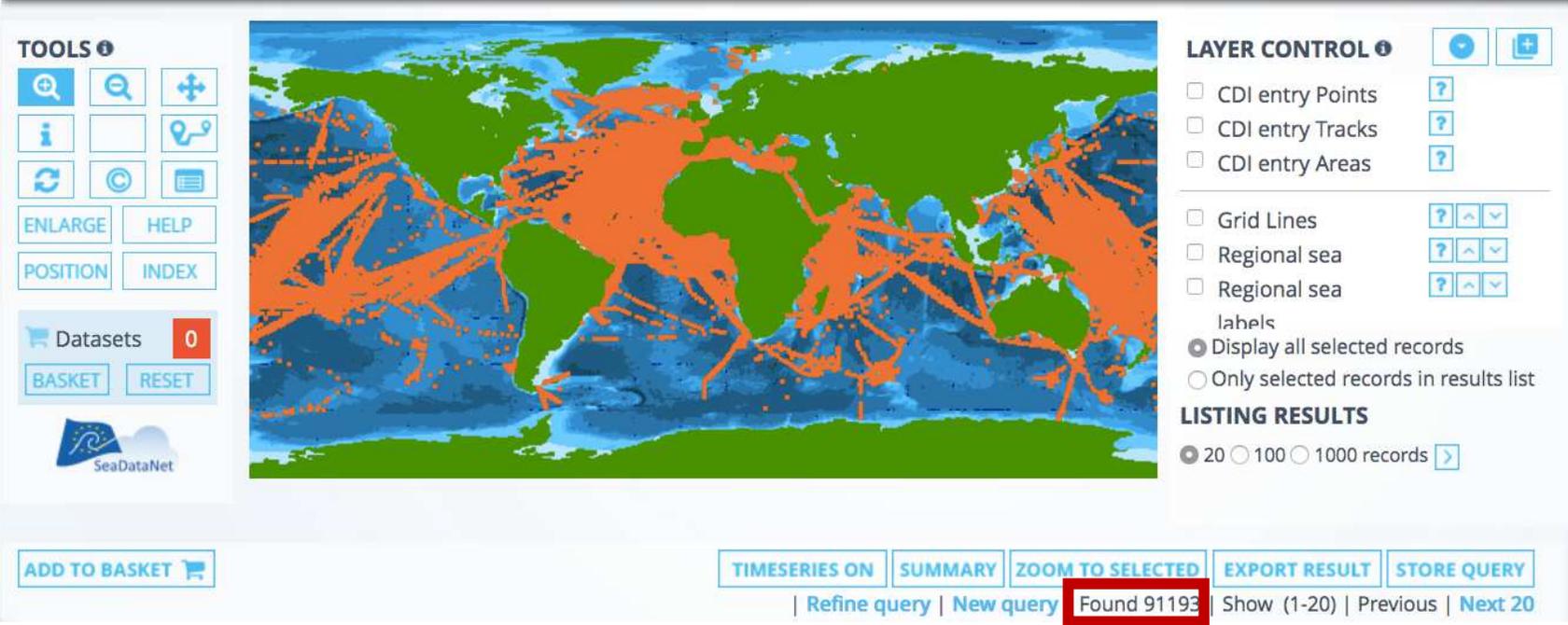
Filling data and metadata omissions highly improves the quality of the infrastructure content and increases users' confidence

Reprocessing at the data center level allows

→ to secure and preserve crucial historical info (international approach of preserving the original data)

→ to apply the latest XBT bias correction (ODV development)

New French XBTs



TOOLS

- ENLARGE
- HELP
- POSITION
- INDEX

Datasets **0**

BASKET RESET

LAYER CONTROL

- CDI entry Points
- CDI entry Tracks
- CDI entry Areas
- Grid Lines
- Regional sea
- Regional sea

