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SeaDataCloud temperature and salinity climatologies for the European marginal seas and the Global Ocean

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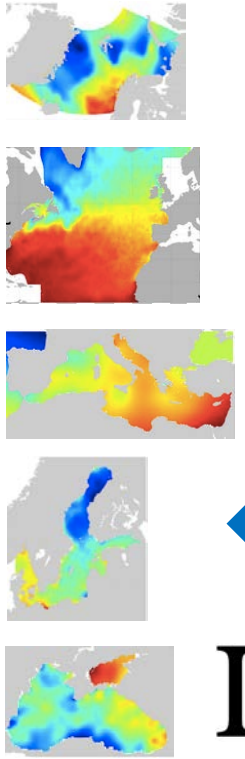
SeaDataCloud (SDC) Climatologies

- have been designed with **harmonized approach** to cover the time period after 1955 on World Ocean Atlas (WOA18) standard vertical levels
- monthly fields 1955-2018 and seasonal decadal fields have been produced with associated error fields
- SDC datasets integrated with external sources: World Ocean Database (WOD18) and/or Coriolis Ocean Dataset for ReAnalysis (CORA5.2)
- computed with **DIVAnd** tool
- **validation** through consistency analysis considering WOA18 as reference
- **documentation**: methodology, validation and usability have been reported in **Product Information Documents (PIDoc)** available with the NetCDF files in the SDC Product Catalogue

