New Mediterranean Sea Climatologies

Simona Simoncelli (INGV)
A. Grandi (INGV)
S. Iona (HCMR)

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OUTLINE

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- Input Dataset
- Methodology
- Results
- Consistency Analysis
- Dissemination
- Work in progress
- Conclusions and Future Work

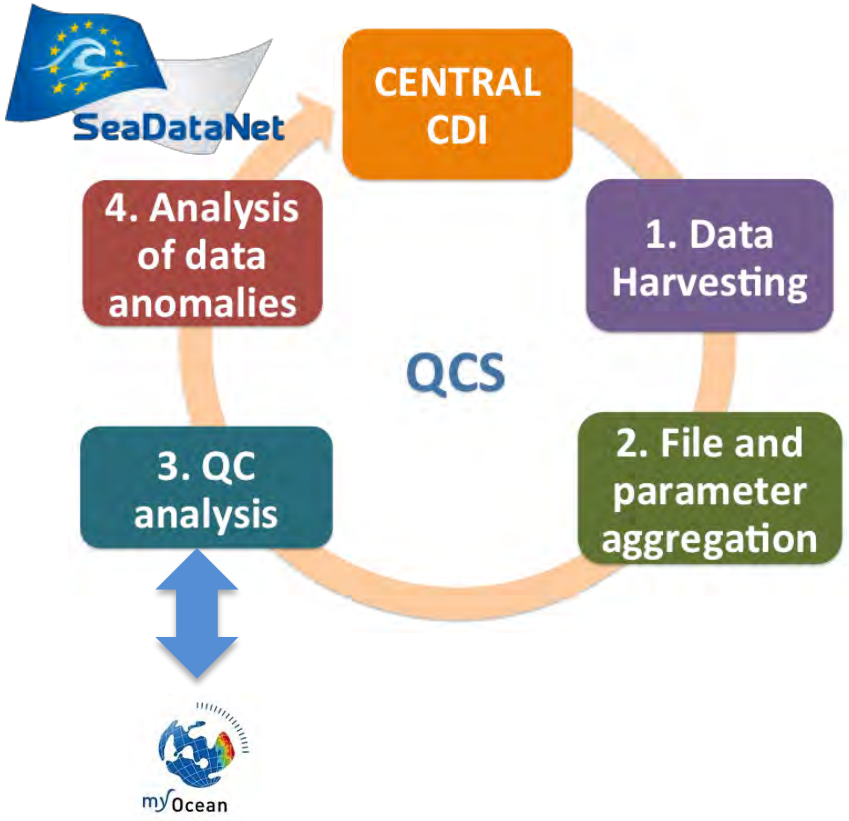
INTRODUCTION

New temperature and salinity monthly climatologies have been produced for the Mediterranean Sea within the framework of SeaDataNet2 EU project.

OBJECTIVES:

- To present/provide new temperature and salinity climatologies for the Mediterranean Sea and develop/implement standard validation/consistency analysis procedure considering reference datasets.
- To provide climatologies for model (analysis and reanalysis) validation and initialization and serve the operational oceanography community.
- To implement a standard validation procedure to be included in quality information documents (like CMEMS QUIDs) and increase SDN products uptake.

SeaDataNet2 → WP10 dedicated to data products, regional aggregated datasets and climatologies



Quality Control Strategy

Iterative approach to facilitate the upgrade of the database and the versioning of data products through the release of new data collections at the end of each QCS loop and the generation of the derived climatologies after a certain time lag

3 QCS loops

V1	not released
V1.1	released
V2	released

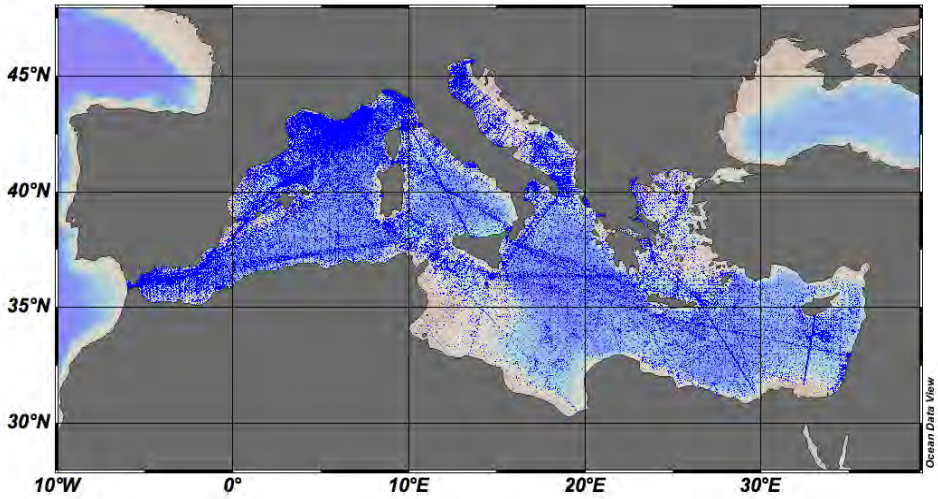
→ CLIMATOLOGIES

+ SDN restricted data

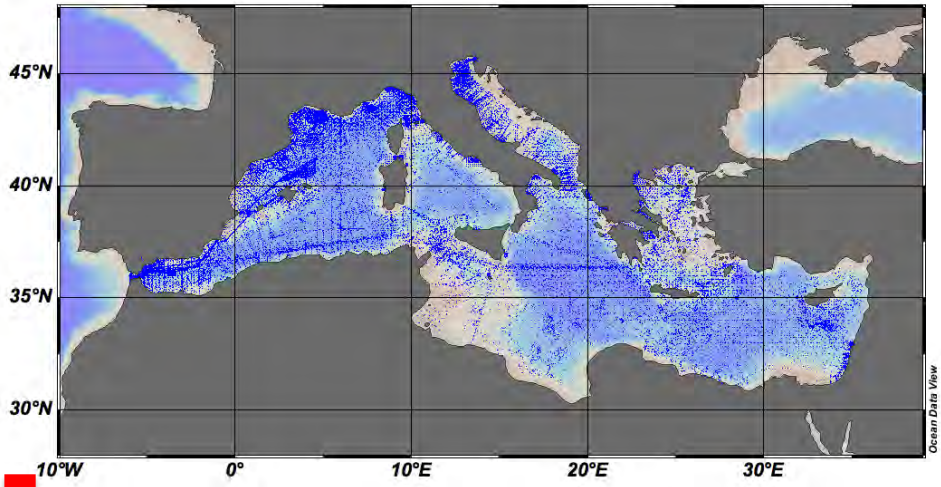
INPUT DATASET

SDN2 V1.1 Climatologies are based on the V1.1 historical data collection of all available temperature and salinity in situ profiles spanning the time period 1900-2013

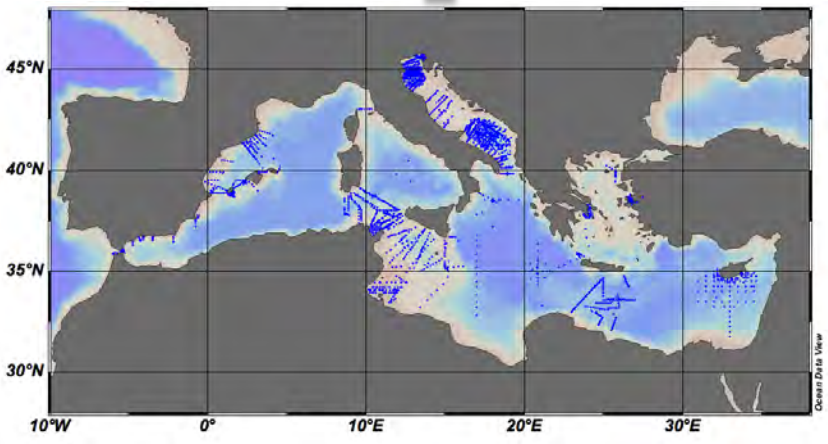
V1.1 Data distribution maps



TEMPERATURE



SALINITY

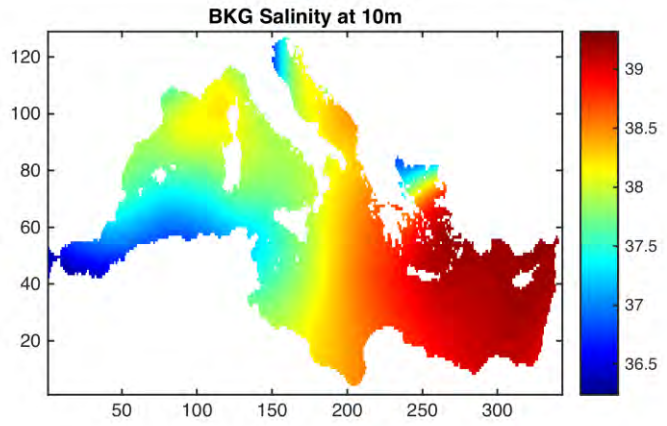


SDN2 RESTRICTED data

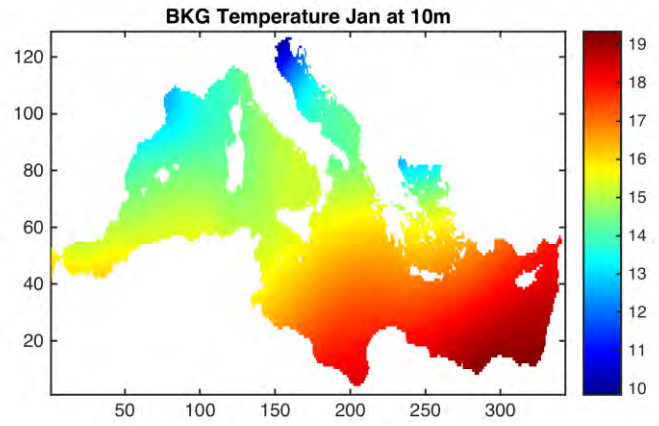
ANALYSIS METHODOLOGY

- DIVA (4.6.9 version)
- Resolution: 1/8° on 33 IODE standard levels
- Monthly fields
- Error field: “clever poor men’s error field” (ispec=111)
- Correlation Length: 2 degrees (Lc)
- Signal to noise ratio: 0.5 (snr)
- Variance of the background field 0.6: (varbak)
- Background fields semi-normed analysis:

Annual SALINITY BKG



3-monthly TEMPERATURE BKG



VALIDATION METHODOLOGY

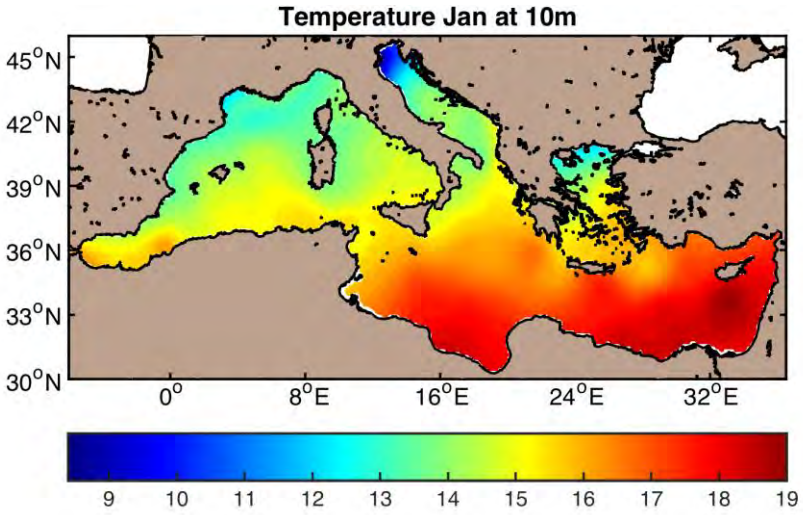
Reference dataset → WOA 2013 V2 monthly temperature and salinity

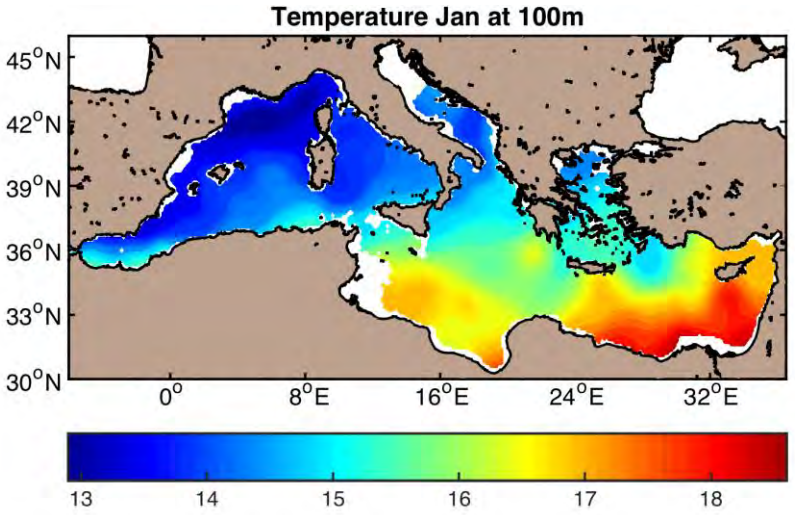
	WOA2013V2	SDN2 V1.1
Horizontal extent	global	Med Sea [-9.25°E]
Horizontal resolution	1/4°	1/8°
Vertical extent	0-1500m	0-5500m
Vertical resolution	57 levels	33 levels
Temporal data coverage	Averaged decades 1955-2012	1900-2013

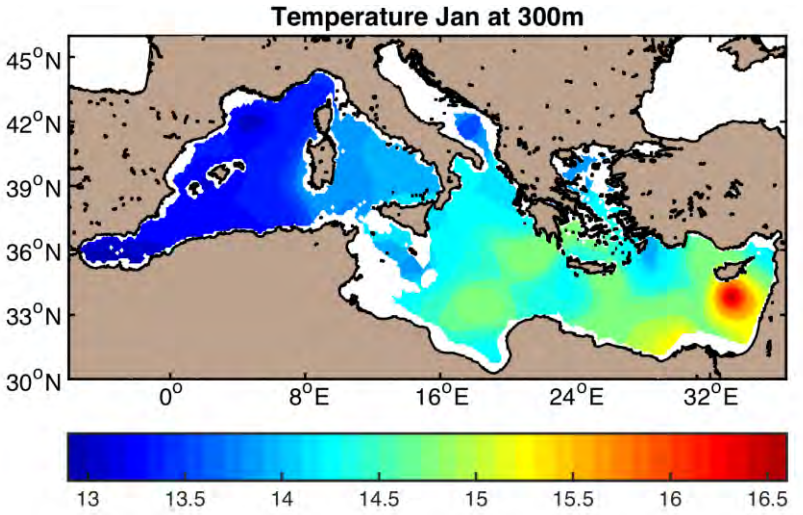
The consistency analysis has been performed over 24 coincident data layers.

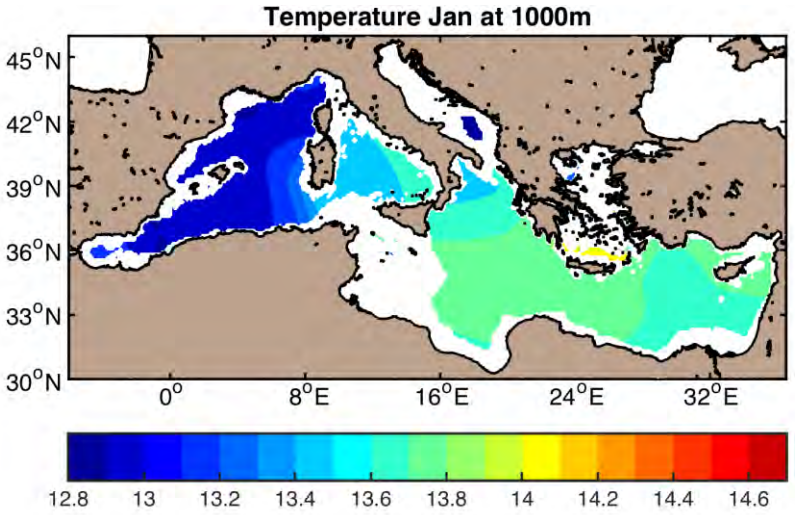
1. Computation of simple statistics, RMSD and BIAS;
2. Visual consistency analysis to check the climatological patterns and verify possible big discrepancies.