labels

- Display all selected records
- Only selected records in results list

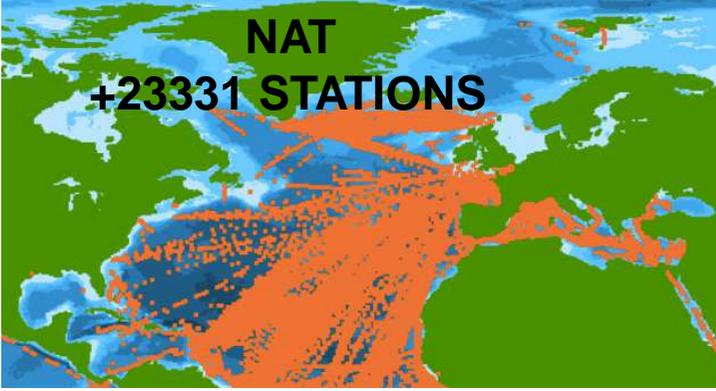
LISTING RESULTS

20 100 1000 records

ADD TO BASKET

TIMESERIES ON SUMMARY ZOOM TO SELECTED EXPORT RESULT STORE QUERY

Refine query | New query **Found 91193** | Show (1-20) | Previous | Next 20



Results: database progresses

Cruises			Stations			Samples (data)		
SDN2_V2	SDC_V1	±%	SDN2_V2	SDC_V1	±%	SDN2_V2	SDC_V1	±%
Mediterranean Sea								
			212887	734957	+245%	26625173	42294299	+59%
Black Sea								
1723	2284	+32.6%	96487	137723	+43%	2696215	4240346	+57%
Arctic Sea								
1075	1956	+82%	266291	731286	+175%	19681474	24203161	+23%
Baltic Sea								
						11100238	13780801	+24%
North Atlantic								
			1807266	9091773	+403%			
North Sea								
			115 596	162 452	+41%	6670529	7817193	+17%

Product Information Documents (PIDoc)

PIDocs contain all specifications and descriptions of:

- Product's characteristics (format, space-time coverage, resolution)
- Quality (validation methodology and results)
- Product's usability
- **data distributors and data originators list** (add statistics)
- instrument type statistics

PIDocs have DOI and are available through the product landing page

→ **Big effort to produce/revise and publish PIDocs**

→ **Major improvement to increase user confidence and products uptake**

- Data population statistics per sea basin show a progressive increase of available data
- Data quality also improved thanks to the introduction of additional checks by regional experts (sub-regions, depth layers, iso-surfaces)
- QF statistics after QC present very high percentages of good data (QF1,2) ~99% MED; 98-99% BLS; ~99% ARC; ~99% BAL; 98-99% NS 96(S)-99% NAT
- **metadata statistics** about data distributors/originators highlights systematic (format, flagging) errors and allows the monitoring the EU data sharing landscape but also fair acknowledgment to providers
- **instrument type statistics** highlights omissions and suggests the need of systematic check and data reprocessing at the data centers level



SDC_DATA_TS_V1 release (June 2018)



PAN-EUROPEAN INFRASTRUCTURE FOR OCEAN & MARINE DATA MANAGEMENT

PARTNERS



USERS



- ABOUT US
- METADATA
- DATA ACCESS
- STANDARDS
- SOFTWARE
- PRODUCTS**
- EVENTS
- PUBLICATIONS

PRODUCTS

SeaDataNet provides aggregated datasets (ODV collections of all SeaDataNet measurements of temperature and salinity by sea basins) and climatologies (regional gridded field products based on the aggregated datasets) for all the European sea basins.

[Read more](#)

Aggregated datasets

Climatologies

Documentation

catalogue

**SDC_DATA_TS_V1
EU basins (DOI)
and
Product Information
Documents
(DOI)**

SeaDataNet2

gridded climatologies (DOI)

- First aggregated dataset V1.1
- Regional climatologies V1.1
- Second aggregated dataset V2

Products Catalogue

SeaDataCloud

CATALOGUE MY DOWNLOADS

Results 1 to 6 on 6 - 20 by page - Sort by: Popularity -

Black Sea - Temperature and salinity Historical Data Collection SeaDataCloud V1

The SeaDataCloud Temperature and Salinity Historical Data Collection for the Black Sea includes open access in situ data on temperature and salinity of water column in the Black Sea (and a little in the Sea of Azov) for period 1968 Endash; 2017. The data were retrieved...

Source: SeaDataNet

Mediterranean Sea - Temperature and salinity Historical Data Collection SeaDataCloud V1

SDC_MED_DATA_TS_V1 SeaDataCloud Temperature and Salinity data collection for the Mediterranean Sea contains all open access temperature and salinity in situ data retrieved from SeaDataNet infrastructure at the end of October 2017. The data span between -9.25 and...

Source: SeaDataNet

North Atlantic Ocean - Temperature and Salinity Historical Data Collection SeaDataClou...

The SeaDataCloud TS historical data collection v1 for the North Atlantic Ocean, includes open access in situ data on temperature and salinity of water column in the North Atlantic Ocean from 10°N to 62°N, including the Labrador Sea. The data were retrieved...

Source: SeaDataNet

North Sea - Temperature and salinity Historical Data Collection SeaDataCloud V1

The data collection of the North Sea is divided in two datasets - the discrete collection and the trajectories collection. The Discrete SeaDataCloud Temperature and Salinity Historical Data Collection for the North Sea includes open access in situ data on temperature...

Source: SeaDataNet

Baltic Sea - Temperature and salinity Historical Data collection SeaDataCloud V1

The SeaDataCloud Temperature and Salinity historical data collection for the Baltic Sea includes open access in situ data on temperature and salinity of water column. The data were retrieved from the SeaDataNet infrastructure at the end of 2017. Data have been quality...

Source: SeaDataNet

Arctic Ocean - Temperature and salinity Historical Data Collection SeaDataCloud V1

SeaDataCloud Temperature and Salinity historical data collection for the Arctic Ocean, including revised quality flags after quality control with ODV. The dataset format is ODV binary collections. You can read, analyse and export from the ODV application provided by Alfred...

