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International Conference on Marine Data and Information Systems

New gridded climatologies from in-situ observations for the Mediterranean Sea

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TOPICS

- SDN gridded monthly climatologies for the Med sea: description
- Gridded climatology for numerical model initialization: a case study
- Conclusion

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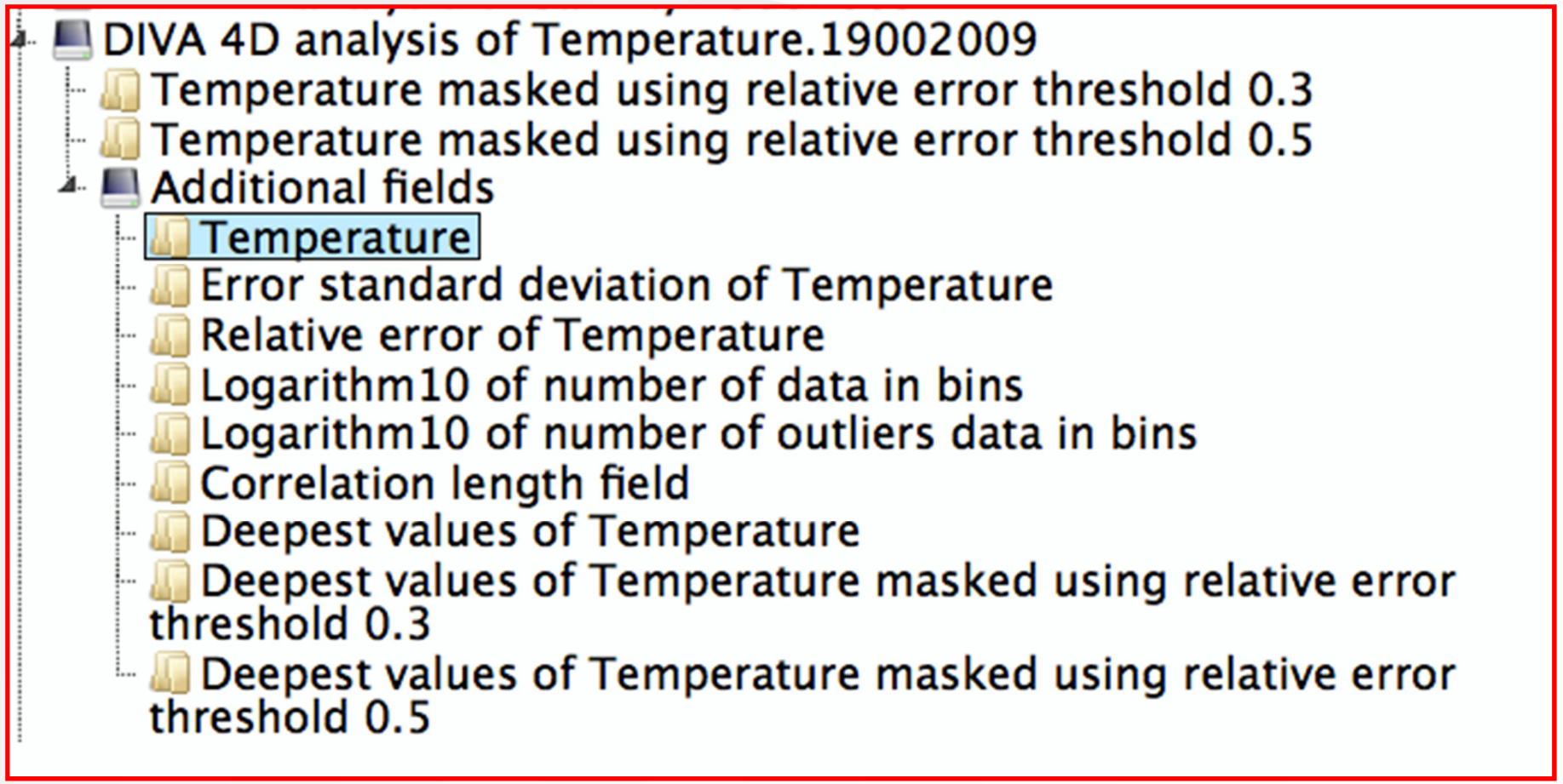