Workflow

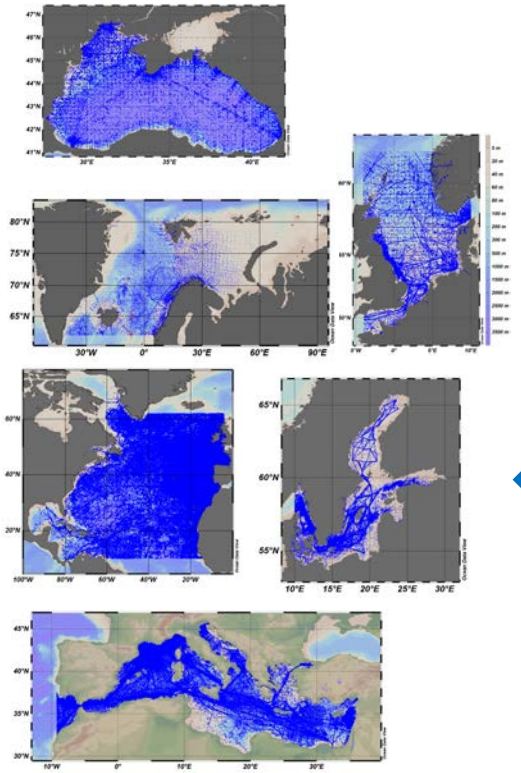
Products

climatologies

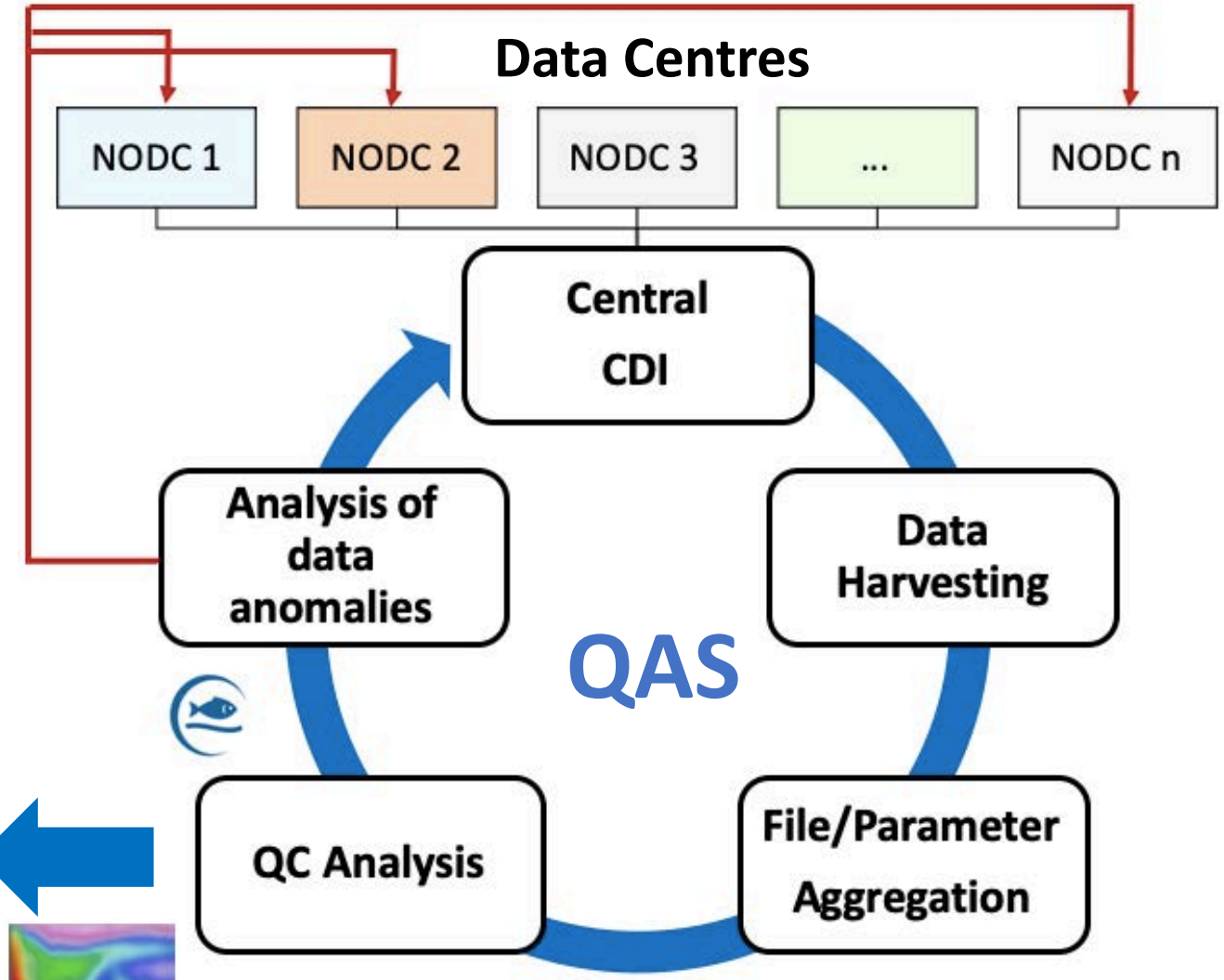


DIVA

aggregated datasets



Ocean Data View



Name	horiz resolution	Time coverage	Seasonal	Monthly	External data sets
GLO_1	1/4°	1900-2017		x	WOD18
GLO _2	1/4°	2003-2017		x	WOD18
ARC _1	1x1/2°	decades	x	x	WOD18
ARC _2	1x1/2°	1955-2014	x	x	WOD18
BAL_1	1/16x1/32°	decades	x	x	CORA5.2
BAL_2	1/16x1/32°	1955-2018	x	x	CORA5.2
NS_1 (V1)	1/8°	1955-2014		x	WOD18
NS_2 (V1)	1/8°	decades	x		WOD18
NAT _1	1/2°	decades	x	x	CORA5.3
NAT_2 (V1)	1/4°	1955-2017	x	x	CORA5.1
NAT_3 (V1)	1/4°	decades	x	x	CORA5.1
MED_1	1/8°	1955-2018	x	x	CORA5.2
MED_2	1/8°	1955-1984	x	x	CORA5.2
MED_3	1/8°	1985-2018	x	x	CORA5.2
MED_4	1/8°	decades	x		CORA5.2
SDC_1	1/8°	1955-1994	x	x	WOD18 and CORA5.2
SDC_2	1/8°	1995-2019	x	x	WOD18 and CORA5.2
SDC_3	1/8°	1955-2019	x	x	WOD18 and CORA5.2
SDC_4	1/8°	decades	x		WOD18 and CORA5.2