Source: SeaDataNet

Reset filters

Products Catalogue

Mediterranean Sea - Temperature and salinity Historical Data Collection SeaDataCloud V1

SDC_MED_DATA_TS_V1 SeaDataCloud Temperature and Salinity data collection for the Mediterranean Sea contains all open access temperature and salinity in situ data retrieved from SeaDataNet infrastructure at the end of October 2017. The data span between -9.25 and 37 degrees of longitude, thus including an Atlanticic the Marmara Sea. It covers the time period 1900-2017. Data have been qua checked using ODV 5.0 software. Quality Flags of anomalous data have been revised using basic QC procedures. The dataset format is ODV binary collections...

Source: SeaDataNet

Download

Landing Page

SEXTANT Spatial Data Infrastructure for Marine Environments

Mediterranean Sea - Temperature and salinity Historical Data Collection SeaDataCloud V1

Date(s): 2018-05-31 (Creation)
 Author(s): Simona Simoncelli¹, Dick Schaap², Reiner Schiltzer³
 Custodian(s): IFREMER / IDM/SISMER⁴
 Originator(s): National Oceanography Centre, Southampton; British Oceanographic Data Centre; Plymouth Marine Laboratory; Proudman Oceanographic Laboratory; CNR, Istituto di Scienze Marine (Sezione di Venezia - ex IBM); OGS (Istituto Nazionale di Oceanografia e di Geofisica Sperimentale); Division of Oceanography; SACLANT Undersea Research Centre (SACLANTCEN); CNR, Institute of Marine Science (ISMAR) (Trieste); CNR, Istituto per lo Studio della Dinamica delle Grandi Masse; Institute of Marine Science S.S. di Lissini (ISPM); ENA Centro Ricerche Ambiente Marino - La Spezia; University of Genova - Laboratory of Marine Geology and Sedimentology, Dpt for the Study of the Territory and Resources; CNR, Institute of Marine Science (ISMAR) - Ancona; CNR, Institute of Marine Science (ISMAR) - Bologna; CNR, Institute of Atmospheric Sciences and Climate (ISAC) (Rome); Hellenic Centre for Marine Research; Institute of Oceanography (IOCHRIO); Università degli Studi di Napoli "Parthenope" - Istituto di Meteorologia e Oceanografia; Stazione Zoologica Anton Dohrn of Naples; Marine Biology Laboratory of Trieste; ICM-CSC/ Institute of Marine Sciences (ICM-CSC); Balearic Islands University, Environmental Biology Department; UIIP; IEO Spanish Oceanographic Institute; Marine Institute; IRD / CENTRE DE BRÉTAGNE; IFREMER / EEP / LEP-DEEP ENVIRONMENT LABORATORY; IFREMER / GM-MARINE GEOSCIENCES; IFREMER / IDM / SISMER - Scientific Information Systems for the SEA; LABORATORY OF OCEANOGRAPHY OF VILLEFRANCHE (LOV) / ODV; MUSEUM NATIONAL D'HISTOIRE NATURELLE / LABORATOIRE D'OCEANOGRAPHIE PHYSIQUE; COM - Physical and Biogeochemical Oceanography Laboratory (LUMINY); UNIVERSITY OF PERPIGNAN / CEFREP; IFREMER / RBE Department / Biogeochemical and Ecotoxicological Research Unit (Nantes); Developmental Biology Research Laboratory; CNRS / Microbiology, Geochemistry and Marine Ecology Laboratory; Shom; CEA / Laboratory of climatological and environmental Sciences (CEP); CNRS / Laboratory of studies on Spatial Geophysics and Oceanography (LEGO); CEREGE; IHPT; Hydrographic Institute; NIOZ Royal Netherlands Institute for Sea Research; Atlantic Scientific Research Institute for Marine Fishery and Oceanography; PP Shirshov Institute of Oceanography, RAS; National Institute of Fisheries Research (INHR); Institute of Marine Sciences, Middle East Technical University; Institute of Oceanography and Fisheries; Center for marine research - Rudjer Boskovic Institute; International Ocean Institute - Malta Operational Centre (University Of Malta) / Physical Oceanography Unit; Malta

Access to data and metadata

Link to the data services and to the full metadata

PIDoc

Is cited by

Simoncelli Simona, Myroshnychenko Volodymyr, Coatanooan Christine (2018). SeaDataCloud Temperature and Salinity Historical Data Collection for the Mediterranean Sea (Version 1). Product Information Document (PIDoc).

ARCHIMER ifremer's institutional repository

SeaDataCloud Temperature and Salinity Historical Data Collection for the Mediterranean Sea (Version 1)

Click to download the PDF

Download metadata
TXT, RIS, XLS

Project(s) FP7/A2020
SeaDataCloud

Related datasets
IFREMER / IDM / SISMER - Scientific Information Systems for the SEA (2018). Mediterranean Sea - Temperature and salinity Historical Data Collection SeaDataCloud V1. IFREMER / IDM/SISMER.