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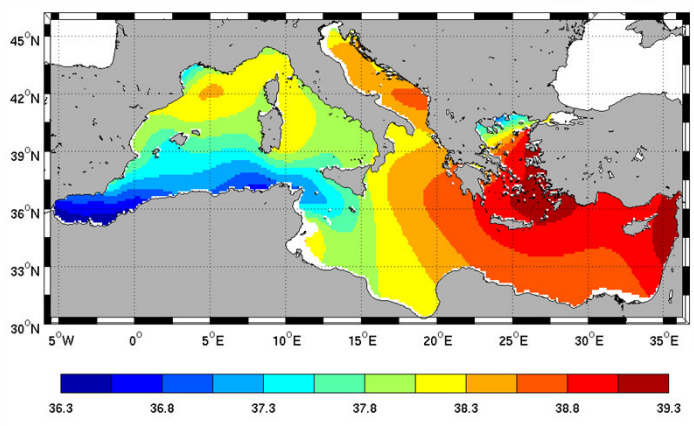
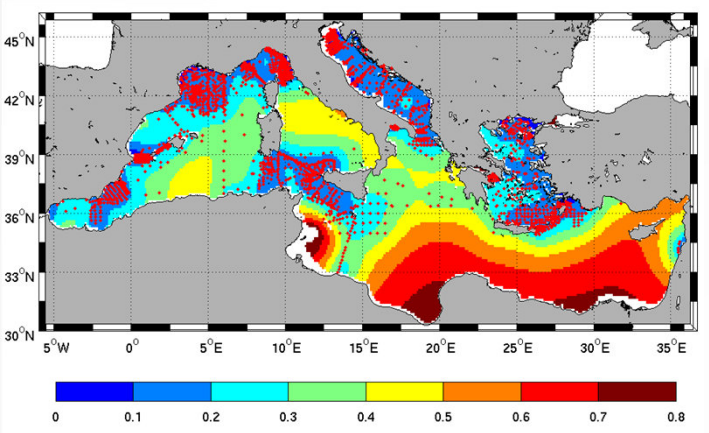
SALINITY CLIMATOGY 30m



DIVA error field 30m



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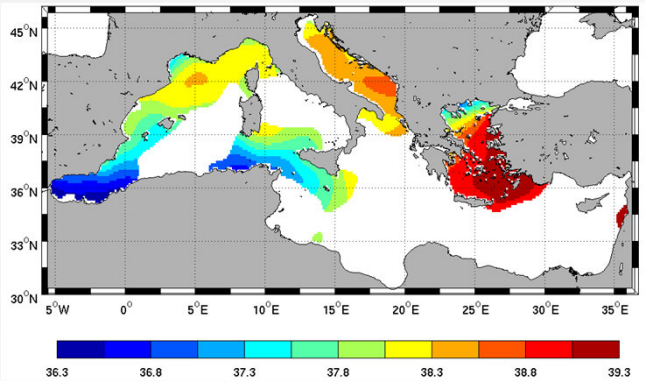

ERROR MASKING

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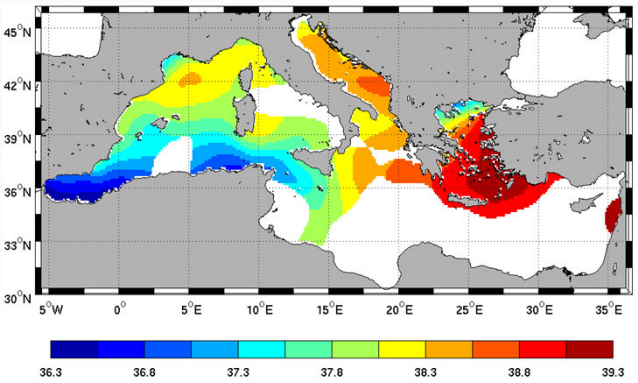
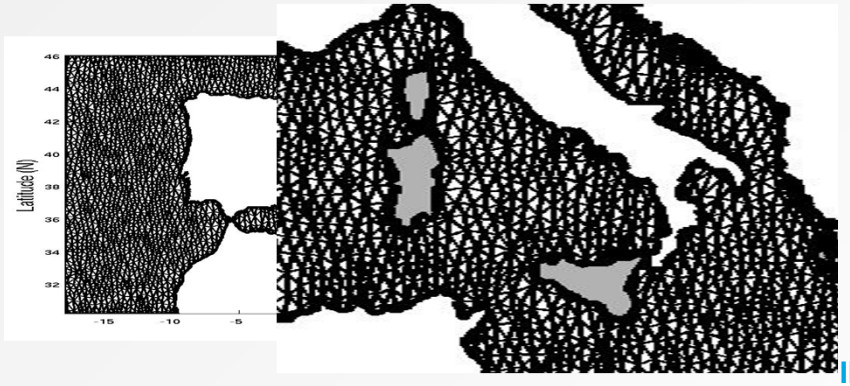