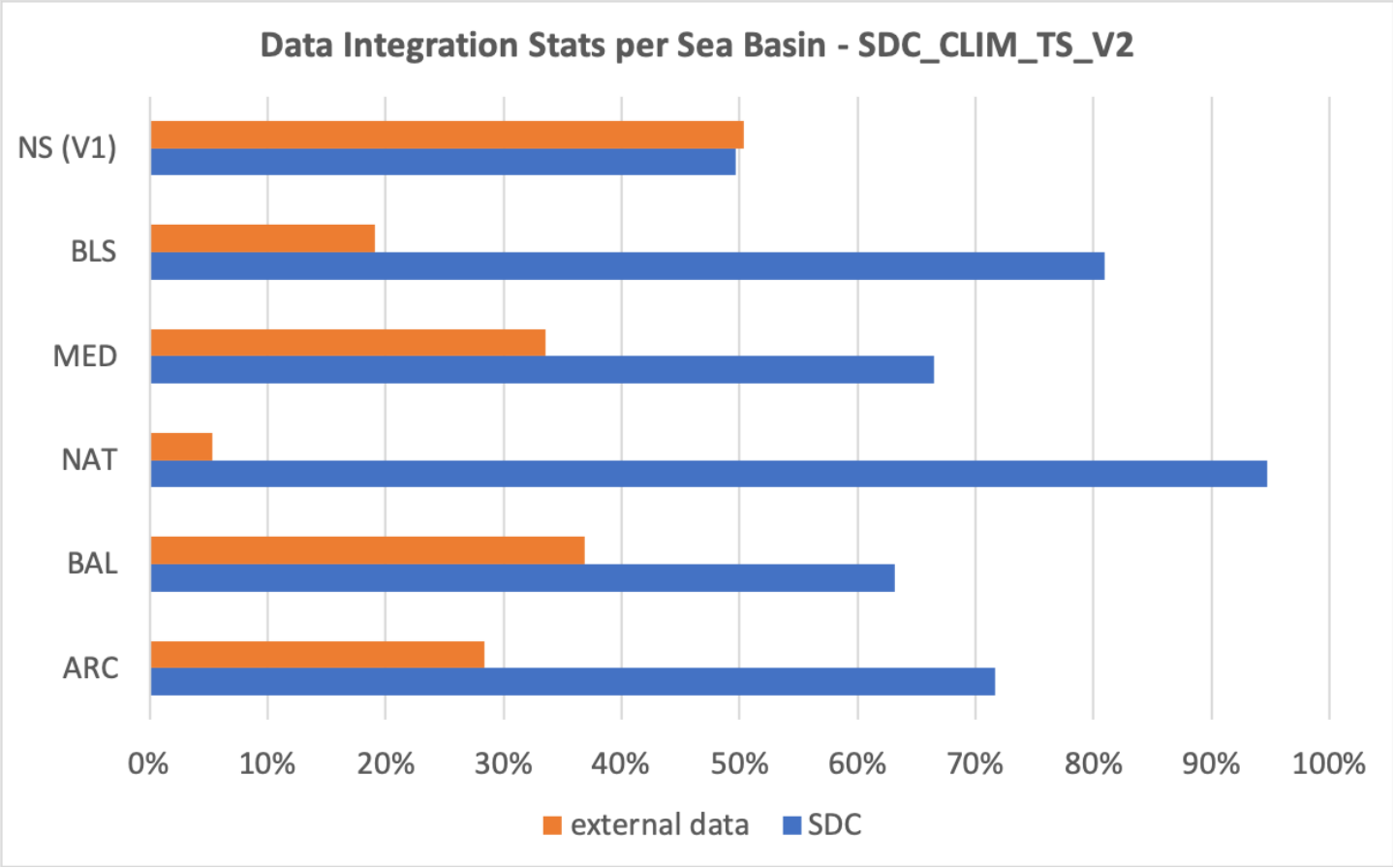
SeaDataCloud

GLO climatology computed with data from WOD18 → the spatial coverage of SDN data at global scale is still too sparse

Integration with external sources

External data imported in ODV and additional QC has been performed through visual inspection before the integration with SDC datasets --> data spatial and temporal consistency

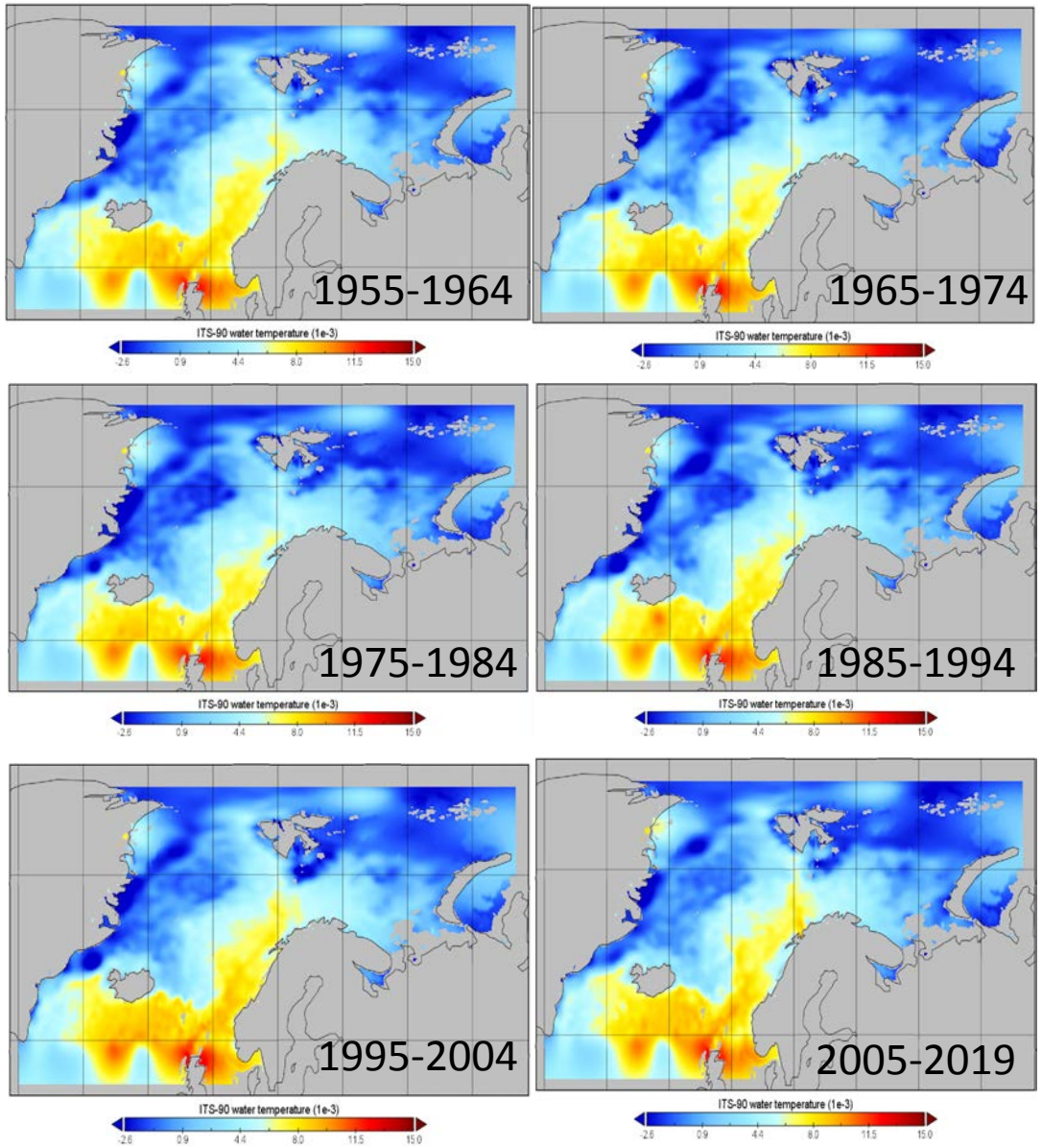
Percentage of SDC data and external sources per sea basin:



In general SDC represents the main contributor → percentage of external data ranging from 5% in the North Atlantic to 50% in the North Sea

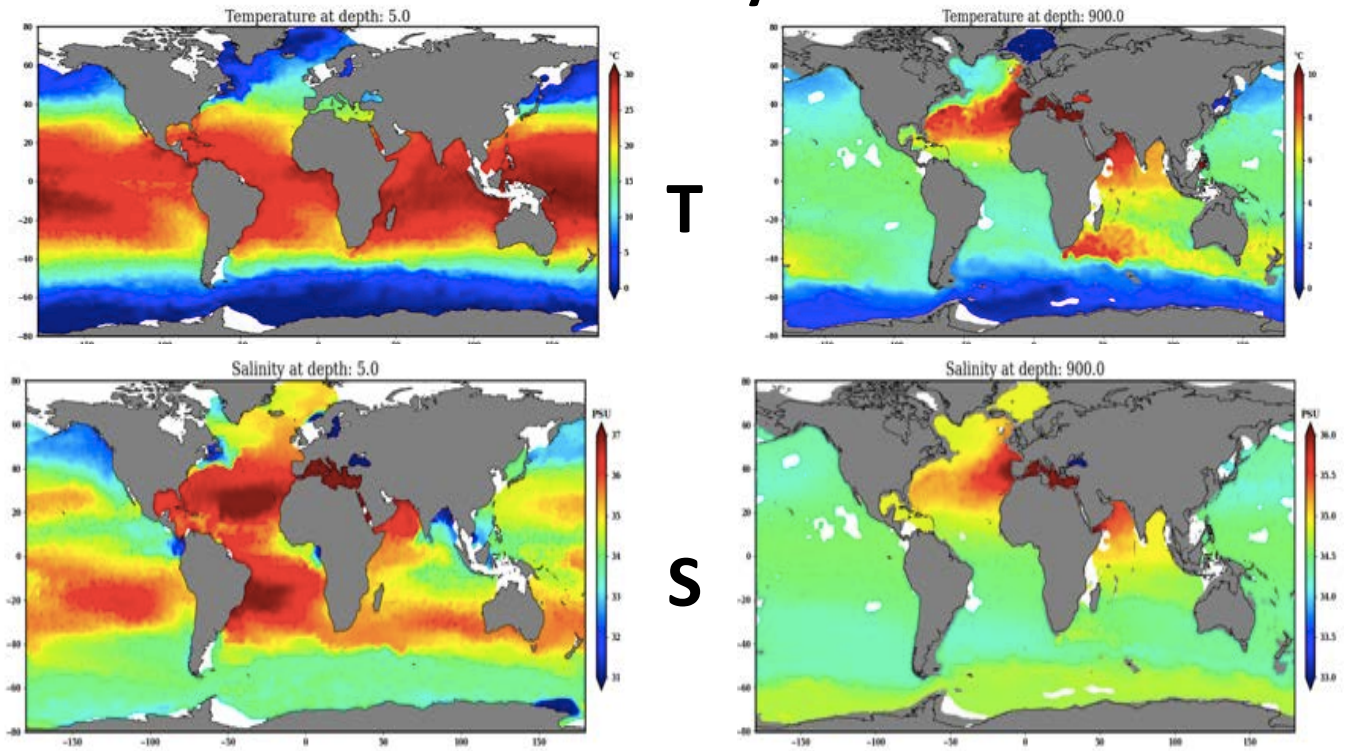
SDC_**ARC**_CLIM_TS_V2