Share

Type: Report
 Date: 2018
 Language: English
 Ref.: Product Information Document (PIDoc)
 Copyright: SeaDataCloud
 Author(s): Simoncelli Simona¹, Myroshnychenko Volodymyr², Coatanooan Christine³
 DOI: 10.13155/57036
 Publisher: SeaDataCloud
 Version: 2

Abstract
 The first release of SeaDataCloud Temperature and Salinity Historical Data Collection for the Mediterranean Sea (SDC_MED_DATA_TS_V1) includes open access in situ data of water column temperature and salinity between -9.25 and 37 degrees of longitude, thus including an Atlantic box and the Marmara Sea. The collection has been obtained harvesting all measurements contained within SeaDataNet infrastructure at the end of October 2017 belonging to 27 data providers (distributors) 111 data originators. The dataset format is Ocean Data View (ODV) binary collection. The quality control of the data has been performed using ODV 5.0 software. Data Quality Flags have been revised following SeaDataNet2 project QC procedures in conjunction with the visual expert check. The number of the Temperature and Salinity profiles (stations) in the collection is 739784.

File	Pages	Size	Access
Publisher's official version	32	1 MB	Open access

Full Text

How to cite

Simoncelli Simona, Myroshnychenko Volodymyr, Coatanooan Christine (2018). SeaDataCloud Temperature and Salinity Historical Data Collection for the Mediterranean Sea (Version 1). Product Information Document (PIDoc). <https://doi.org/10.13155/57036>

How To Cite

How To Cite

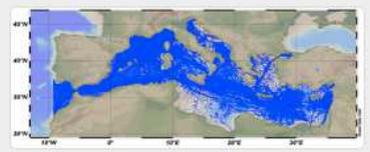
PIDoc

Is cited by

Simoncelli Simona, Myroshnychenko Volodymyr, Coatanooan Christine (2018). SeaDataCloud Temperature and Salinity Historical Data Collection for the Mediterranean Sea (Version 1). Product Information Document (PIDoc).

Products Catalogue

Mediterranean Sea - Temperature and salinity Historical Data Collection SeaDataCloud V1



SDC_MED_DATA_TS_V1 SeaDataCloud Temperature and Salinity data collection for the Mediterranean Sea contains all open access temperature and salinity in situ data retrieved from SeaDataNet infrastructure at the end of October 2017. The data span between -9.25 and 37 degrees of longitude, thus including an Atlantic box and the Marmara Sea. It covers the time period 1900-2017. Data have been quality checked using ODV 5.0 software. Quality Flags of anomalous data have been revised using basic QC procedures. The dataset format is ODV binary collections...

Source: SeaDataNet



- SDC_MED_DATA_TS_V1
- Water_body_salinity
- ITS-90_water_temperature
- + Add all 3 layers to the map



HORIZONTAL SECTION VERTICAL SECTION

CONTACT ABOUT HELP



Water_body_salinity

min depth: [m]
0

max depth: [m]
10

min time: [ISO8601] max depth
2000-01-01T00:00:00.0000Z

max time: [ISO8601]
2001-01-01T00:00:00.0000Z

29.37986, 47.13623

Visualization

Restricted data analysis

- PIDocs are available
- Metadata stats → to monitor continuously the amount of restricted data, the providers