RESULTS: Temperature

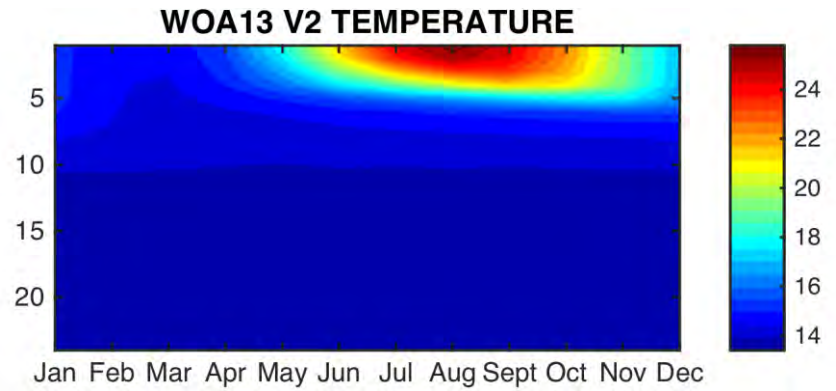


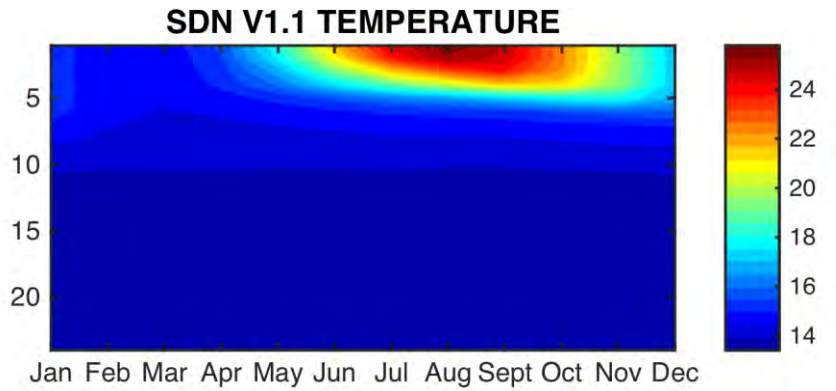


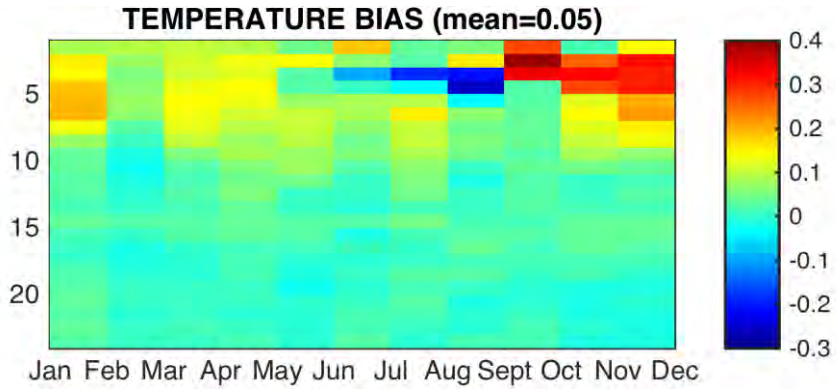


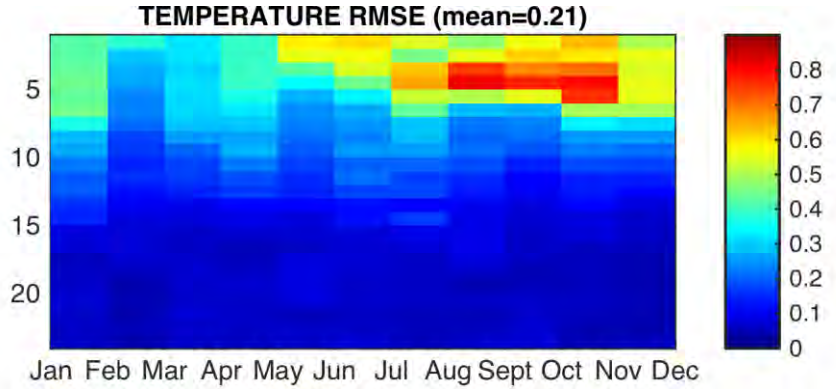


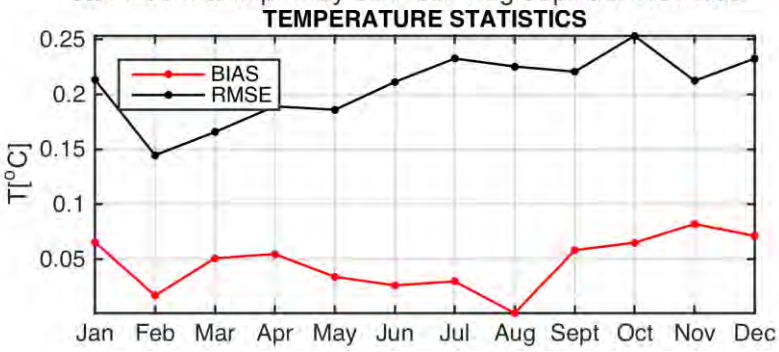
CONSISTENCY ANALYSIS: Temperature









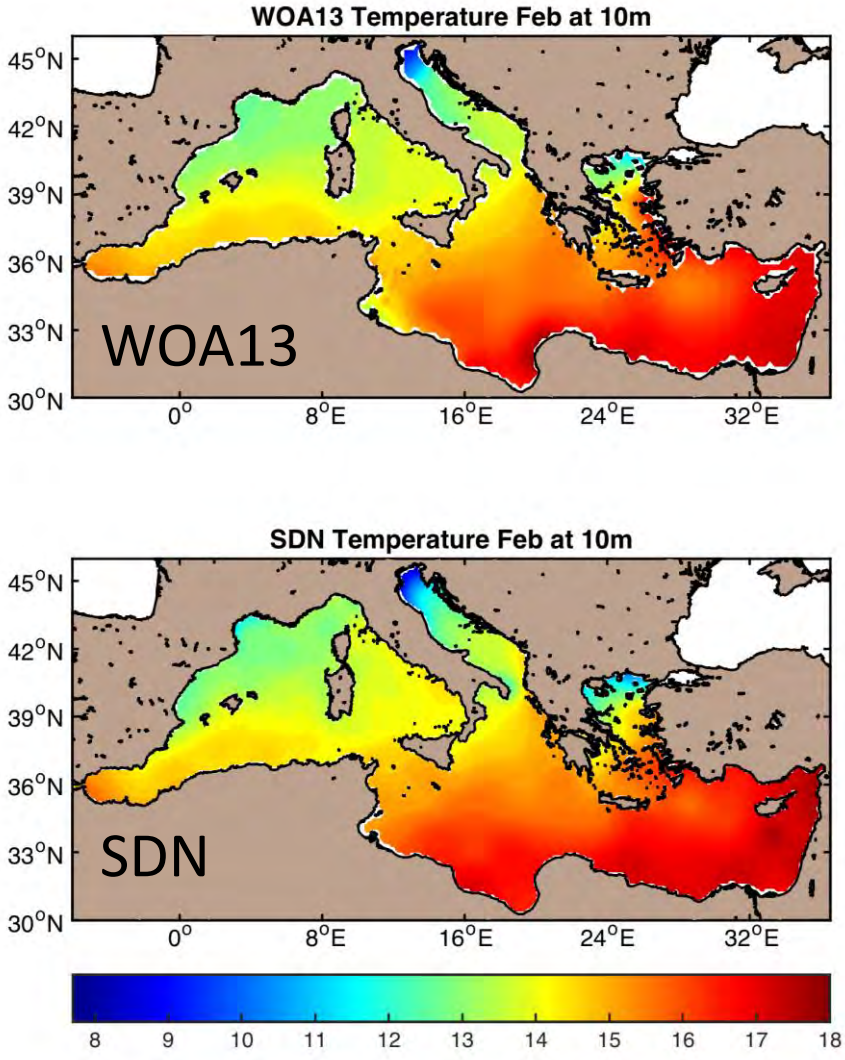


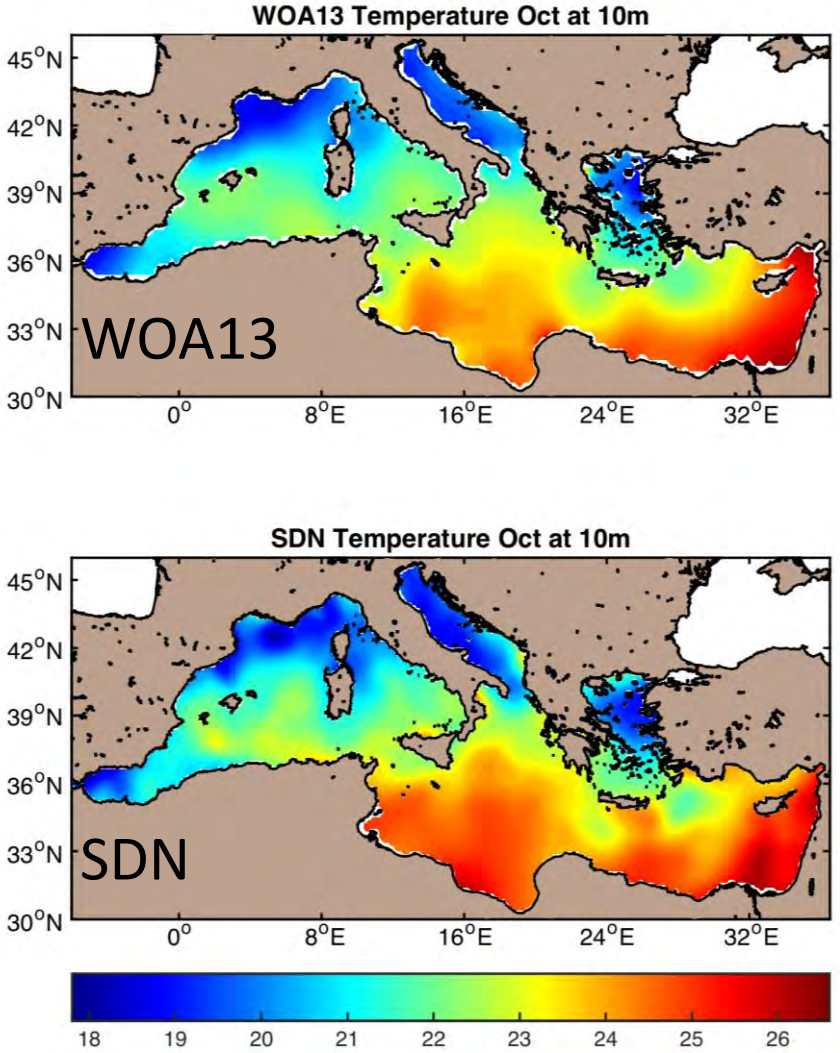
SDN-WOA13V2
monthly basin
average BIAS and RMSE