Winter Temperature at 50m

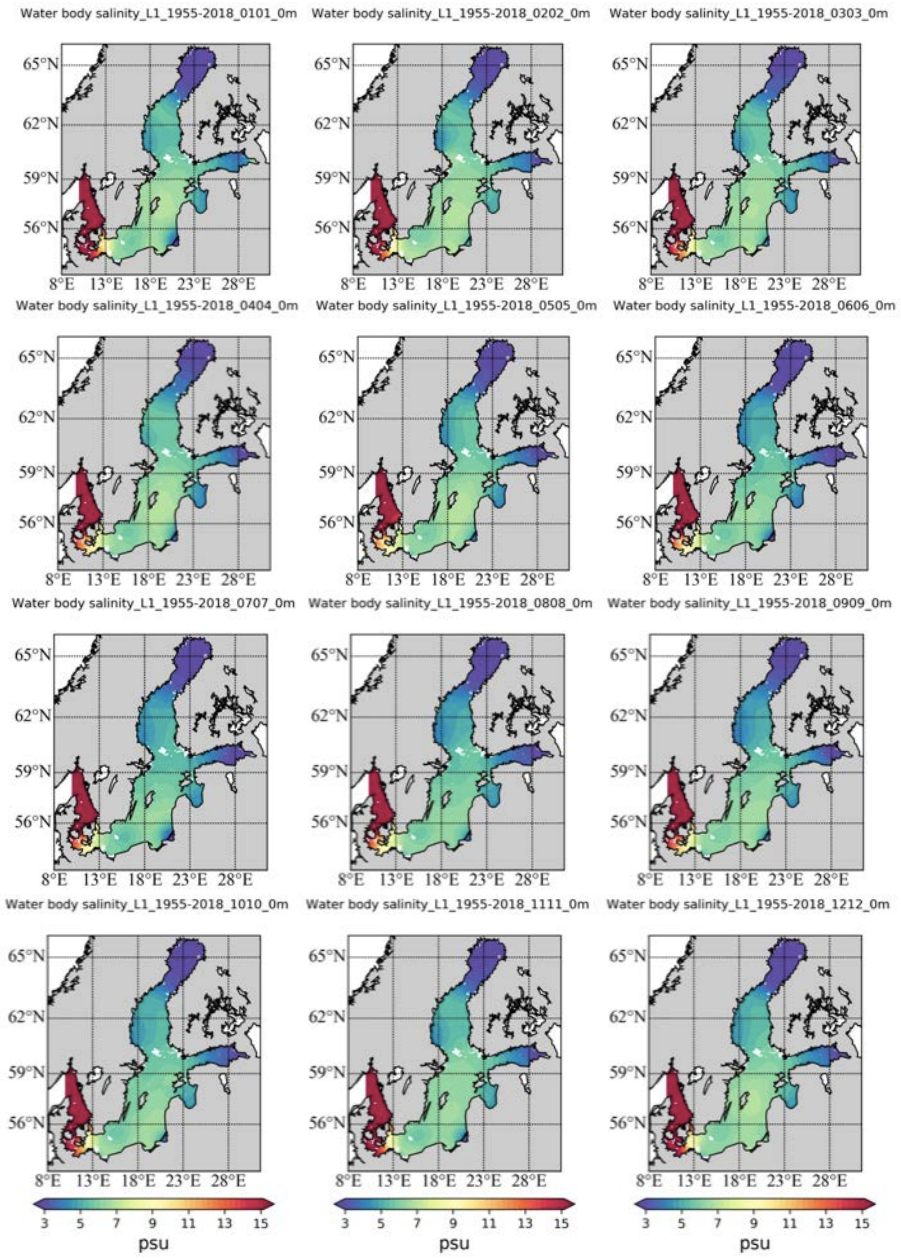


SDC_**GLO**_CLIM_TS_V2_2

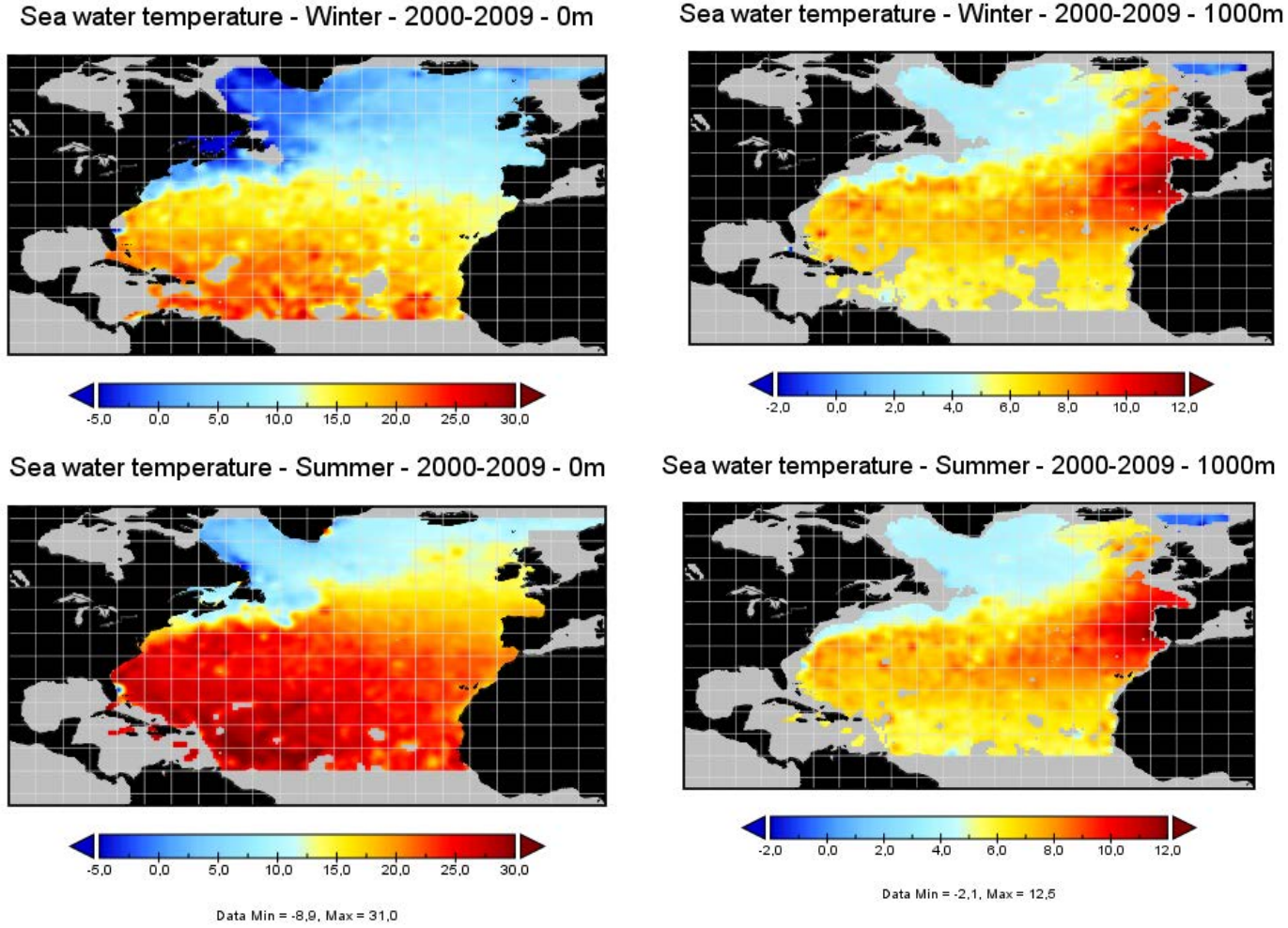
5m **January** 900m



SDC_**BAL**_CLIM_TS_V2_1 Surface Salinity 1955-2018