SDN Grid monthly climatologies for T & S

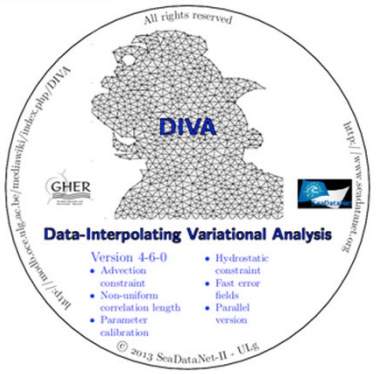
MEDATLAS climatology (Maillard et al. 2005) limits:

- no coastal data considered
- no check on vertical stability
- fields very smooth (due to a large correlation lenght)

→ production of new climatologies using DIVA SW



DIVA mesh at surface



SDN Grid monthly climatologies for T & S

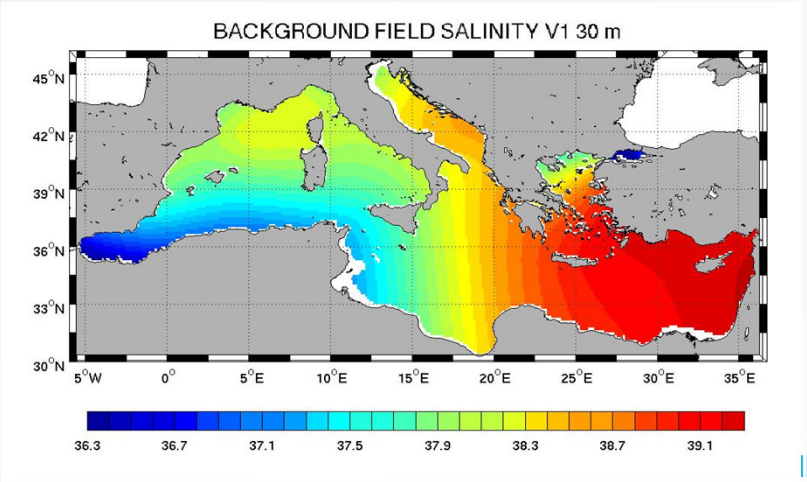
	MEDATLAS	SEADATANET V0
Corr. lenght	350 km	ca. 222 km (2° degree)
Background field	Semi-normed	Semi-normed
Signal/Noise	Changes with depth and parameter. Not the same for T and S.	0.5 whether for T or for S
Used data	Medatlas 2002+ Mater (excluding data from coastline to 15 km and data in points where max. depth is below 50m)	SDN merged with Medatlas 2002 & Mater + Argo profiles
Bathymetry	Sandwell&Smith + corrections ETOPO5	MFS grid (1/16° horizontally) fron DBDB_V1.

Background field definition is very important if the observations are not homogenously distributed in space and time, as is the case of the Mediterranean Sea

Salinity Background computation in SDN

- Salinity background: semi-normed taking into account all the available obs for each vertical level without taking into account the time. All the 12 months have the same background computed using all the obs for the 12 months all over the considered period (1900-2009).

- it's not possible for salinity to have a sasonal background due to scarcity of data in certain area in certain months at a given depth



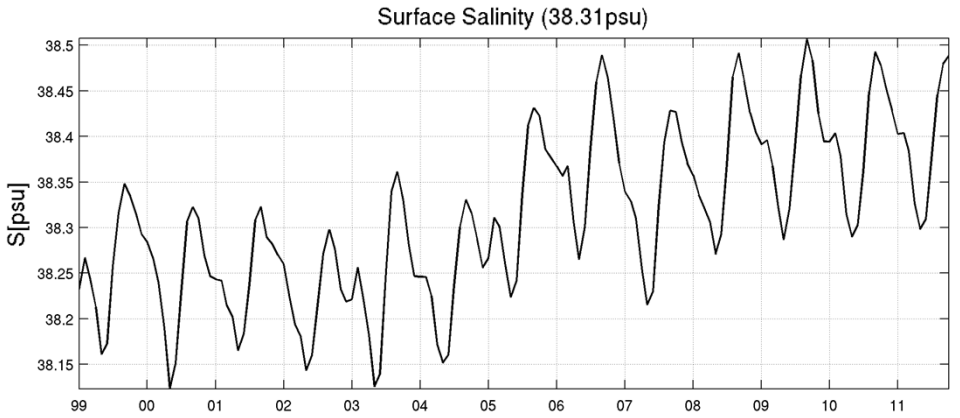
DIVA salinity background at 30m

Background Computation

SALINITY

Salinity field has a strong spatial variability west-east (low in the west with a minimum of 36.4psu in the Alboran region and maximum of 39.2psu in the levantine) with a difference of more than 2psu. Seasonal variability in a determined area is around 0.2 psu