CONSISTENCY ANALYSIS: Temperature

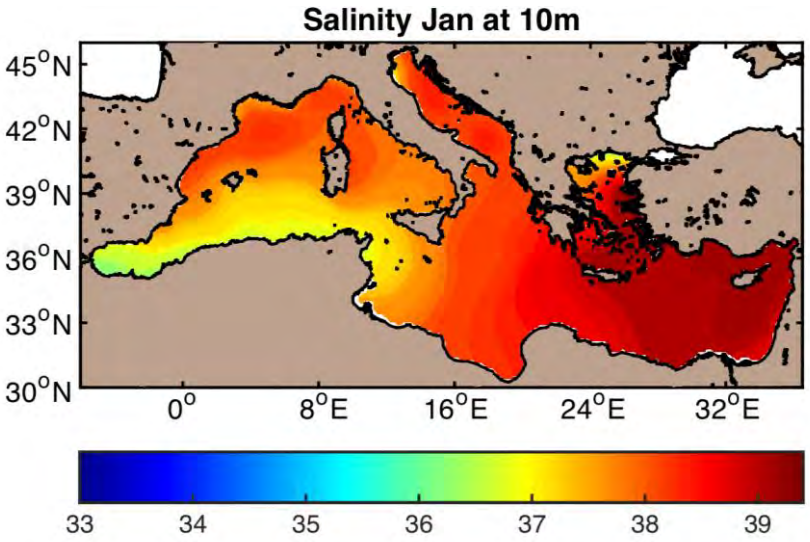
February

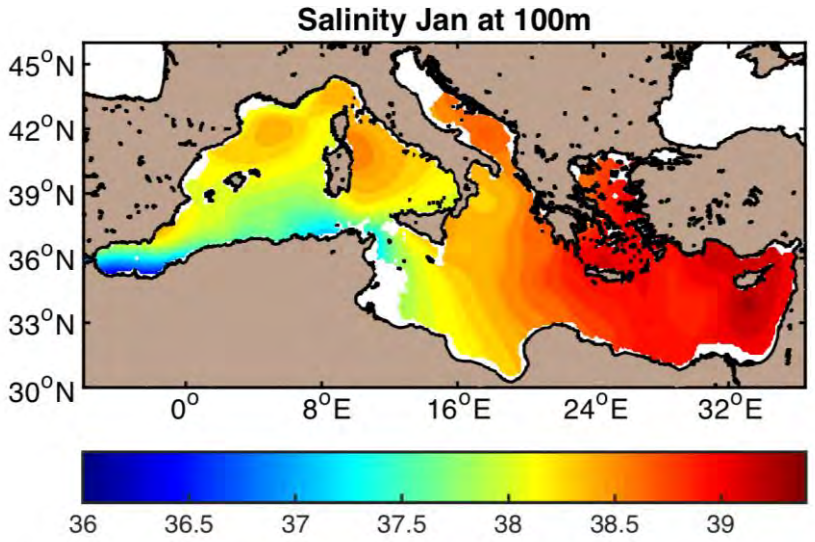
October

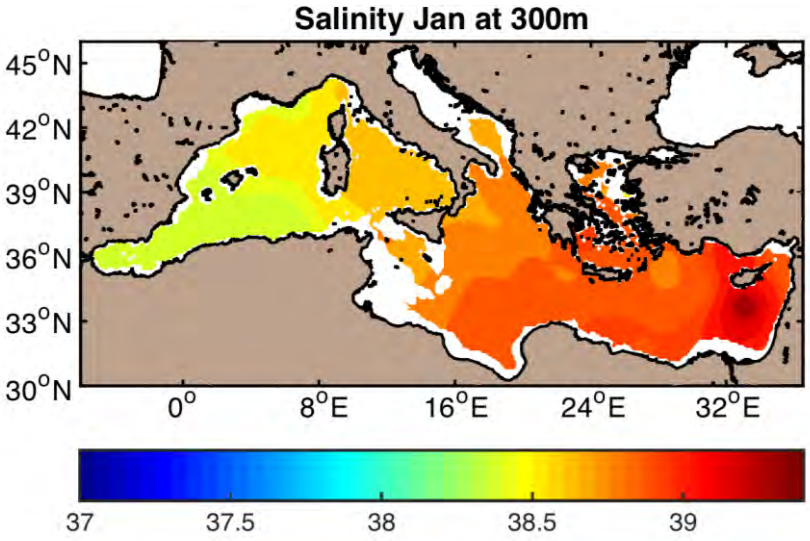


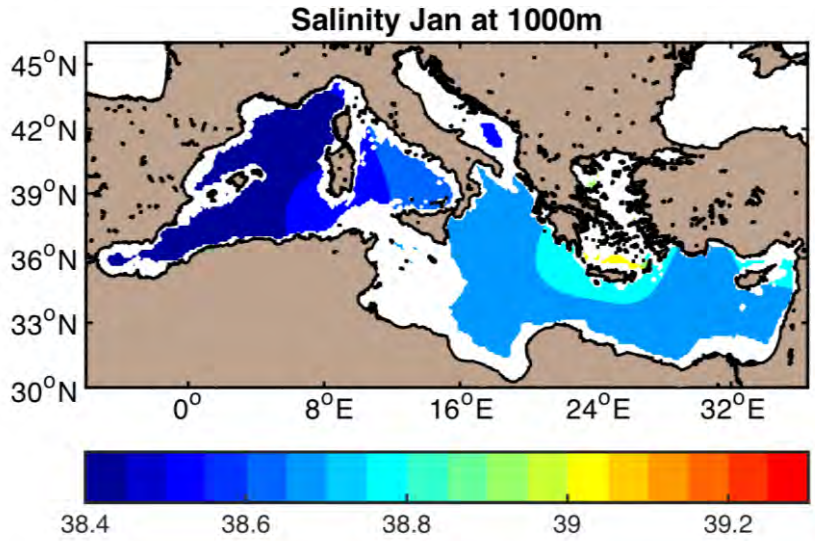


RESULTS: Salinity

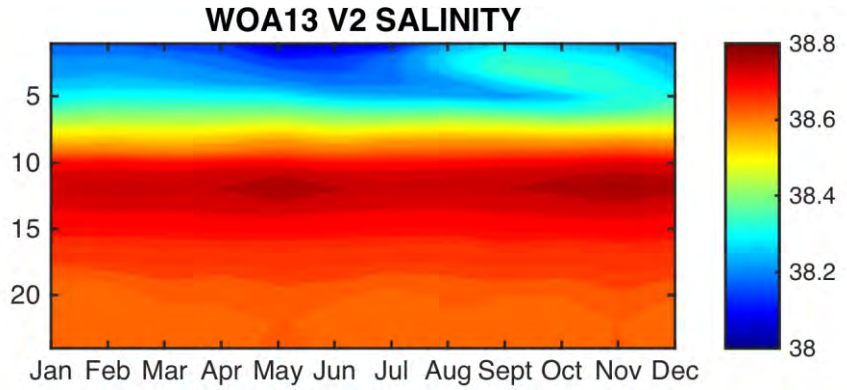


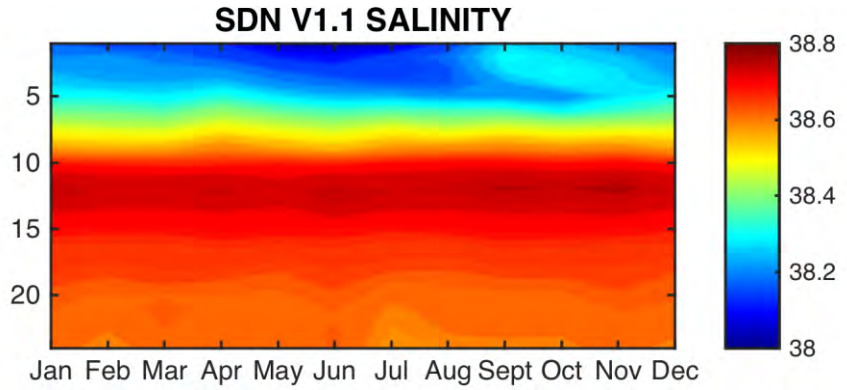


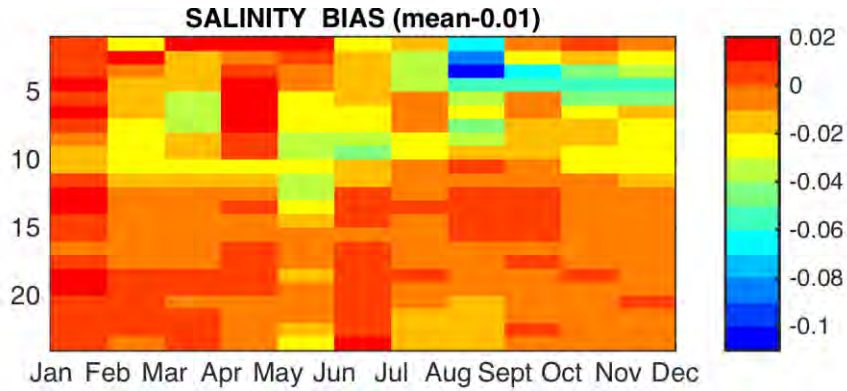


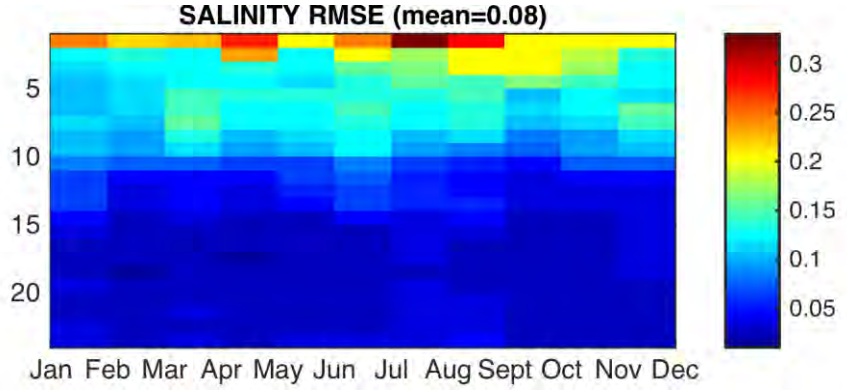


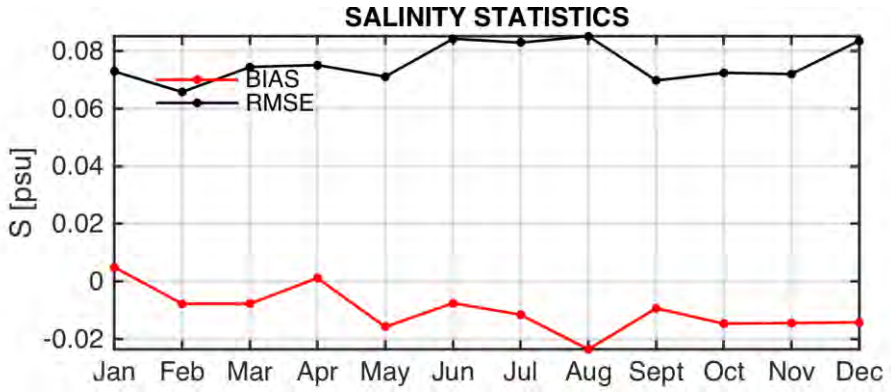
CONSISTENCY ANALYSIS: Salinity



