

HyMeX



# The TRANSMED SST and SSS time series in the Gulf of Lions: from events to interannual variability

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# HyMeX

## Low-cost fully-automated thermosalinometer system TRANSMED on ships of opportunity

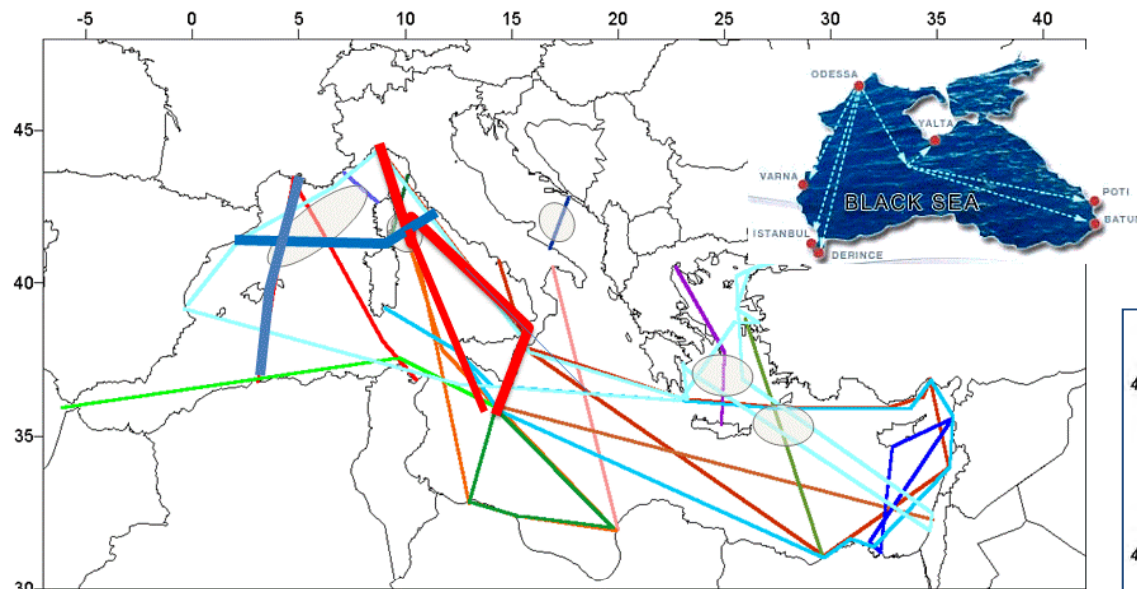
MISTRALS

### HyMeX LOP

**SST + SSS**  
+ HyMeX-designed  
**meteorological package**  
**SEOS**

Reality (3.5 years):

### TRANSMED POTENTIAL NETWORK

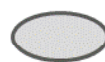


Data synoptic at basin-scale

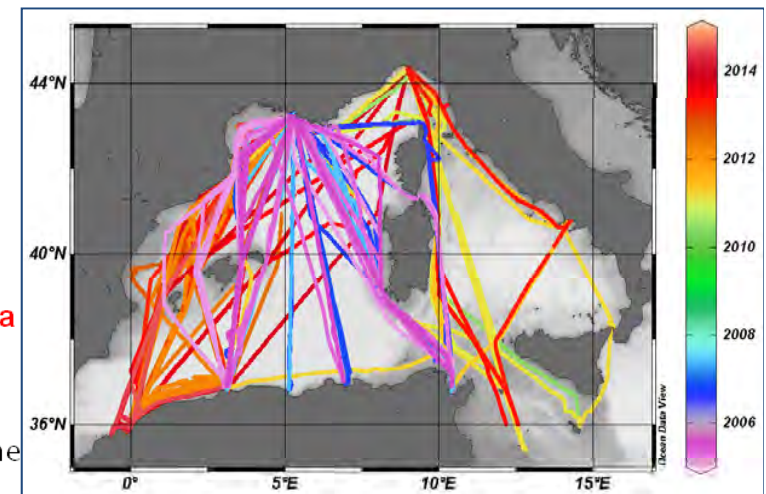
Samples both coastal and open sea  
**and straits**