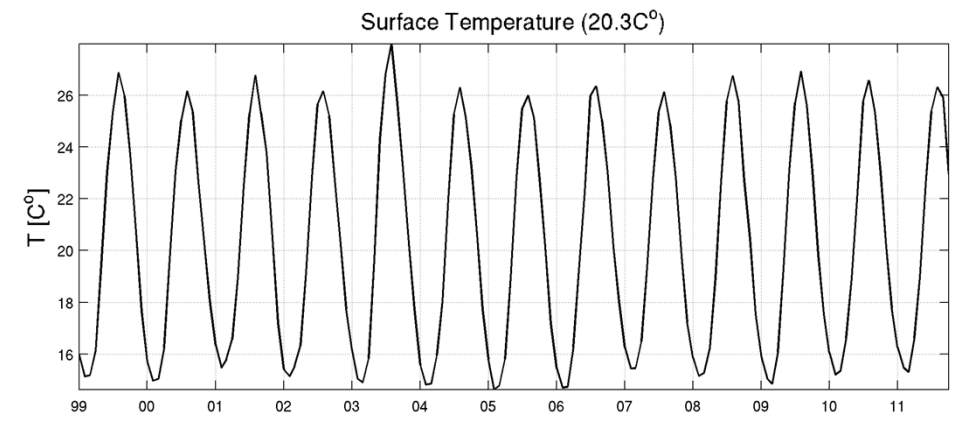
→ **semi-normed annual background**



TEMPERATURE

Temperature field has a very high seasonal variability (much higher than the spatial variability). The number of temperature data available is larger than salinity data.

→ **semi-normed background computed over three months of data, centered around each analysis month**



QC of climatologies: modelers point of view

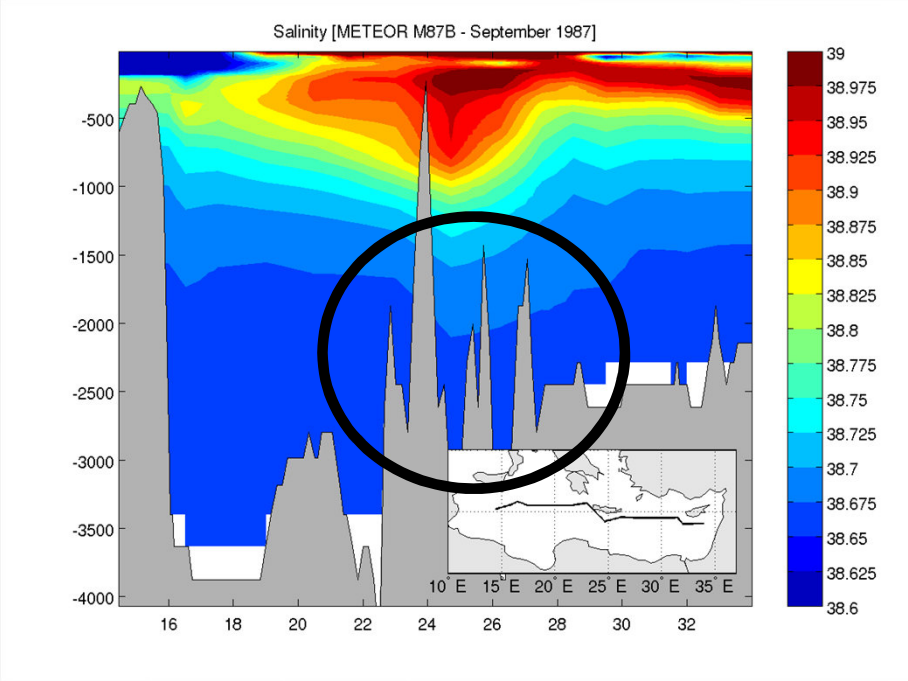
Model initialisation: at the first step of integration the values of temperature and salinity at each grid point is defined equal to the climatological field for the corresponding month

How this initialisation will affect the model performances?