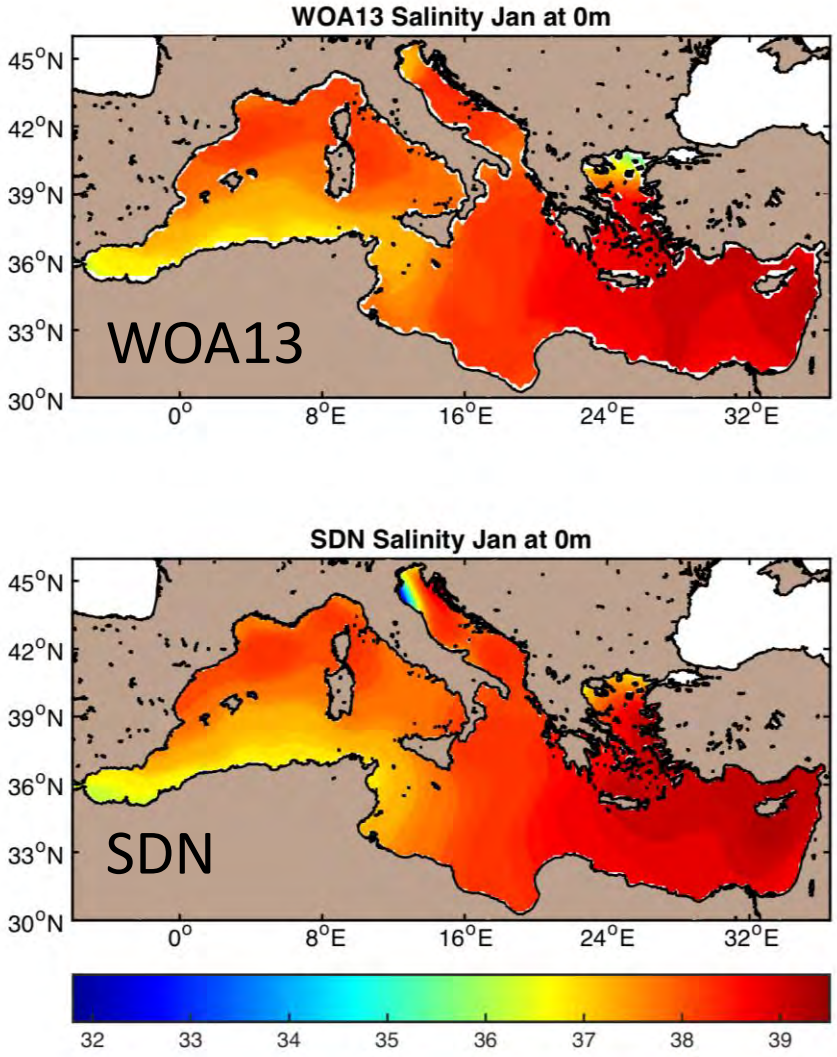


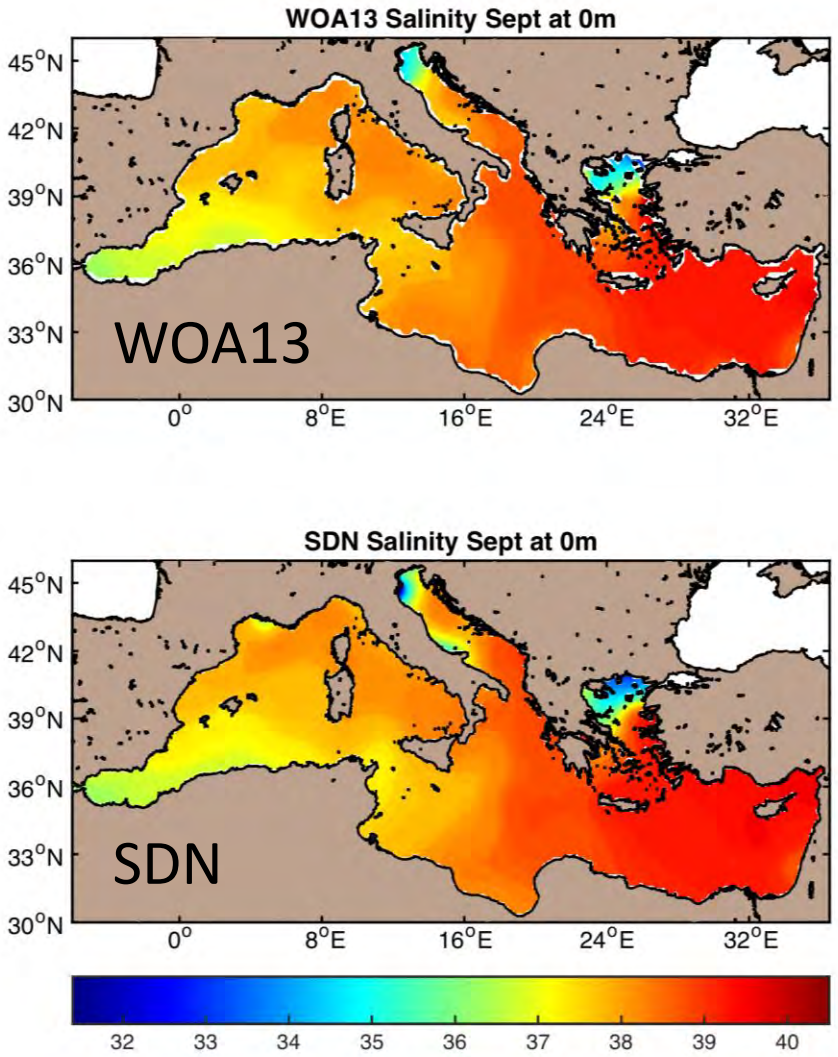






CONSISTENCY ANALYSIS: Salinity





CONSISTENCY ANALYSIS with CMEMS Reanalysis

Extracted from CMEMS Mediterranean Sea Physical Reanalysis 1997-2014

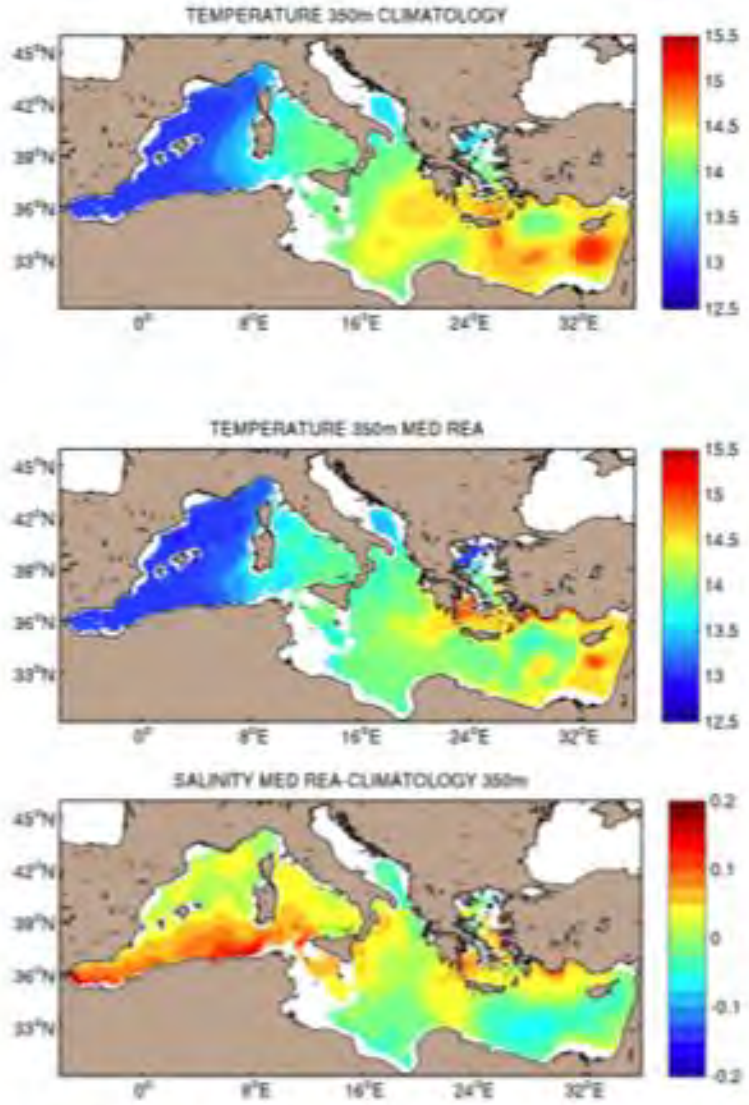


Figure 8T-CLASS1-T3D_MEAN Annual mean maps of Temperature at 350m of depth: **(top)** from SDN climatology; **(middle)** from MED REA climatology; **(bottom)** differences between MED REA and SDN climatology (1900-2009).