TS with MeteoFrance package



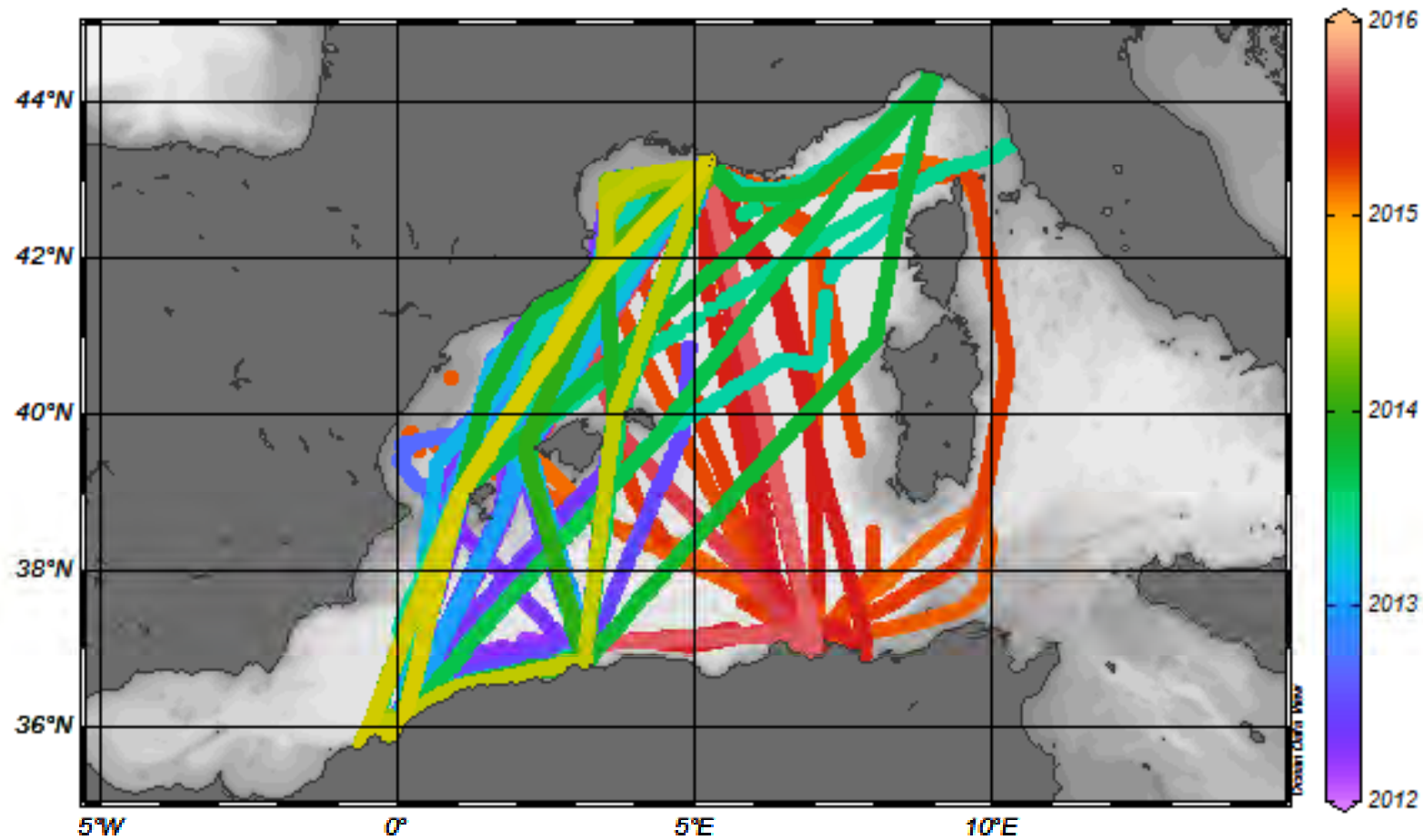
Dense Water Formation zone





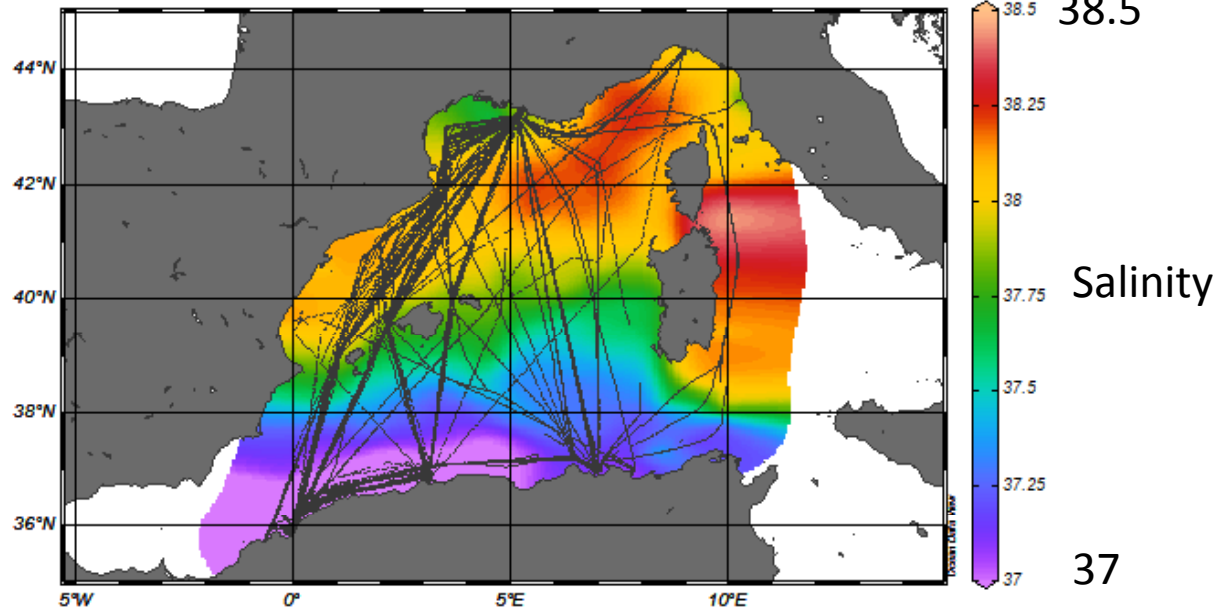
# Time distribution of the SST and SSS collected from 2012