SDC_**NAT**_CLIM_TS_V2_1 Temperature 2000-2009



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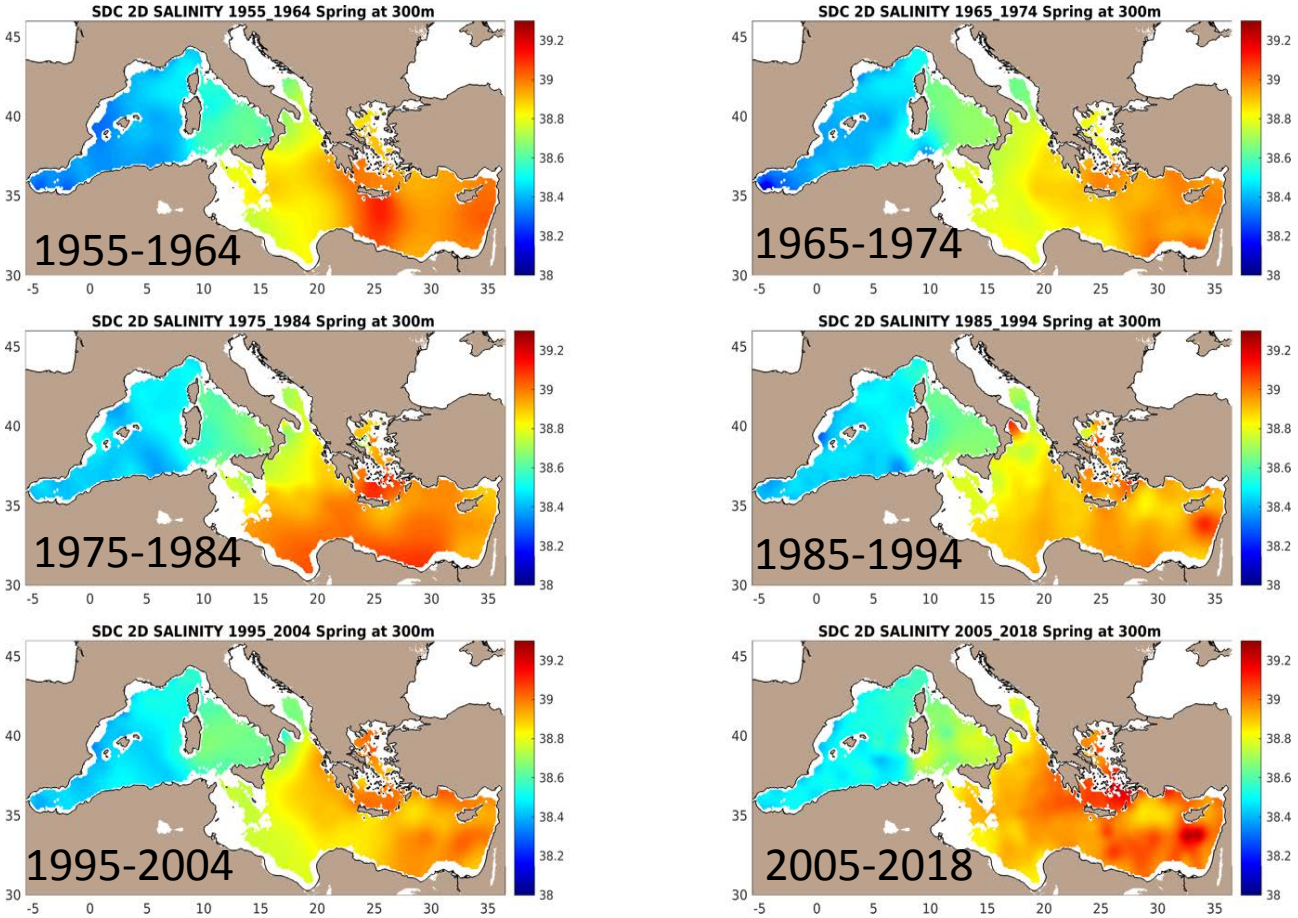
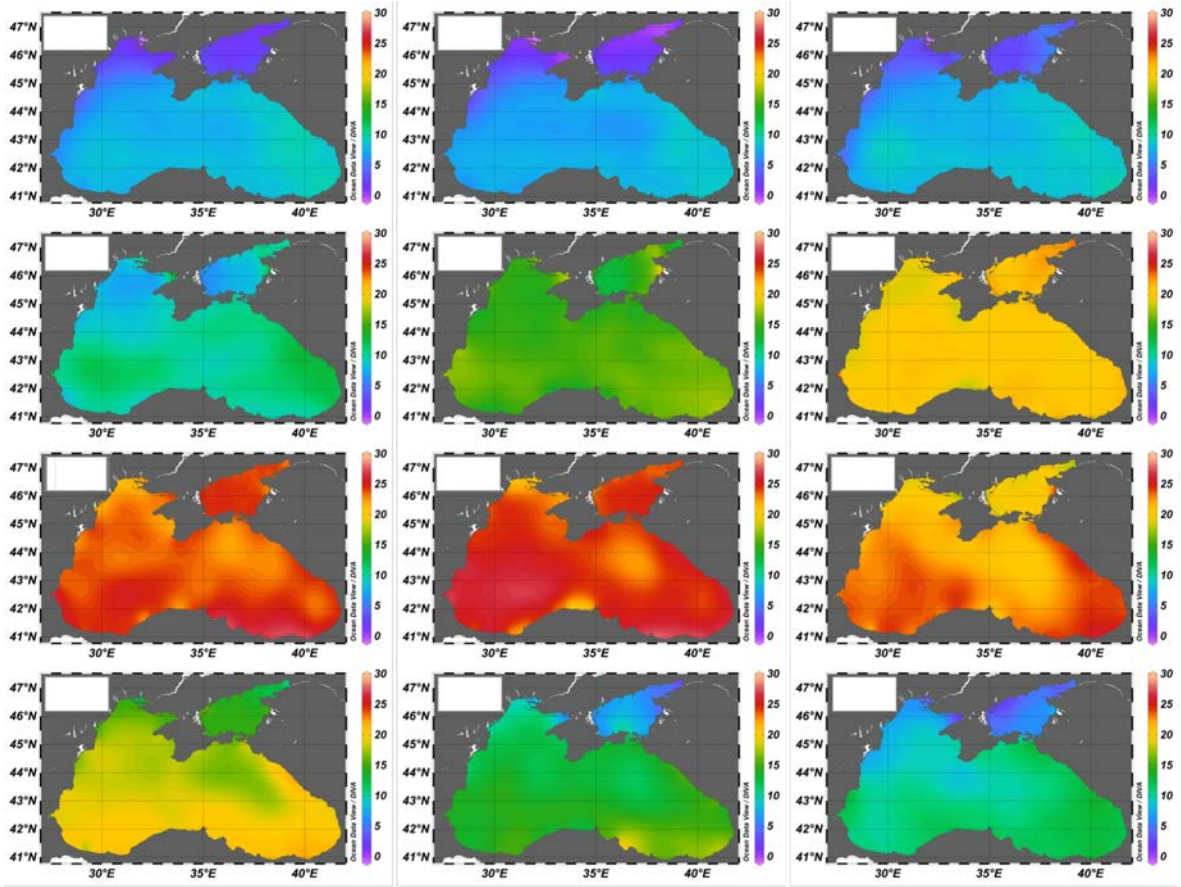
SDC_**MED**_CLIM_TS_V2