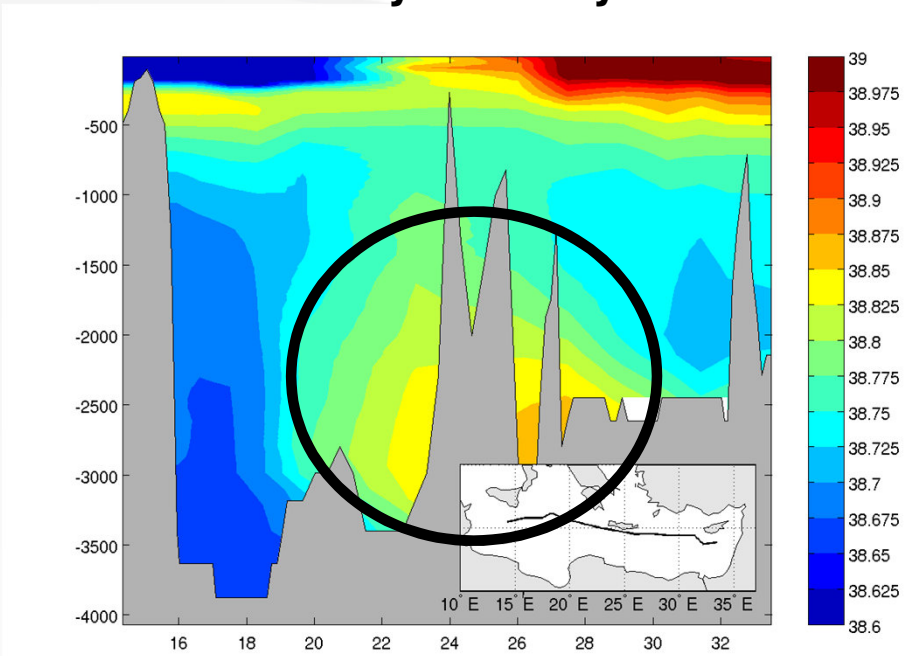
Example: water masses pre and post East Mediterranean Transient (Roether 2007)