*Time (station date&time) [years since 0000-01-01]*

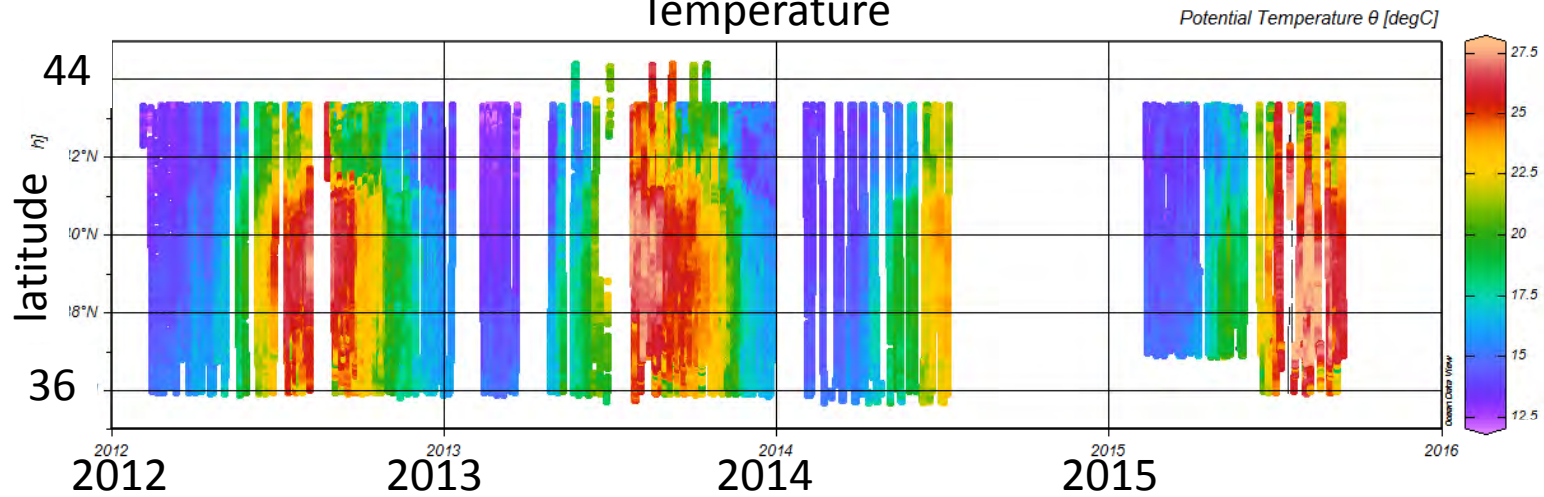




Salinity @ Time-Stamp=first

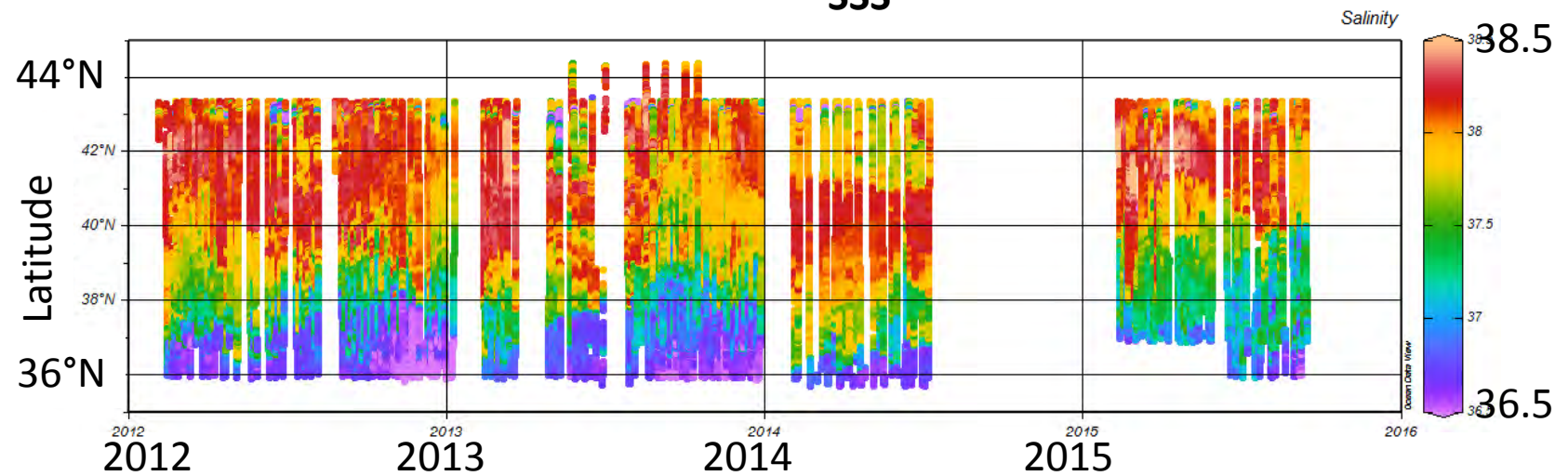
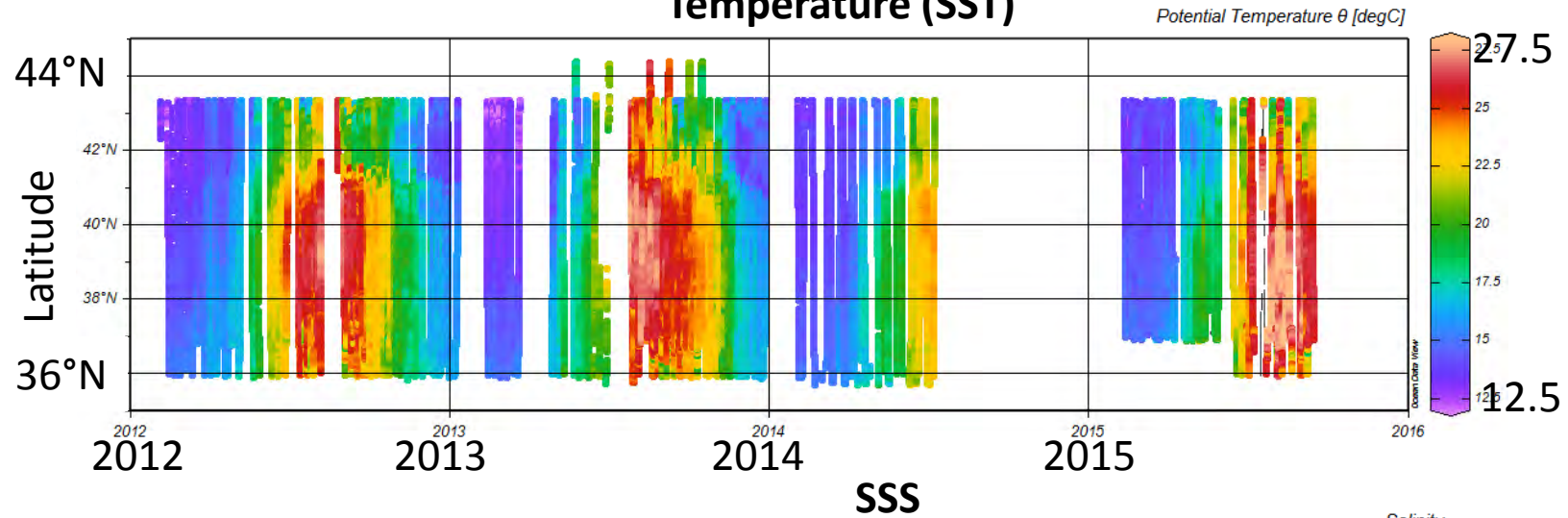