Spring Salinity at 300m



SDC_**BLS**_CLIM_TS_V2

Surface Temperature 1955-2019



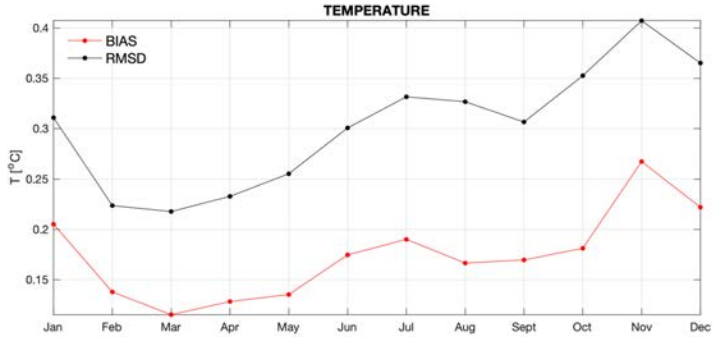
Consistency Analysis

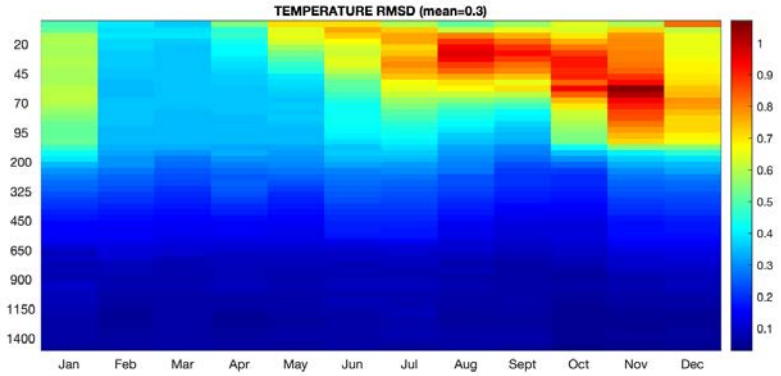
Validation is essential for products reliability → global WOA18 climatology as reference