Observed Salinity along Meteor transects in 1987 and 1995

September 1987

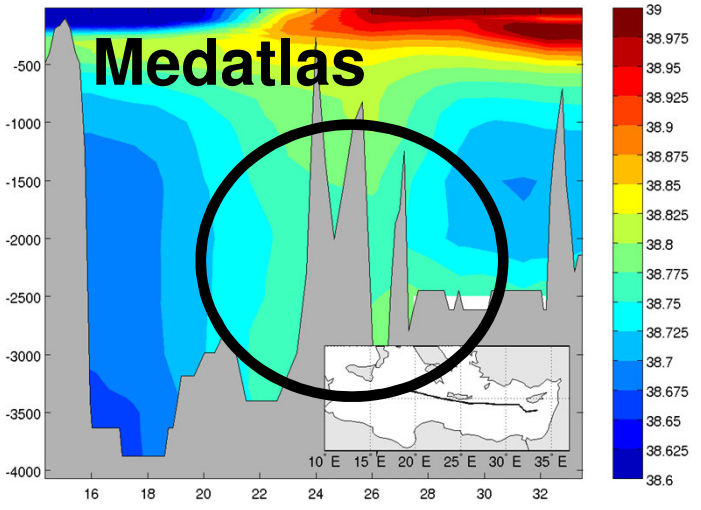


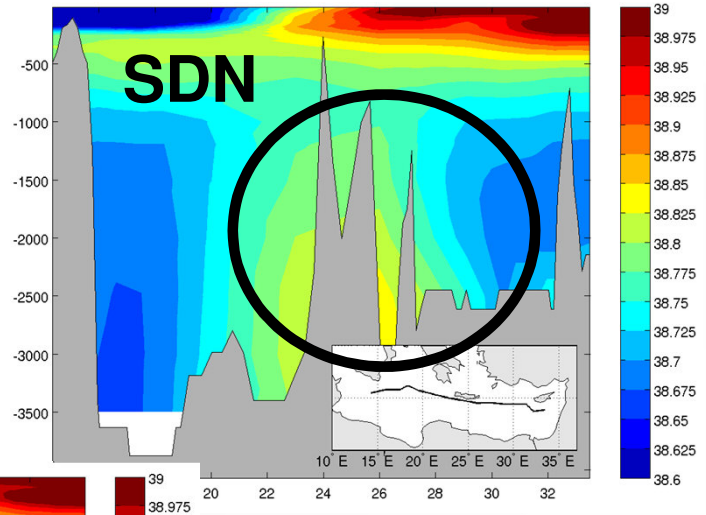
January/february 1995

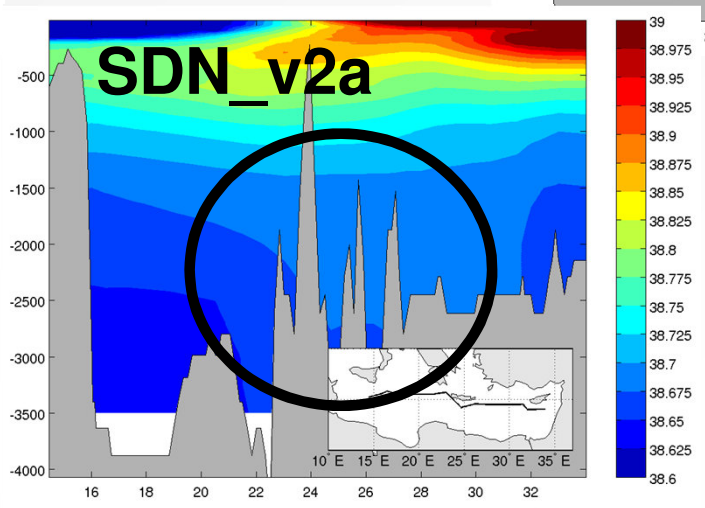


→observed increase of salinity at intermediate and deep level

Climatological fields: model simulation is initialized in Jan1985

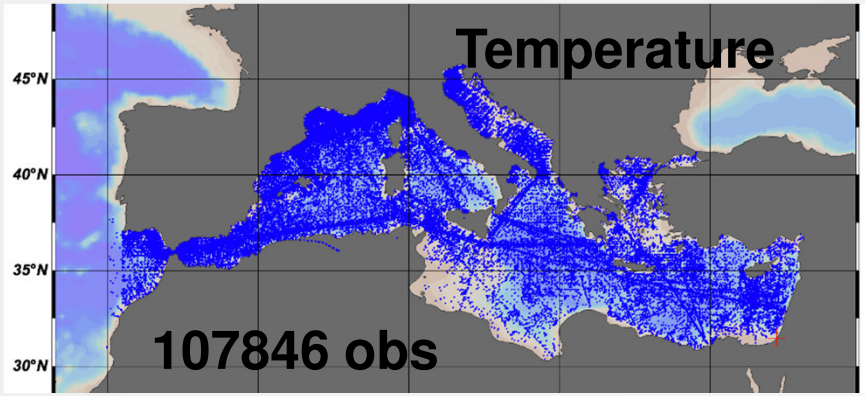




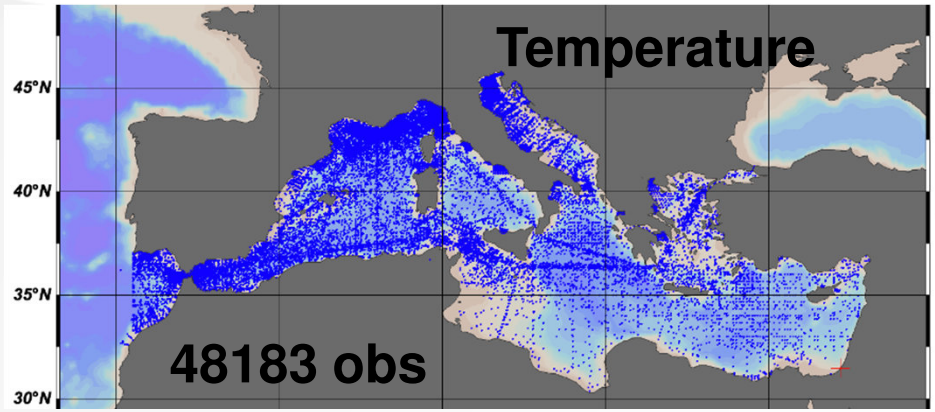


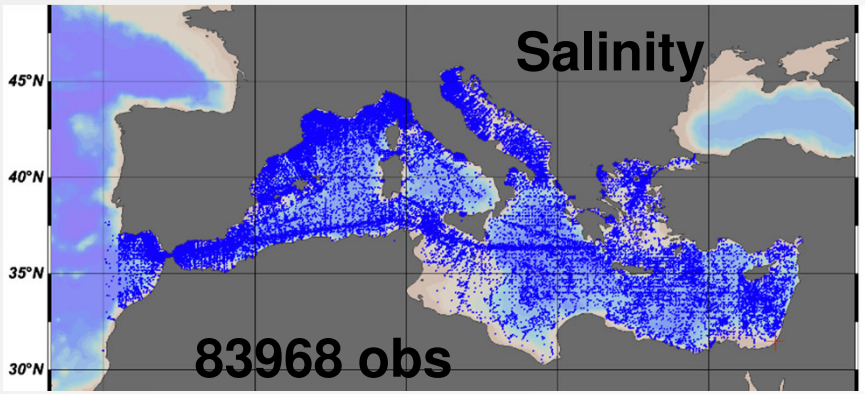
Number of observations

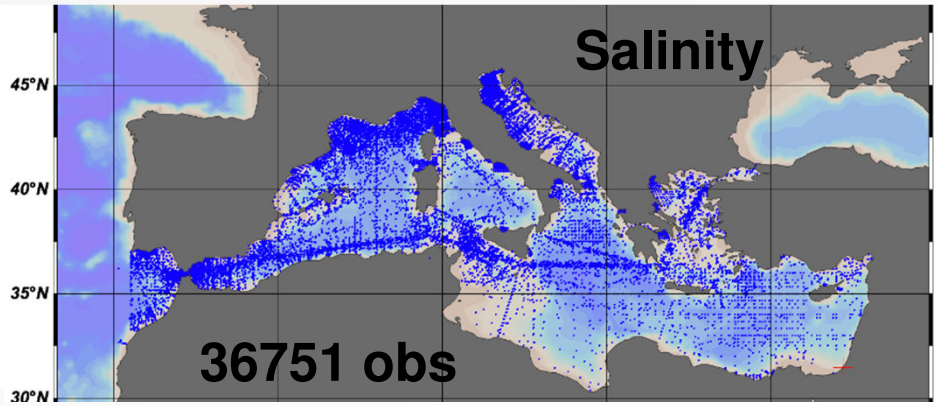
SDN 1900-2009