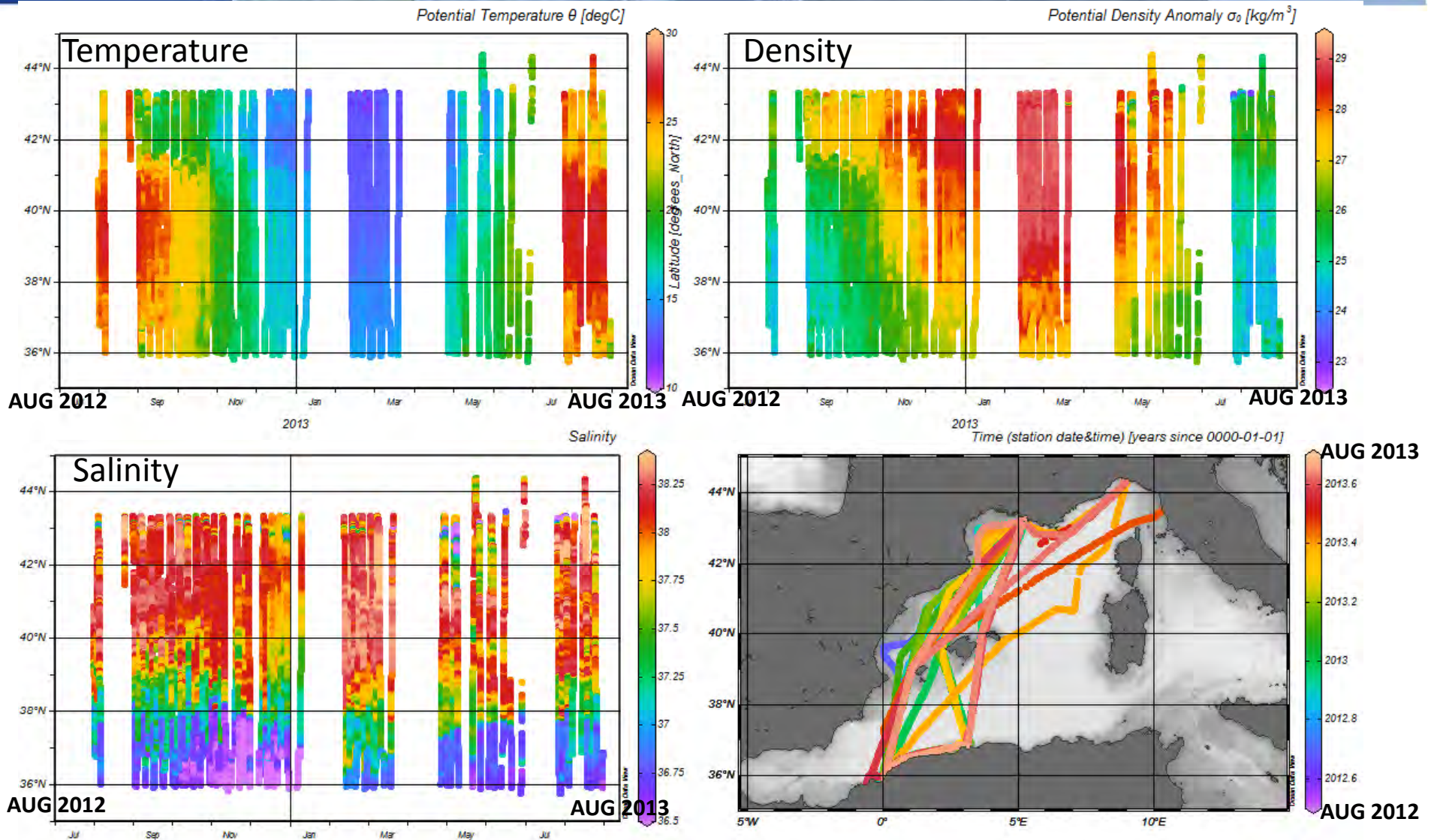
## Temperature





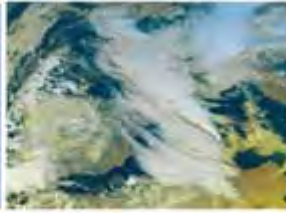
## Temperature (SST)





Data available for models validation from preconditioning phase to restratification  
 (+ *Sea Embedded Observation System (SEOS) data* )

**HyMeX**



**HyMeX**

Hydrological cycle in Mediterranean EXperiment

## **SEOS (Sea Embedded Observation System)**

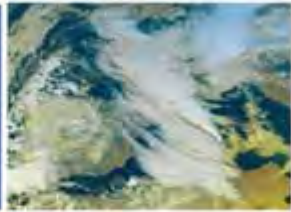
**Mesures atmosphériques sur navires  
d'opportunité pour l'estimation des échanges  
Surface – atmosphère**

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GMEI/4M  
42 Avenue Coriolis  
31057 Toulouse Cedex



**METEO FRANCE**  
Toujours un temps d'avance





## SEOS

### *Sea Embedded Observation System*

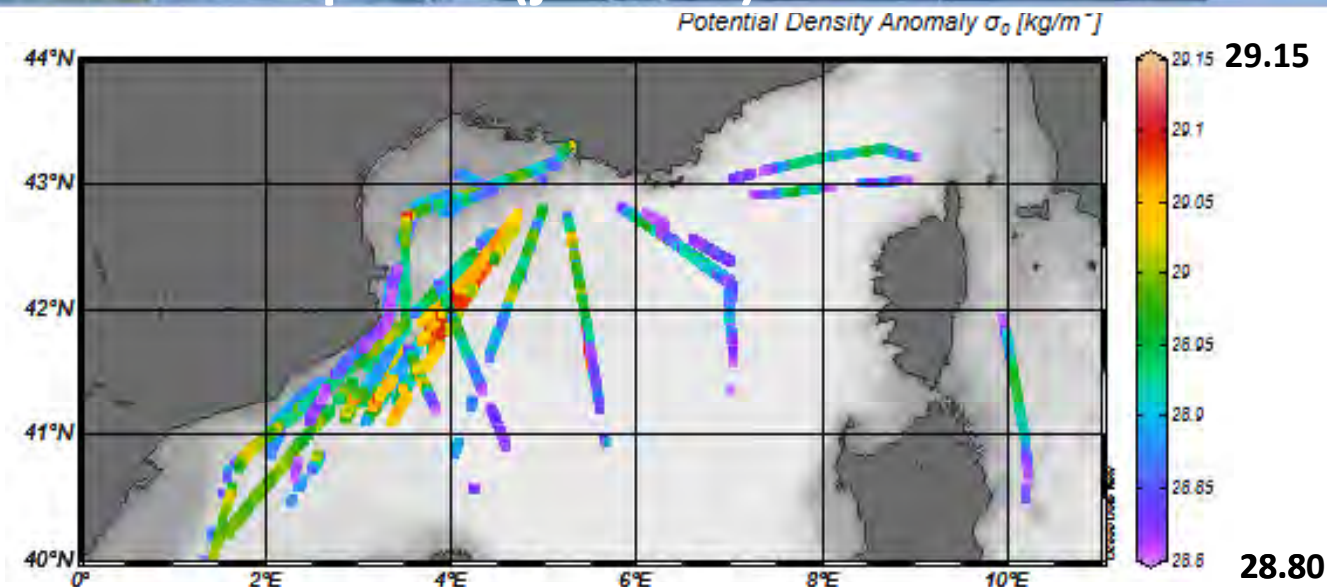
- SEOS, un système :
  - Adaptable à divers type de bateaux,
  - Facile à installer (et à démonter),
    - Pour pouvoir maintenir les mesures sur une ligne régulière (changement de bateau possible)
  - Pas de modification de l'infrastructure du navire (pas de câblage, pas de modification mécanique)
    - Autonome en énergie,
    - Modulaire.
  
- Les 8 paramètres :
  - *Température de l'air,*
  - *Humidité,*
  - *Pression,*
  - *Précipitations,*
  - *Vent (direction et force),*
  - *Température de la surface de la mer,*
  - *Rayonnement infrarouge et global*
 pour estimer les échanges mer/air de chaleur et de vapeur d'eau.