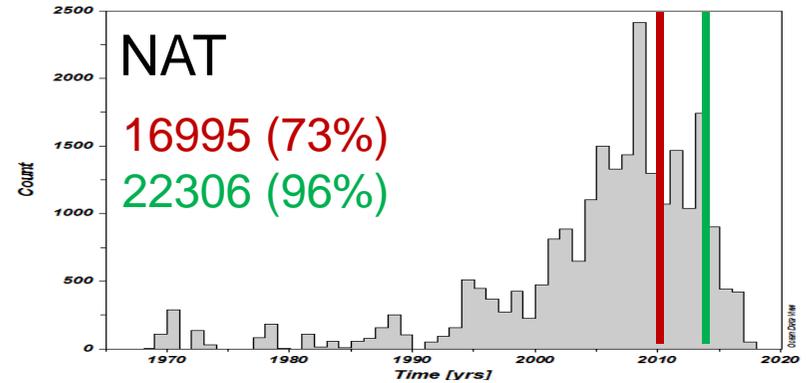
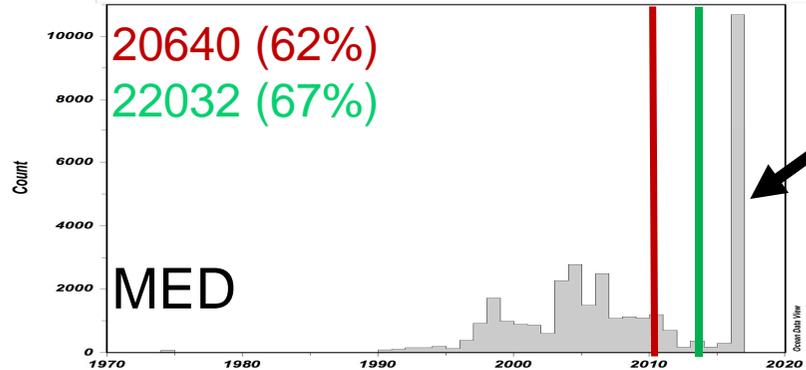
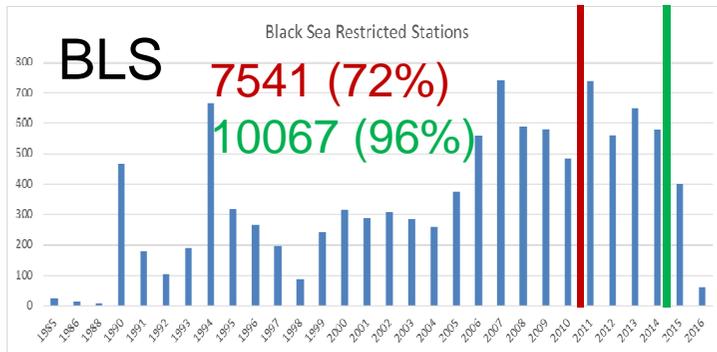


GOAL unlock old data and avoid stagnation

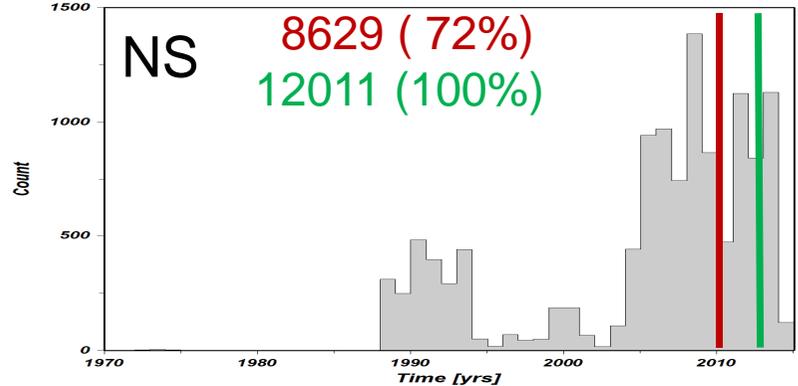
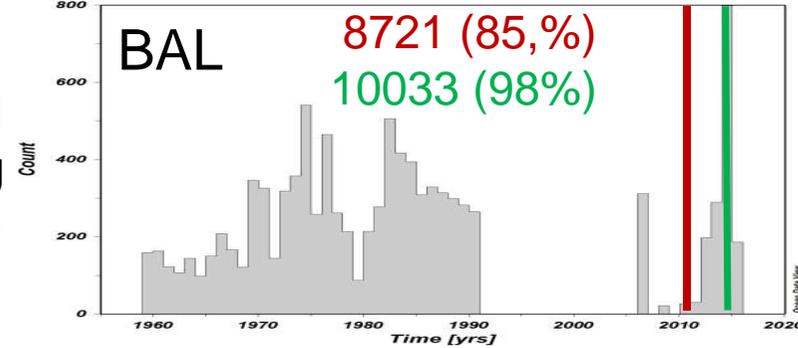
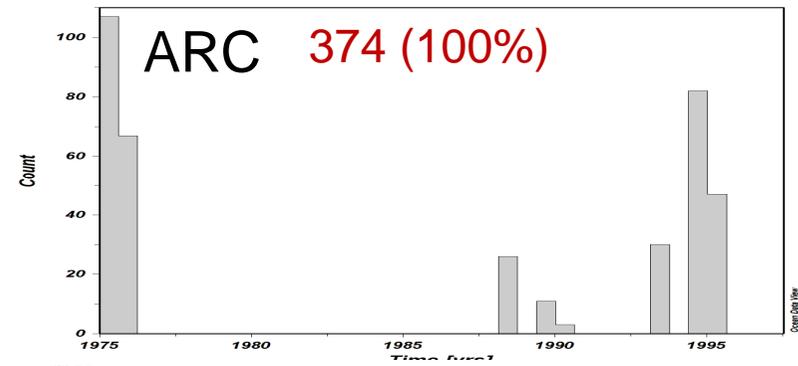
Restricted/Unrestricted ratio

	STATIONS		
	unrestricted	restricted	%
NAT	9091773	23217	0,3
BAL		10221	1,0
MED	734957	33022	4,5
BLS	137723	10528	7,6
ARC	731286	374	0,1
NS	1385289	12011	0,9

Unlock restricted data before 2010? 2014?