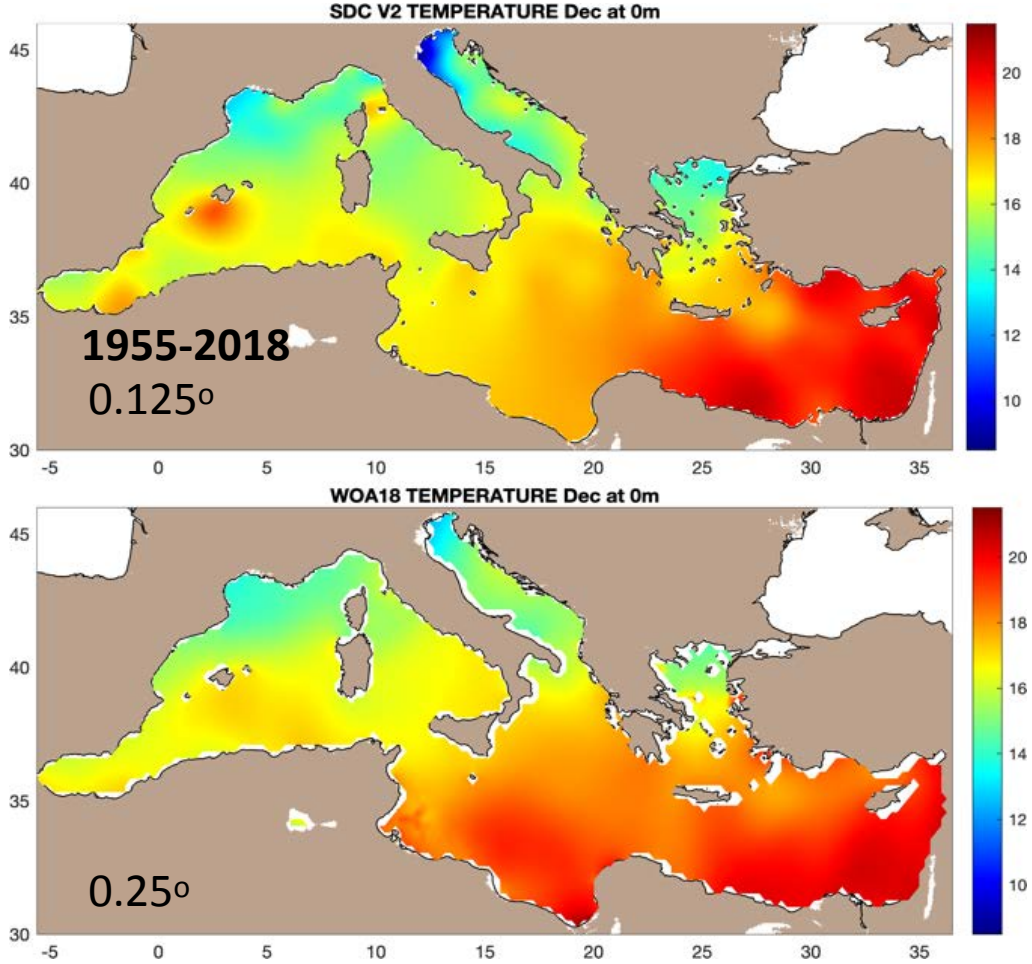
Twofold scope: (1) to detect possible drawbacks; (2) to highlight strength/weaknesses of SDC climatologies → usability information

Qualitative (visualization): ARC, BAL, NAT, NS

Quantitative (quality indices): GLO, MED, BLS







Conclusion

- 2 releases within SDC project: decadal gridded fields, integration of external data, DIVAnd software uptake and PIDocs
- Data integration process has been improved
- **SDC co-development/production** process is in place and will be further advanced exploiting the new SDC Virtual Research Environment (VRE)
- Good consistency with WOA and added value of the highest resolution regional climatologies
- Issues identified and reported in PIDocs under *Product Usability*
- Next improvements: gravitational stability, 3D interpolation, automation of multiple datasets integration, standardisation of duplicate detection and removal
- datasets and PIDocs have DOIs and are available at

https://www.seadatanet.org/Products#/search?from=1&to=30

SeaDataNet

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DATA PRODUCTS

DESCRIPTIONS & DOCUMENTATION | USER MANUAL

SeaDataNet provides aggregated datasets (ODV collections of all unrestricted SeaDataNet measurements of temperature and salinity by sea basins) and climatologies (regional gridded field products) based on the aggregated datasets and data from external data sources such as the COriolis Ocean Dataset for Reanalysis (CORA) and the World Ocean Database (WOD) for all the European sea basins and the Global Ocean. Each SeaDataCloud product is described in a Product Information Document (PIDoc) that can be accessed from the product's landing page. Click on the User Manual tab on the top-right corner of the page for instructions.

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Source: SeaDataNet

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SDC_MED_DATA_TS_V2 SeaDataCloud Temperature and Salinity data collection for the Medit Sea contains all c ess temperature ity in situ data retr ...

Source: SeaDataNet

Global Ocean Climatology - Temperature and Salinity Climatolog...

The SDC_GLO_CLIM_TS_V2 product is an improved version of SDC_GLO_CLIM_TS_V1 contains two different monthly climatologies temperature and salinit

Source: SeaDataNet

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References and Acronyms

WOA	https://www.ncei.noaa.gov/products/world-ocean-atlas
WOD	https://www.ncei.noaa.gov/products/world-ocean-database
CORA	*Szekely et al., 2019* https://archimer.ifremer.fr/doc/00595/70726/
ODV	https://odv.awi.de/
DIVAnd	*Barth et al., 2014* http://dx.doi.org/10.5194/gmd-7-225-2014
QAS	Quality Assurance Strategy
PIDoc	Product Information Documents
VRE	Virtual Research Environment https://www.seadatanet.org/Software/VRE