On SEDOO too !

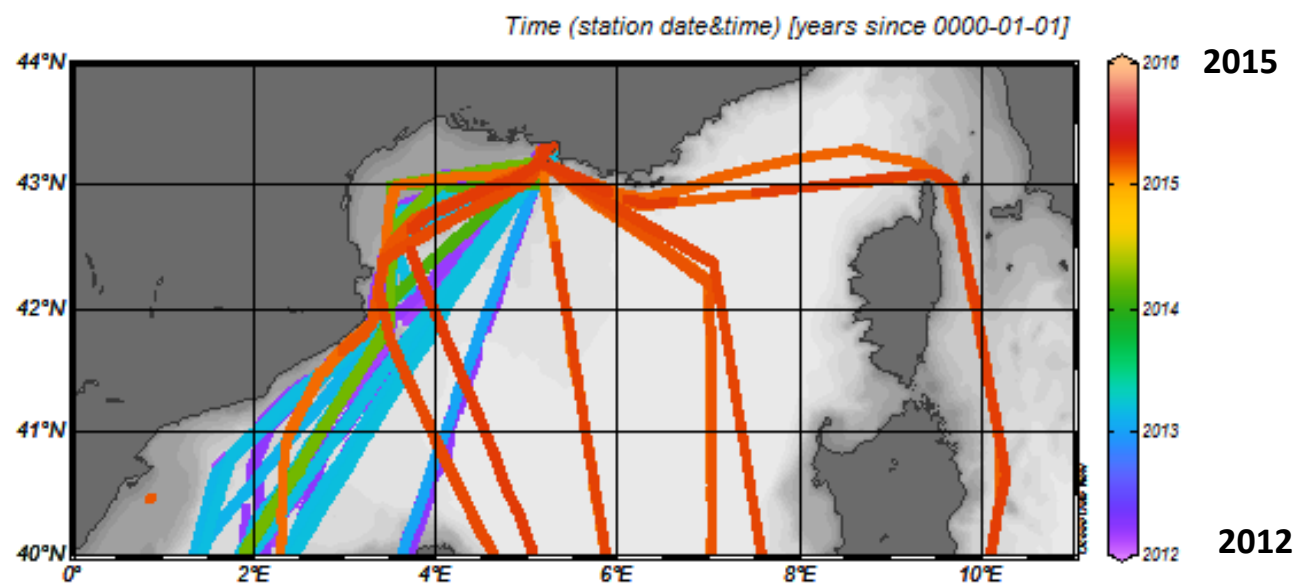


# Interannual variability: Winter period (jan-mar) 2012-2015

Density > 28.8  
2012 - 2015

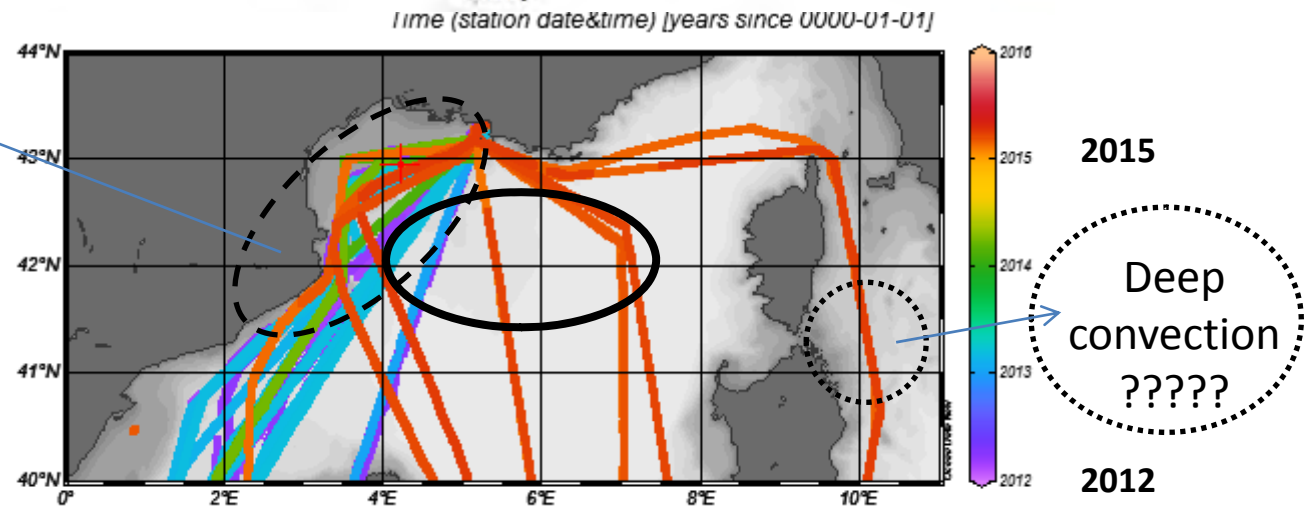
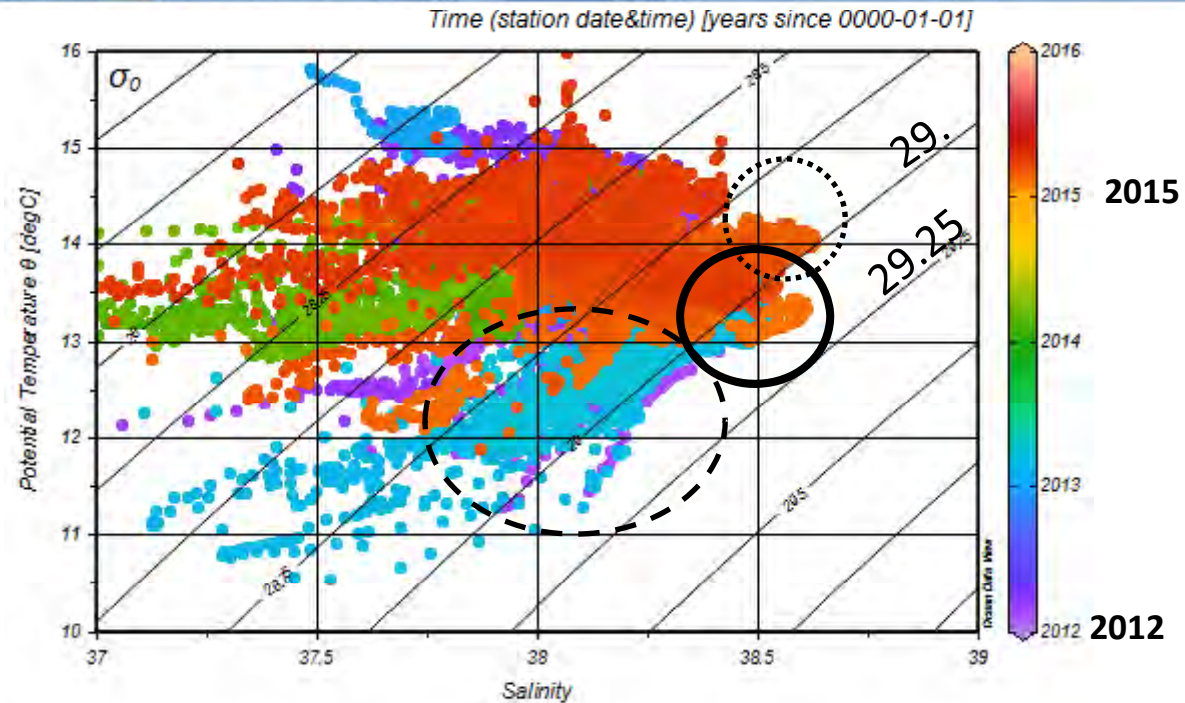