SDN V2a 1900-1987







pre-transient data (<1987) better resolve the water masses at intermediate and deep water → **but** less obs → larger error field

Impact on model simulation experiment 1985-1995

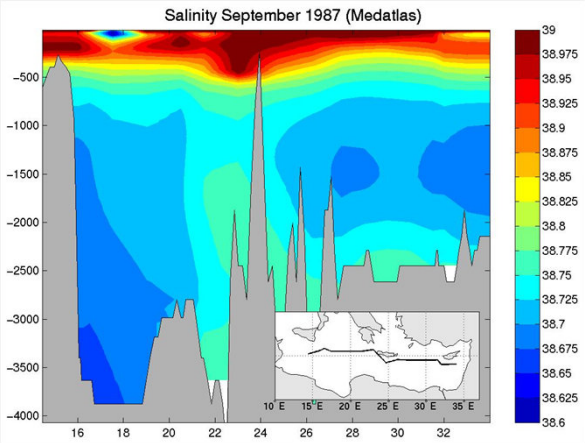
1. simulation initialized with MEDATLAS
2. simulation initialized with SDN
3. simulation initialized with SDN v2a

Impact on reanalysis

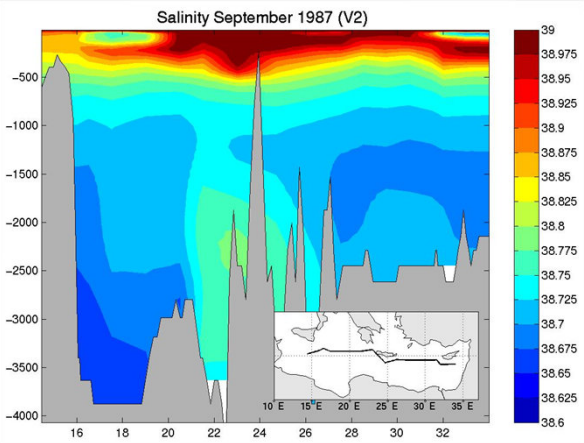
1. 1985–2007 Mediterranean Sea Reanalysis data (*Adani et al., 2011, Pinardi et al. 2013-in press*)
2. 1985-2012 New MyOcean Reanalisis (in production)