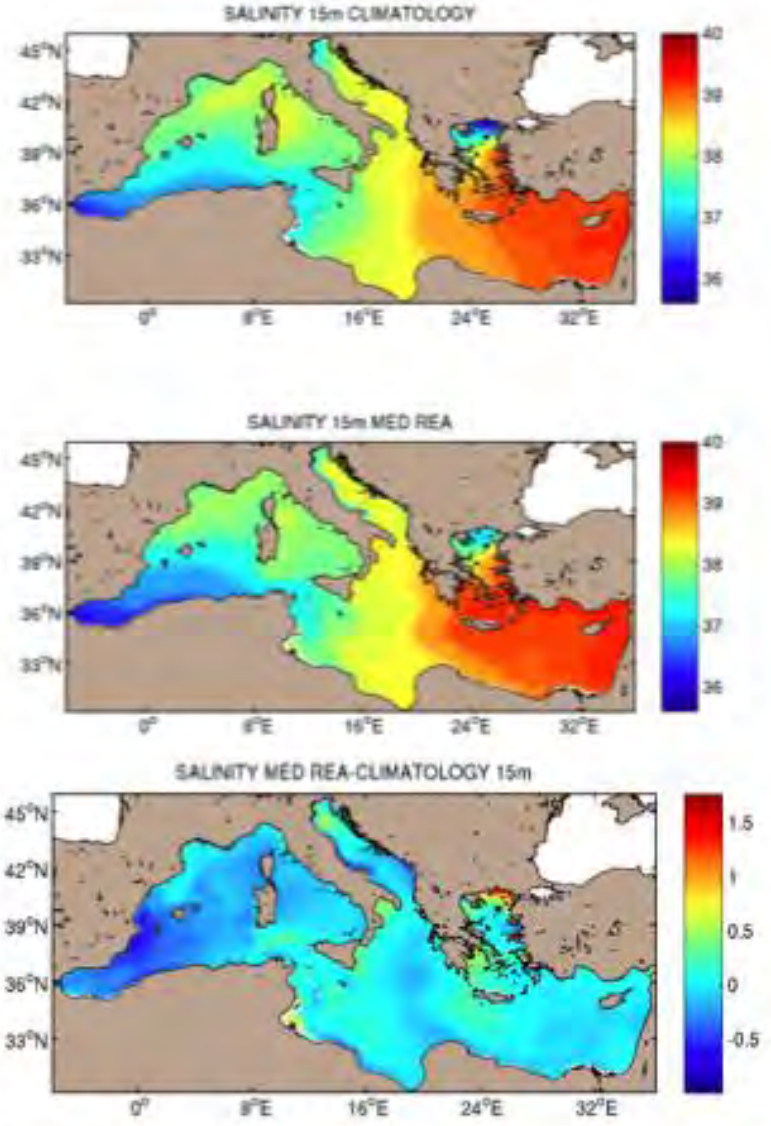
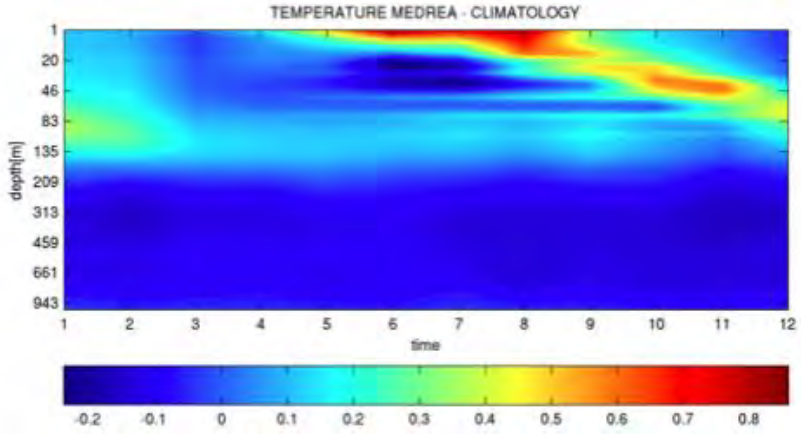


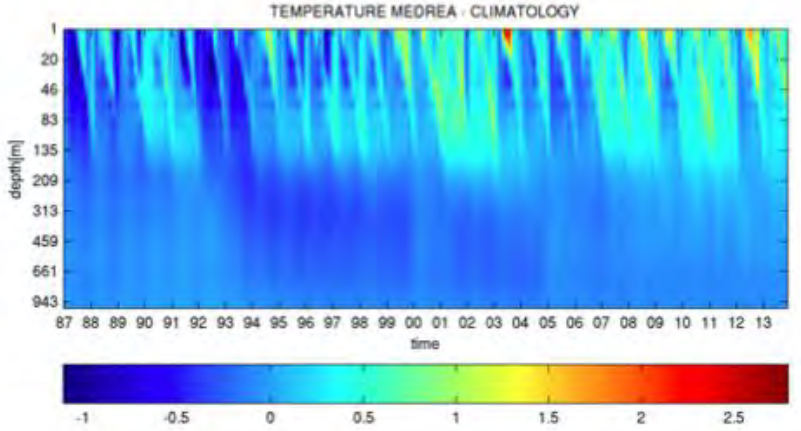
Figure 2SS-CLASS1-S3D_MEAN Annual mean maps of Salinity at 15m of depth: **(top)** from SDN climatology; **(middle)** from MED REA climatology; **(bottom)** differences between MED REA and SDN climatology (1900-2009).

CONSISTENCY ANALYSIS with CMEMS Reanalysis

Extracted from CMEMS Mediterranean Sea Physical Reanalysis QUID

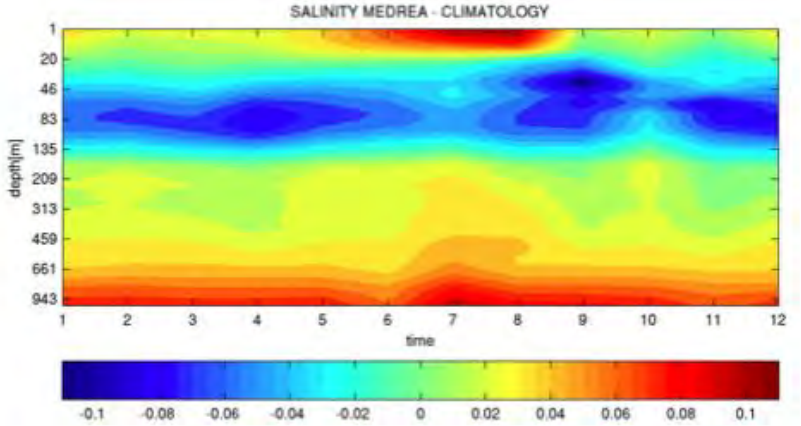


(a)

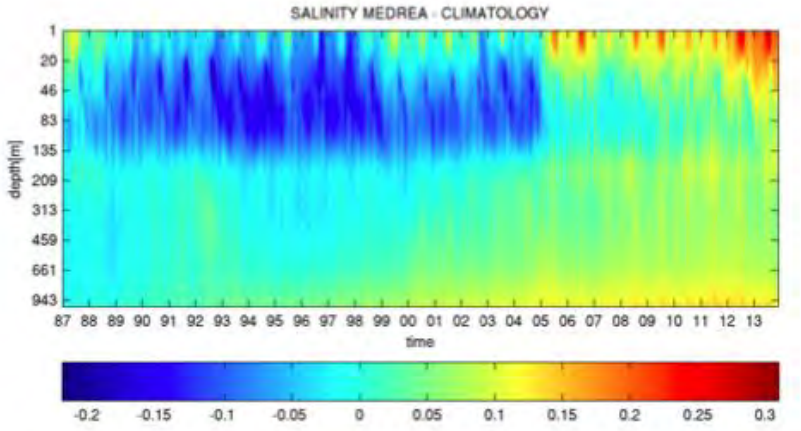


(b)

Figure 11 Temperature difference between (a) MED REA monthly Climatology and monthly basin SDN Climatology; (b) MED REA monthly basin averaged profile (time period 1987-2013) and SDN monthly Climatology within the first 1000m of water column.



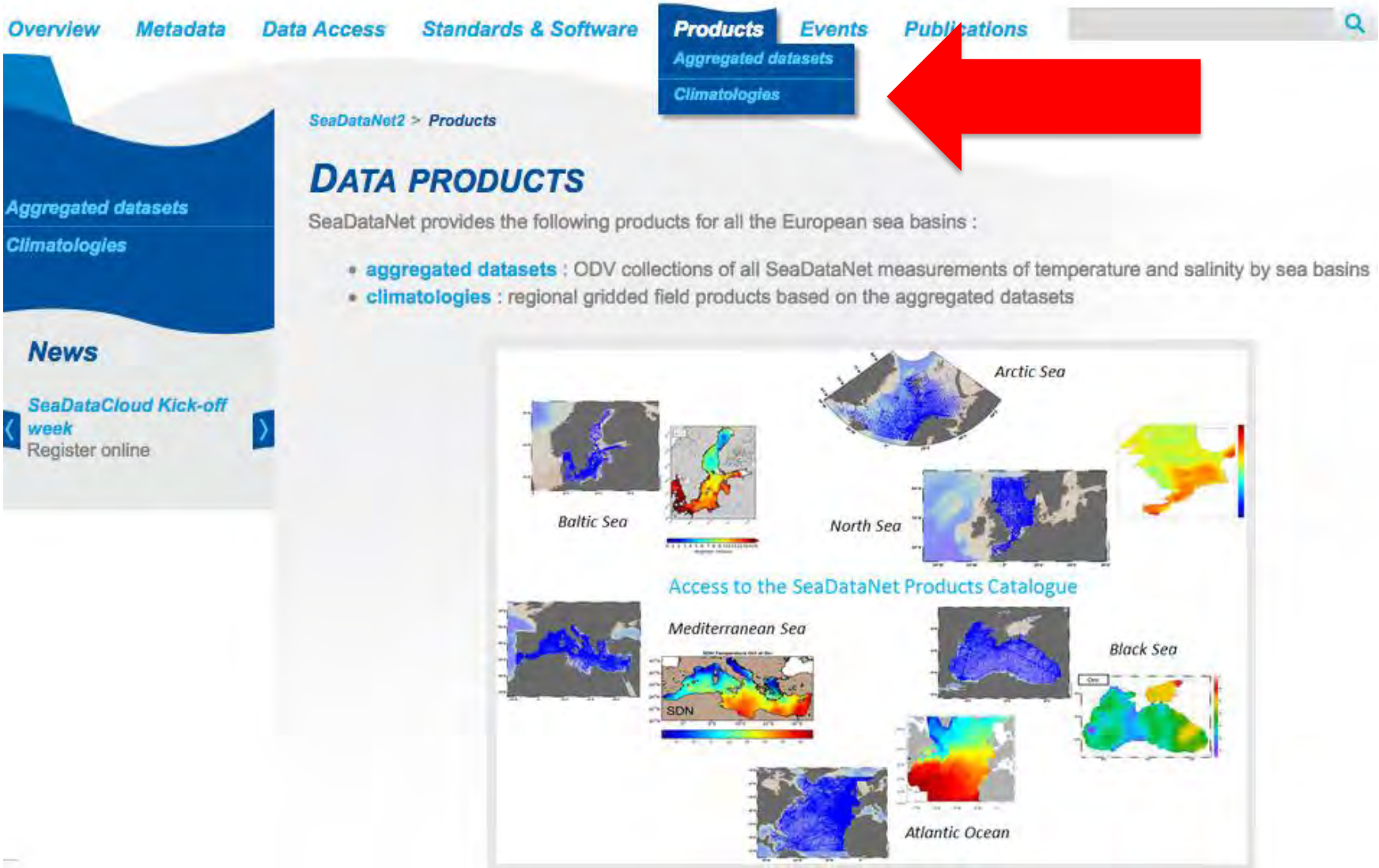
(a)