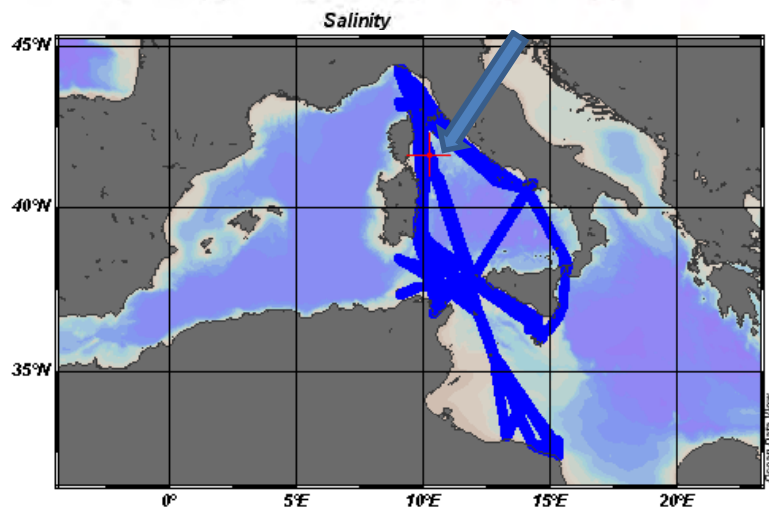
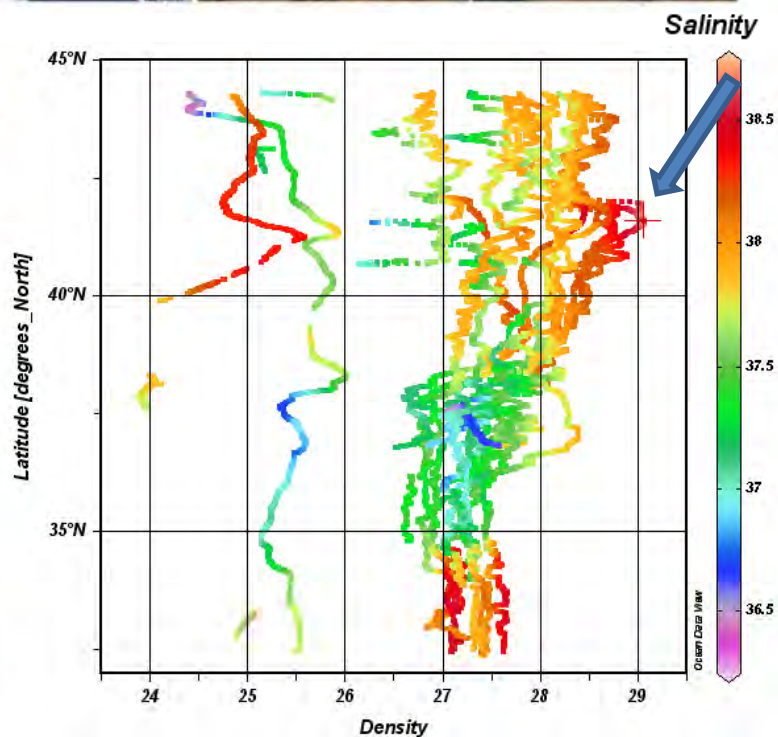
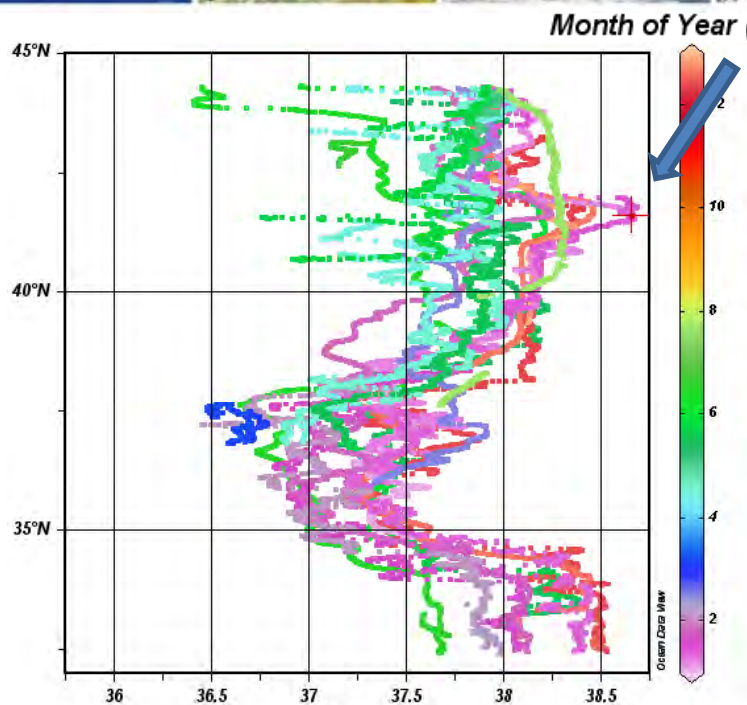
Jan-Mar  
2012-2015