Model results along METEOR transects Sep1987

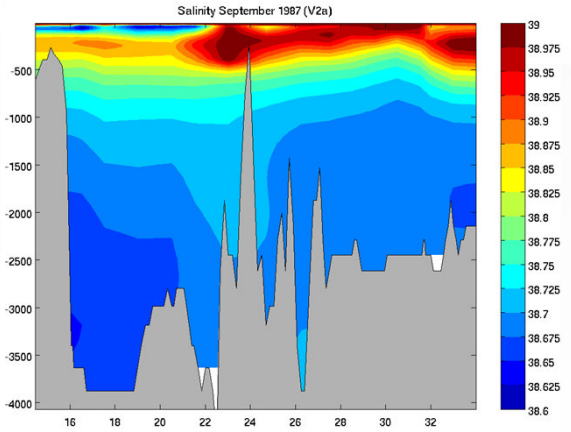
MEDATLAS



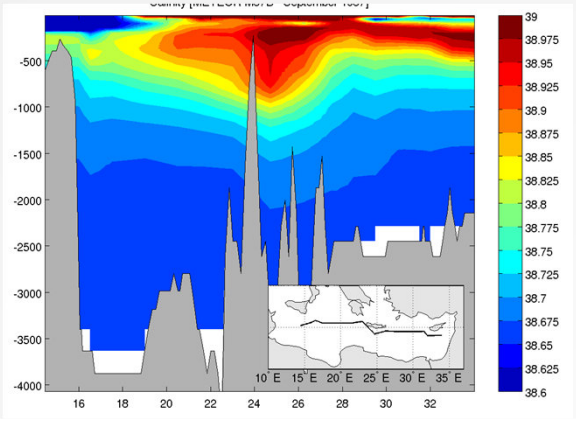
SDN



SDN v2a



Obsearvations

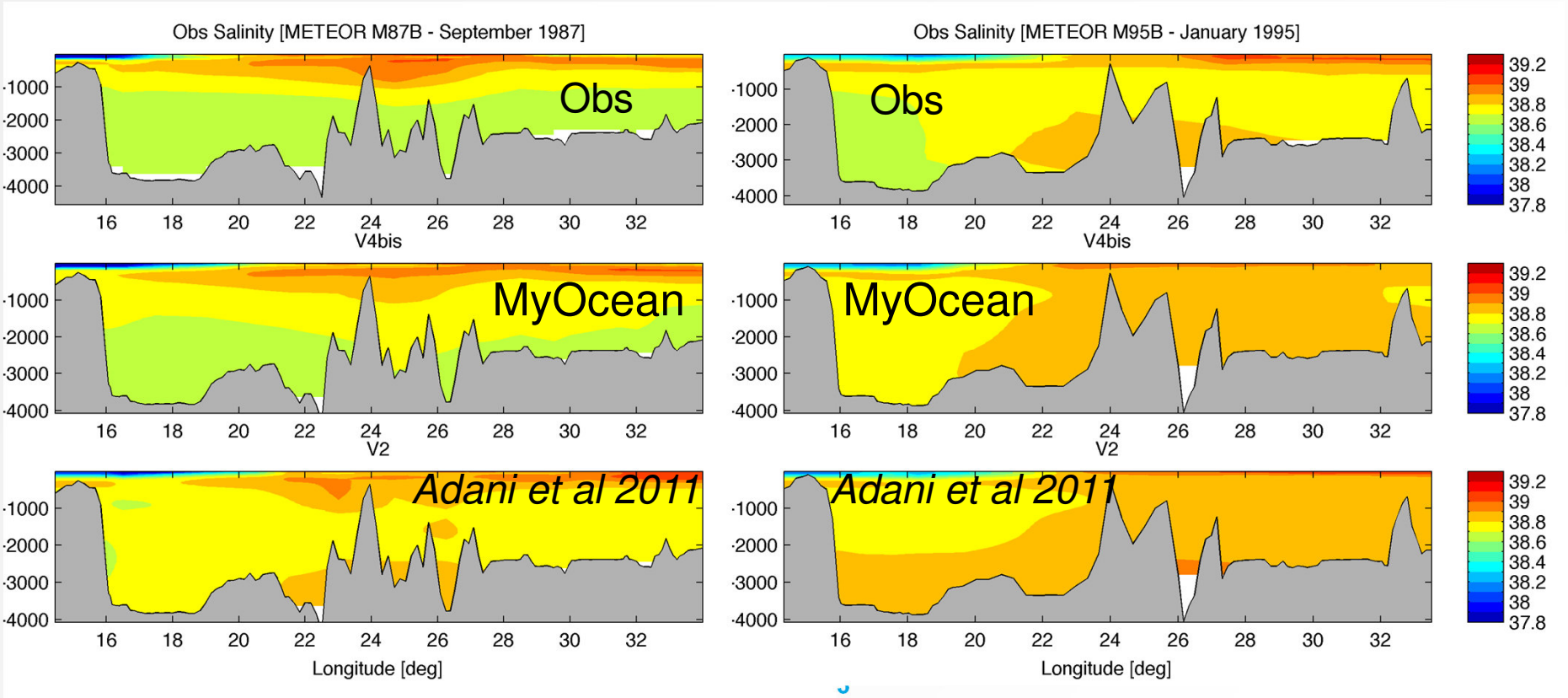


Model simulations initialized in Jan 1985 with MEDATLAS and SDN show higher salinity values at intermediate and deep level than the simulation initialized with SDN v2a

Reanalysis Results

Sept 1987

Jan 1995



Conclusions

- SDN products are available and they will be updated in SDN2
- New monthly climatologies will be computed from the new TS historical data collections considering long term water mass variability
- The climatology play an important role for model initialization because the intemediate and deep water masses have a slow renewal rate