(b)

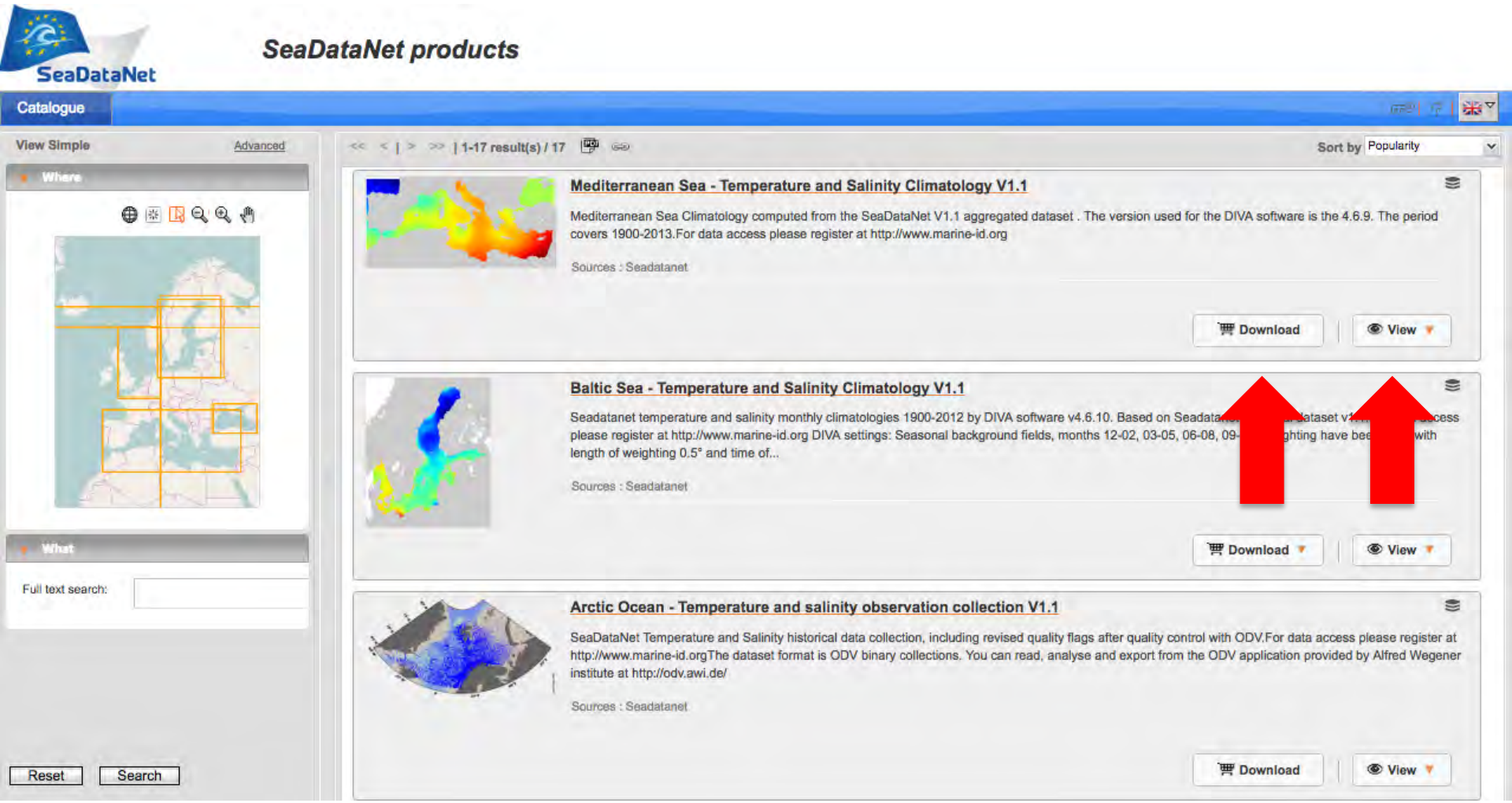
Figure 22 Salinity difference between: (a)MED REA monthly basin climatology and monthly SDN Climatology (b) MED REA monthly basin averaged profile (time period 1987-2013) and SDN monthly Climatology within the first 1000m of water column.

DISSEMINATION



http://www.seadatanet.org/Products

DISSEMINATION



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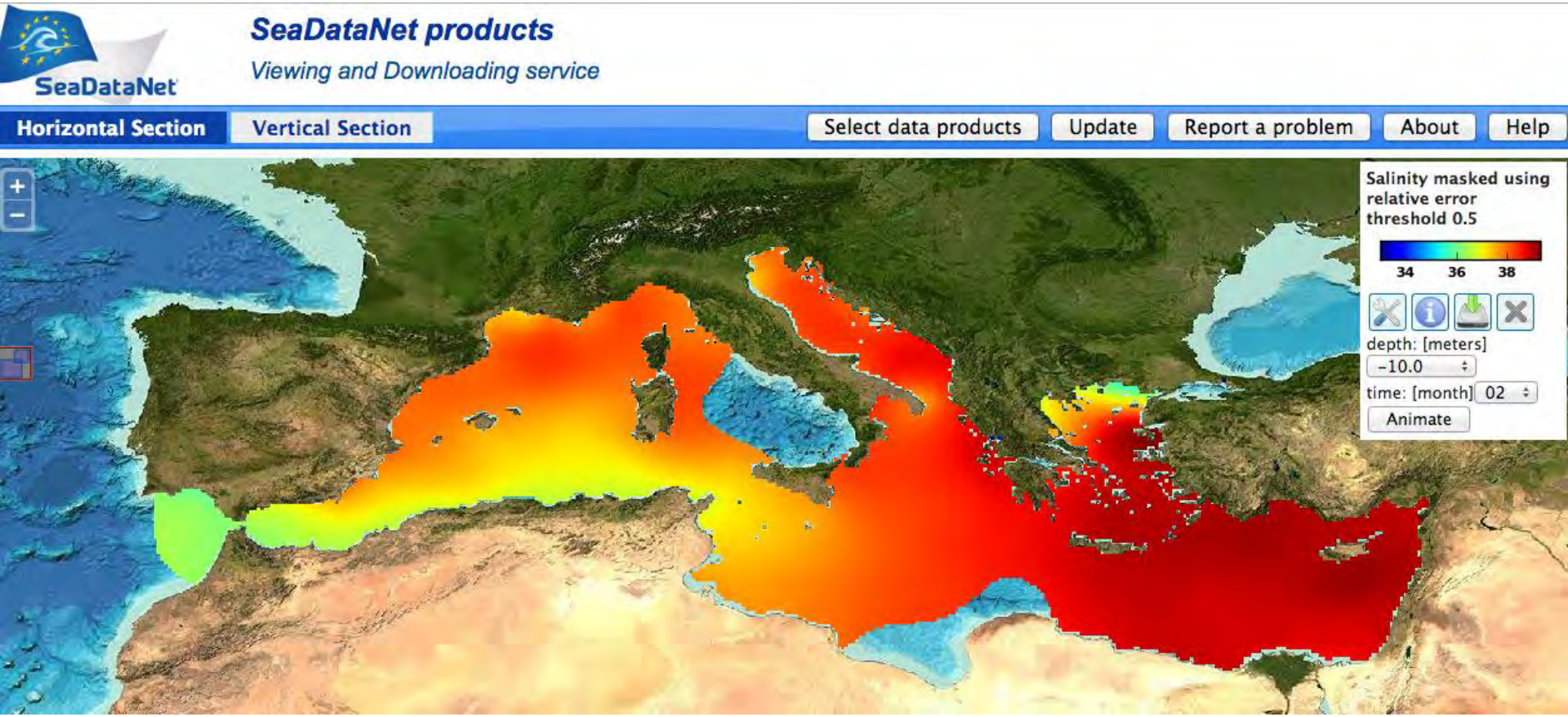
DISSEMINATION



http://www.emodnet-physics.eu/portal/Products

DISSEMINATION

EMODnet
European Marine Observation and Data Network
Physics

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Home page > **Products**

Products

At European level, different groups are contributing to high quality ocean physics data products or services. They are developed, operated and made available by the research or the environment monitoring communities.

Here EMODNET-Physics federates access to the data products provided by Copernicus Marine Environment Monitoring Service (DG Growth) and SeaDataNet (DG Research) in a single catalogue.