Open sea convection

Shelf DWF



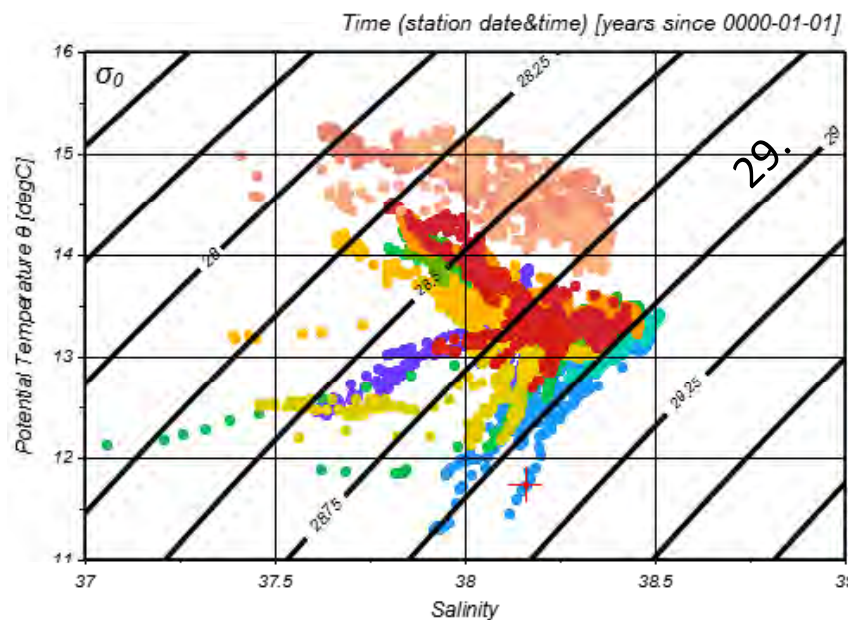


Position	10.205°E / 41.594°N	
Date	12 January 2011	
Time	15:59:54.000	
Depth Range [m]	[3 - 3]	

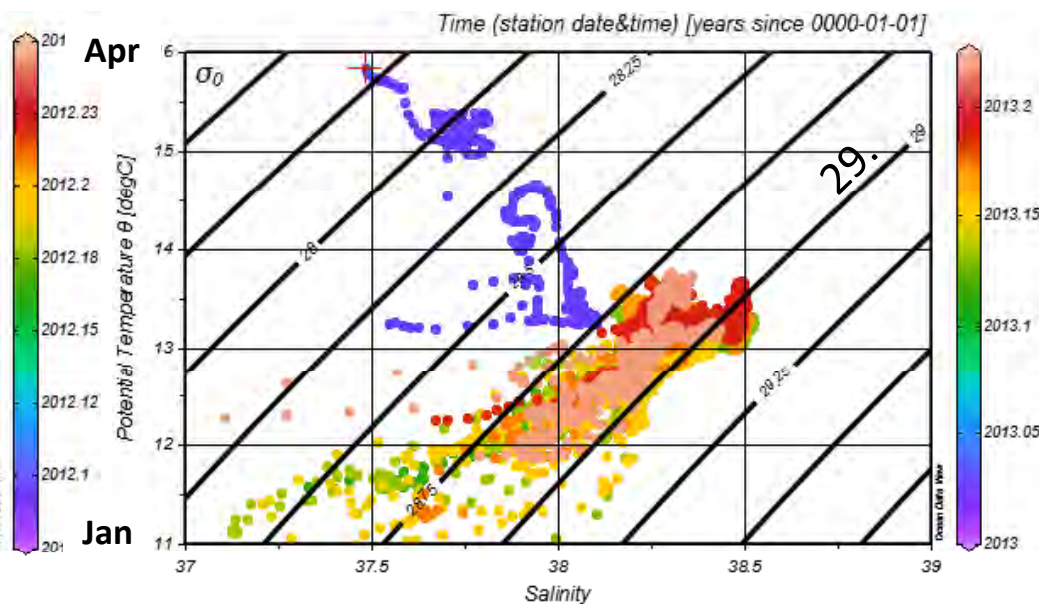
**Sample: 1 / 1**

1: Time-Stamp	734515.69	1
2: Speed	13.49	1
3: Temperature	13.64	1
4: Salinity	38.66	1
5: Density	29.06	1

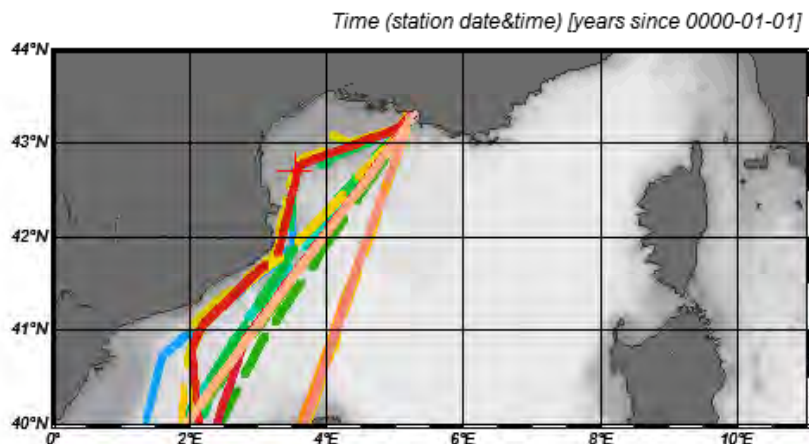
=> Hyp.: DWF BB ?