10522 stations from INSTM with missing depth (QF9)



Major providers of restricted data

Region	EDMO	Originator	% st
MED	1232	Institut National des Sciences et Technologies de la Mer (INSTM)	51
BLS	723	State Oceanographic Institute (SOI)	56
ARC			
BAL	193	Institute of Meteorology and Water Management National Research Institute, Maritime Branch in Gdynia (IMWM MB)	81
NAT		IEO	66
NS	2135	Marine Scotland Science	37

Coming soon → monitoring of restricted/unrestricted ratio per data provider to assure that the balance is reasonable

TRAINING and DISSEMINATION

DIVA training 3-6 April 2018 → wide participation, all RC were present
Very good and efficient course

 [SDC_WP11_D11.14_StrategyForTrainingActivities.pdf](#)

Modified on: 22 December, 2017 By: Michele FICHAUT

 [SDC_WP11_D11.15_OutcomeOfTrainingActivities.pdf](#)

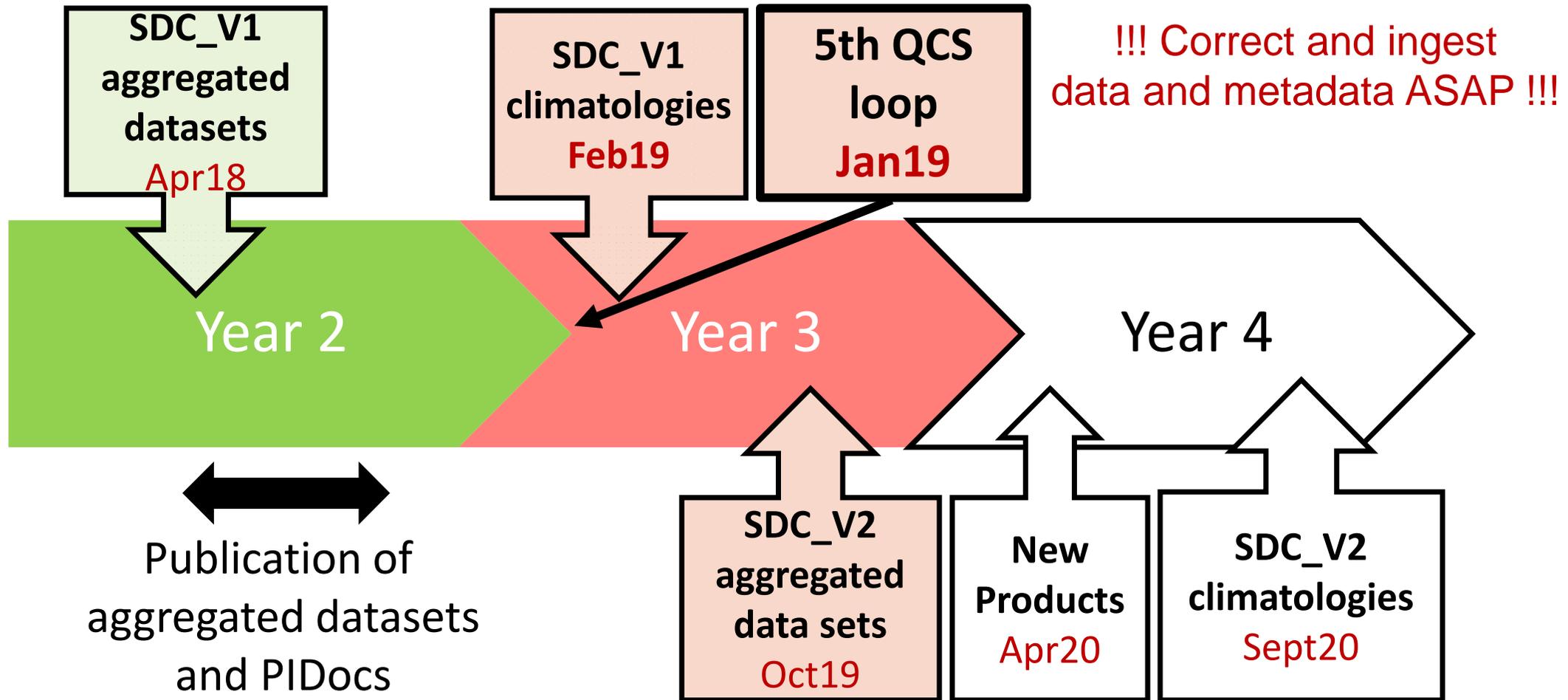
Modified on: 20 April, 2018 By: Michele FICHAUT

→ Importance Quality Control SDC WP11 Introduction

Presentation to the 1st SDC training workshop (Serge, Simona, Christine)

WP11 promoted and presented SDC in many workshop and conferences (WP4 presentation)