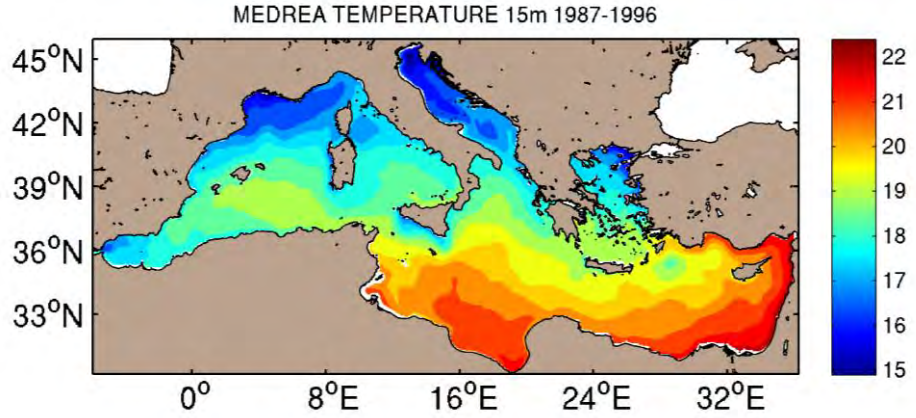
The function, provided by Sextant technical component, is currently in demonstration mode.

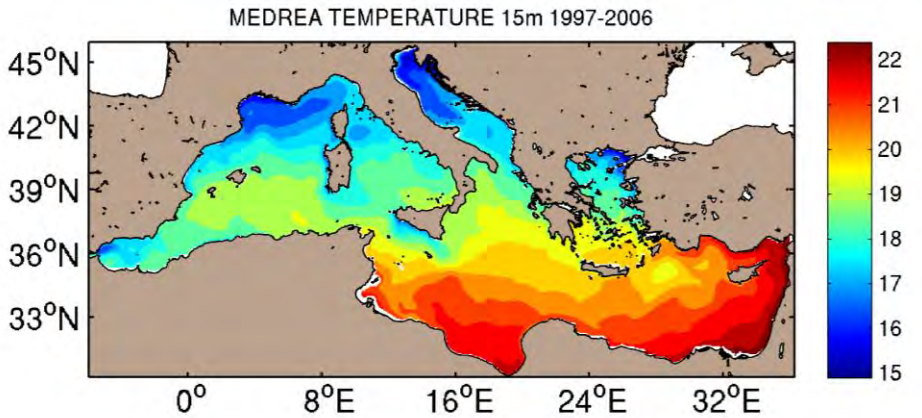
<<<See the products from our contributing partners >>>

WORK IN PROGRESS

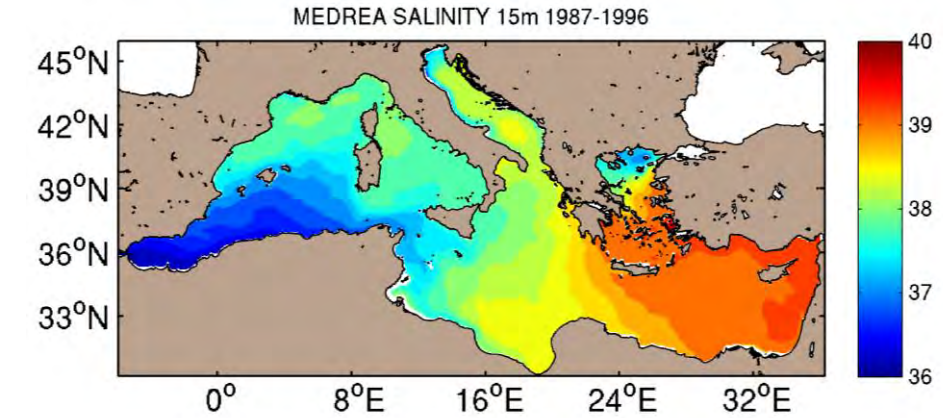
in collaboration with *S.Iona* EMODnet Chemistry

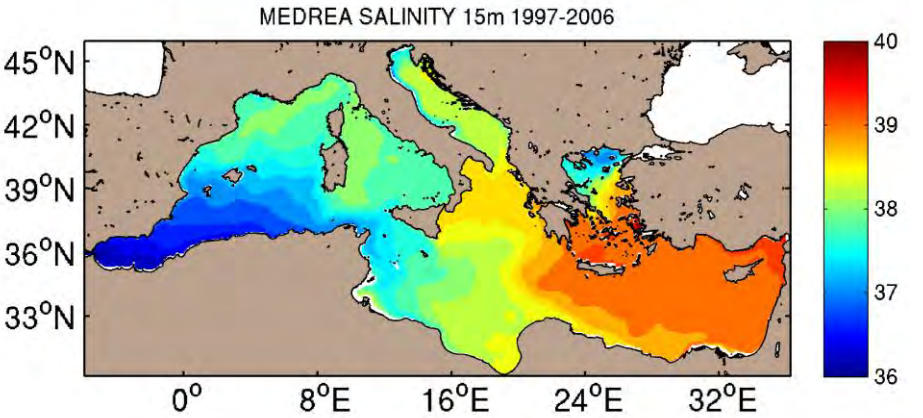
Looking for decadal variability patterns: CMEMS REANALYSIS





Warming in the Levantine basin



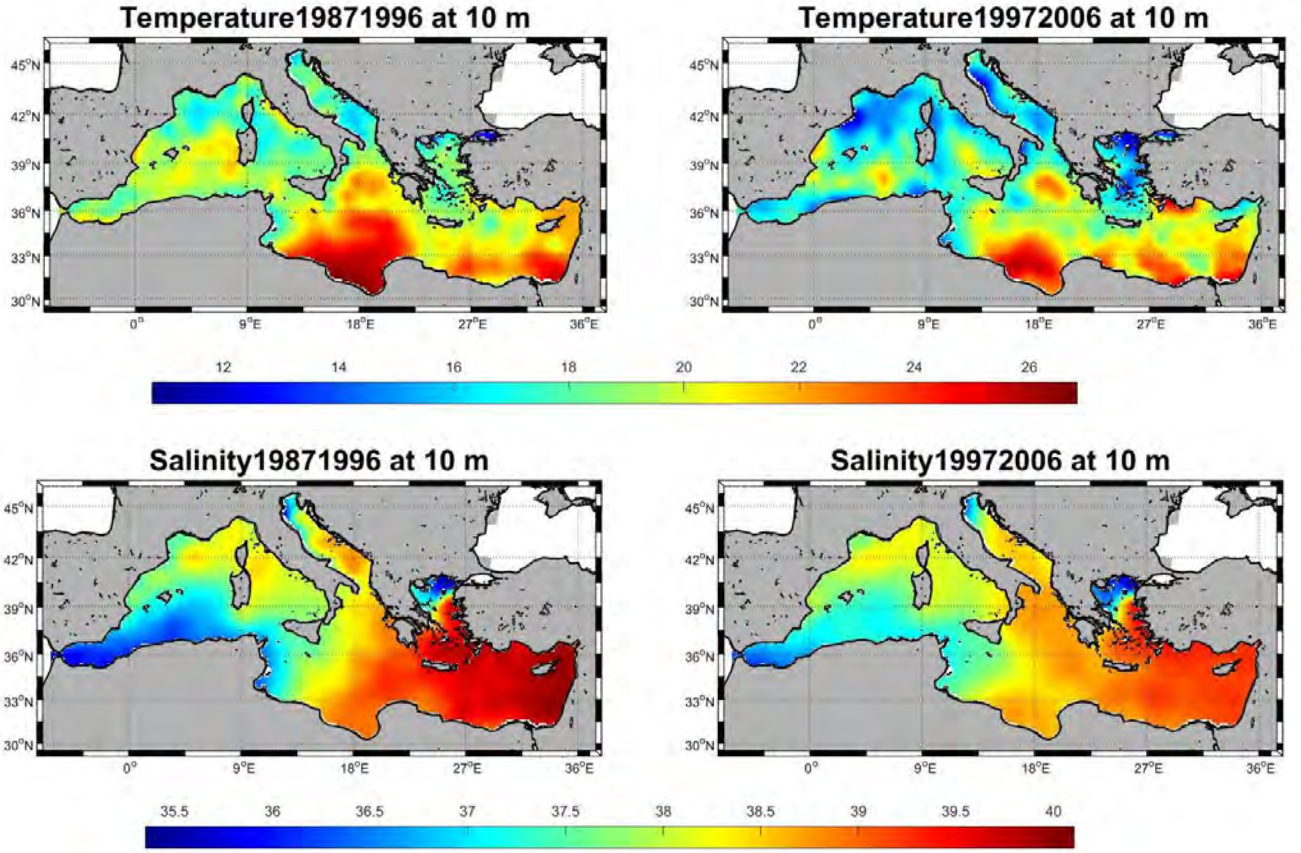


Salinity increase in the northern Ionian (NIR)

WORK IN PROGRESS

in collaboration with S.Iona EMODnet Chemistry

Looking for decadal variability patterns: climatologies



Do we have enough data to solve these decadal patterns?

More Tuning of DIVA parameters is needed

CONCLUSIONS

- SDN2 V1.1 Mediterranean Sea climatology have been produced and distributed through SDN and EMODnet Physics catalogues
- SDN2 V1.1 climatology is consistent with the WOA2013V2, it has higher horizontal resolution and it solves better the coastal gradients
- The standard validation procedure provides a simple and efficient view to check the quality of the climatology and the consistency with other available products
- This standard validation will raise user awareness and products uptake

FUTURE WORK (SeaDataCloud)

- Increase of horizontal and vertical resolution
- Merge different datasets: SDN+CMEMS REP
- Compute different climatologies on decadal base but considering the long term variability of the basin (EMT, NIR)
- Use of different reference datasets for validation/consistency: CMEMS REP SST, CMEMS reanalysis
- Test the standard validation methodology for EMODnet chemistry products (e.g. nutrient/oxygen/clorophyll climatologies)