Work Plan and Timeline



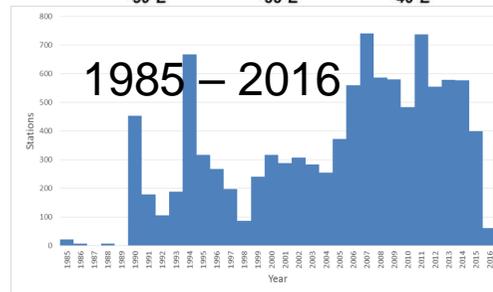
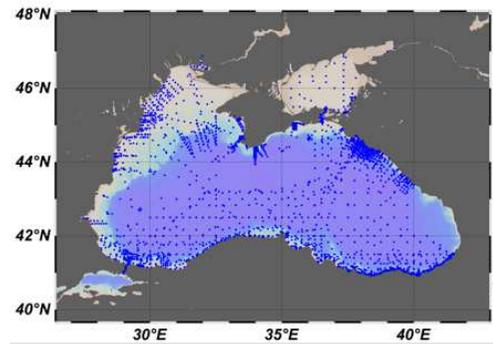
Ongoing Activities: data integration

Black Sea

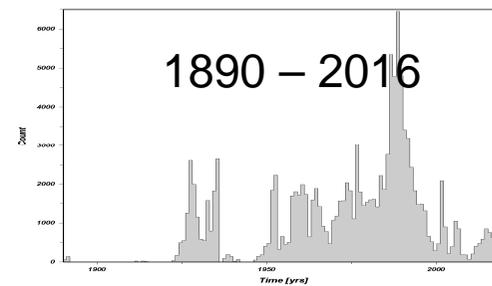
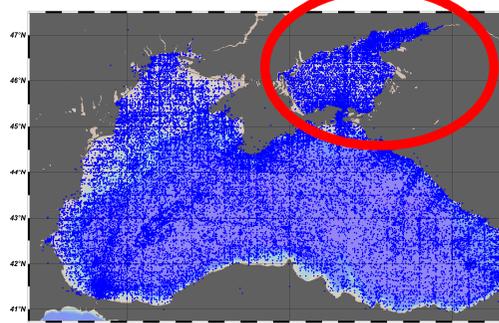
CORA 5.1

Estimates from metadata:
60% duplicates
80000 stations
(+50%)

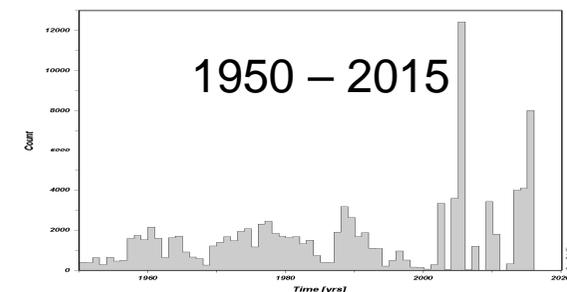
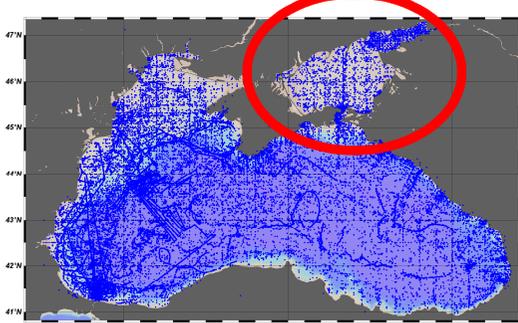
Restricted Dataset



WOD2013



CORA 5.1



	unrestricted	restricted	WOD2013	CORA 5.1
stations	137723	10528	120845	103721
	148251			

Ongoing Activities: collaboration with CMEMS Ins TAC

1st Joint Meeting July 12th 2018



AGENDA

General introduction

1. From SeaDataNet to SeaDataCloud: new data products and innovation
2. From phase I to phase II: CMEMS in situ TAC developments

DISCUSSION

Review of Quality Check procedures

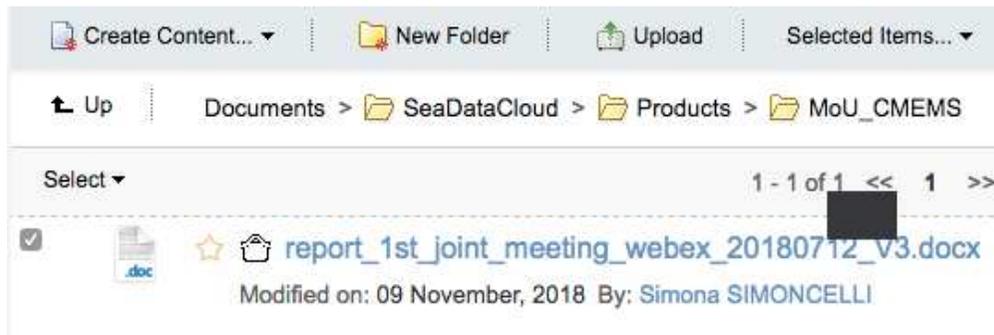
3. SDN Quality Check Strategy: from visual inspection to automatic approach
4. CMEMS quality check procedures

DISCUSSION → find a common strategy

5. First release of SDC_XXX_DATA_TS_V1 and Product Information Documents (PIDocs)
6. CMEMS new data types?

DISCUSSION --> data type

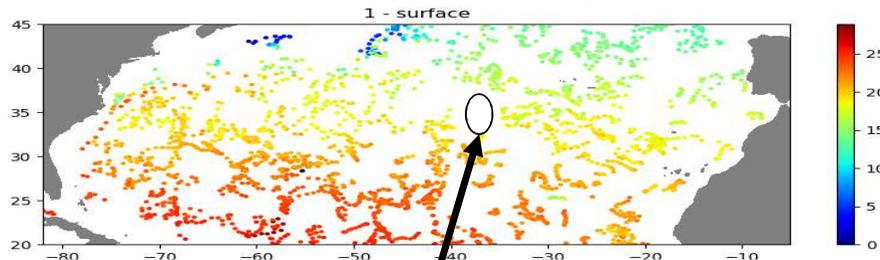
approach/timelines/mutual requirements



Advanced estimates of GLOBAL climatologies

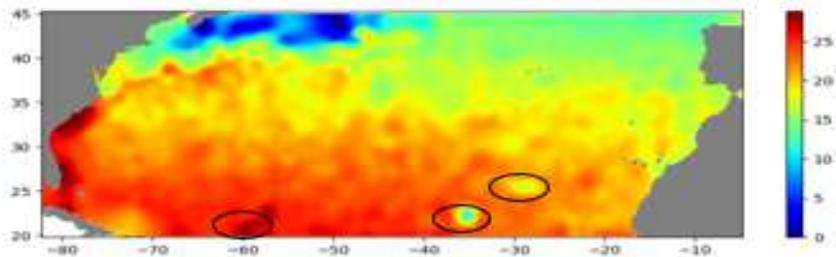
K. Shahzadi, N. Pinardi, M. Zavatarelli (UNIBO), S. Lyubartsev (CMCC), S. Simoncelli (INGV)

World Ocean Database (WOD2013)



Temperature from ARGO, Spring (2012-2013)

What's the **CLIMATOLOGICAL value** at this location?



DIVA estimate of 2012-2013 observations

Preliminary results from DIVA

→ anomalous features

→ **better quality control to eliminate outliers**

Errors in observations could be:

Instrumental Error (limited precision or bias of the sensor)

Representativeness Error

Synoptic Error (time)

Gross Error:
Human error, Instrumental failure, Incorrect communication, calibration error

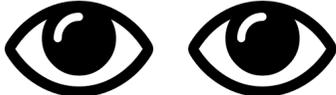
Quality Control

Need to develop a new **NONLINEAR QC (NQC)** to reduce the representativeness error

Climatologies SDC_CLIM_TS_V1

- T and S monthly and seasonal climatologies with **increased horizontal and vertical resolution** (WOA standard depth) covering the time period 1955-2017
 - **Integration** of SeaDataCloud data collections **with external data sets** to increase data coverage (CMEMS, WOD2018, ICES)
 - Analysis of (1) space/time data distribution; (2) data types consistency; (3) long term variability to compute climatologies on a decadal basis (sliding decades when possible)
 - **Product validation** → consistency analysis with WOA and CMEMS products (satellite reprocessed data sets and reanalysis)
- PIDoc will contain all this information
- SDC_CLIM_TS_V1 will be also accessible through EMODnet Physics

Conclusions

- Introduction of **PIDocs** represented a very good progress
- SDC_DATA_TS_V1 publication → *data set paper* and submission of SDN QCS as Ocean Best Practice
- **Metadata analysis** will be extended to all the regional seas in the next QCS loop
- Hunting of **data omissions** will be intensified 
- **QC analysis per data type** will continue to assure data consistency
- **Integration with external datasets** (WOD2018, CMEMS) for climatology production (upcoming milestone)

- **WP11 met regularly online to monitor and harmonize the activities**
- **High participation/great collaboration/very good progresses**
- **Deliverables and reports were all submitted in time**

Open Issues

- **underway data** → data have been subsampled in SDC_DATA_TS_V1 release (1 over 7) → wish to manage underway data (FerryBox and TSG) separately and provide the full resolution (on going discussion)
- **restricted data** → need to reduce its percentage (unlock data older than 2010)
- **Time series** → fragmented and difficult to manage for QC and data products → how do we want to proceed? WP11 wish a reprocessing at the data center level
- Meeting with Ins-TAC CMEMS ASAP

Thanks to

Christine Coatanoan, IFREMER

Volodymyr Myroshnychenko, METU

Örjan Bäck, SMHI

Helge Sagen, IMR

Serge Scory, RBINS

Reiner Schlitzer, AWI

Michèle Fichaut, IFREMER

Dick Schaap, MARIS