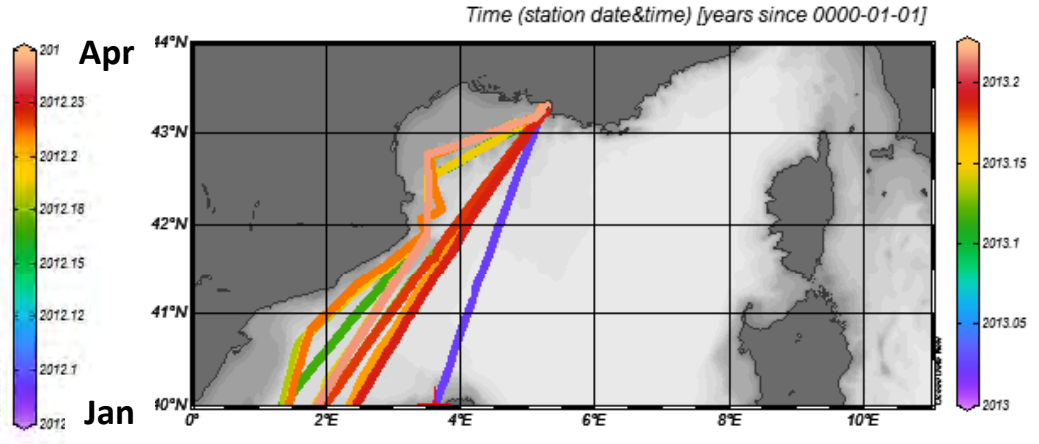
WINTER



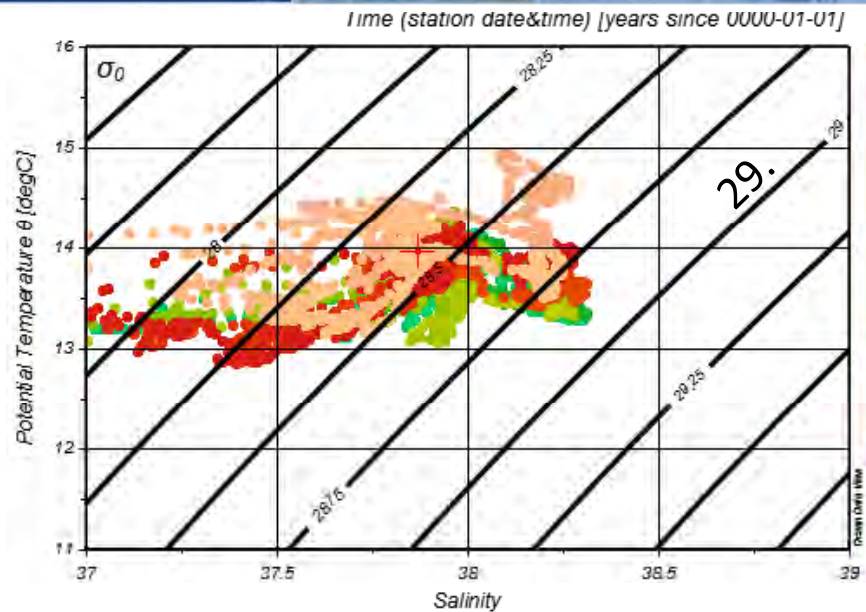
WINTER



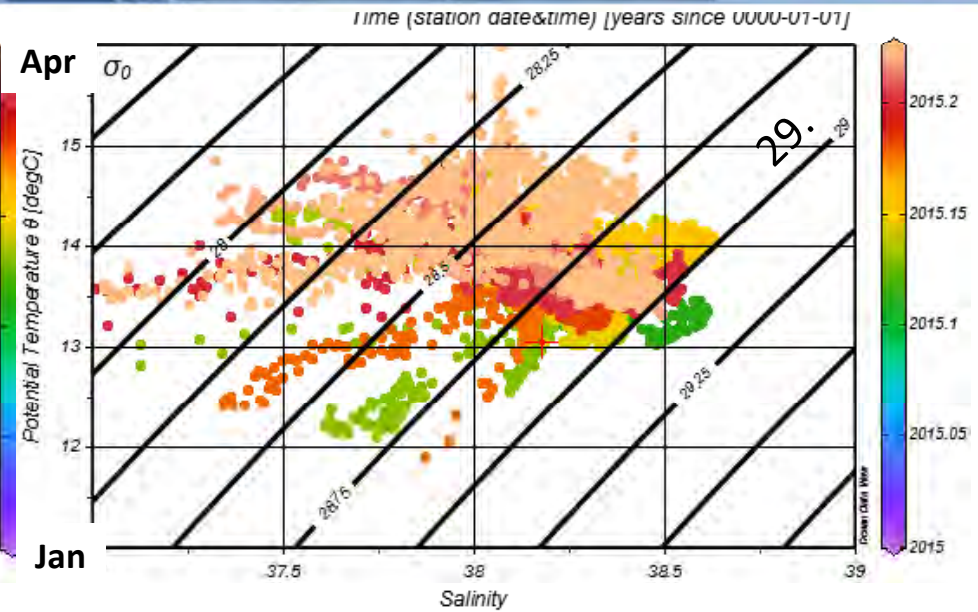
Jan – Mar 2012 Shelf DWF + DWF



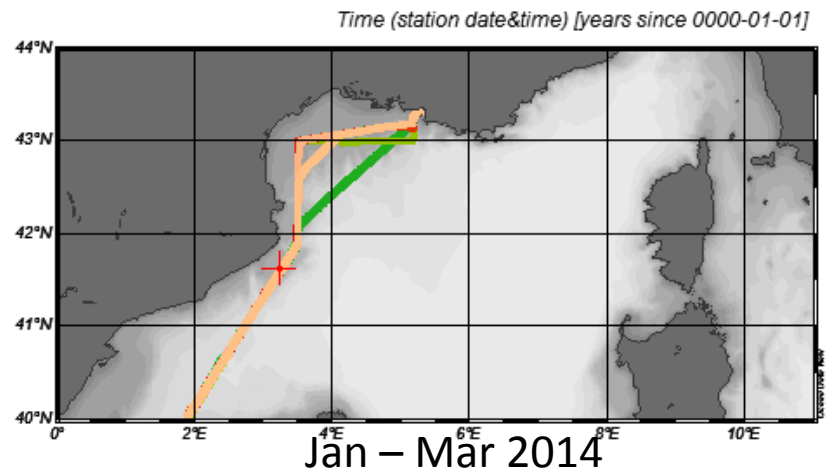
Jan – Mar 2013 Shelf DWF + DWF



WINTER

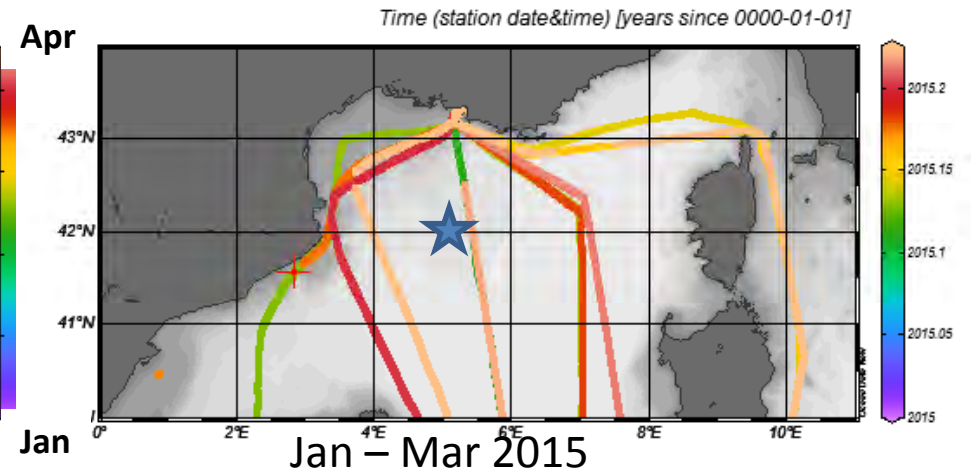


WINTER



Jan – Mar 2014

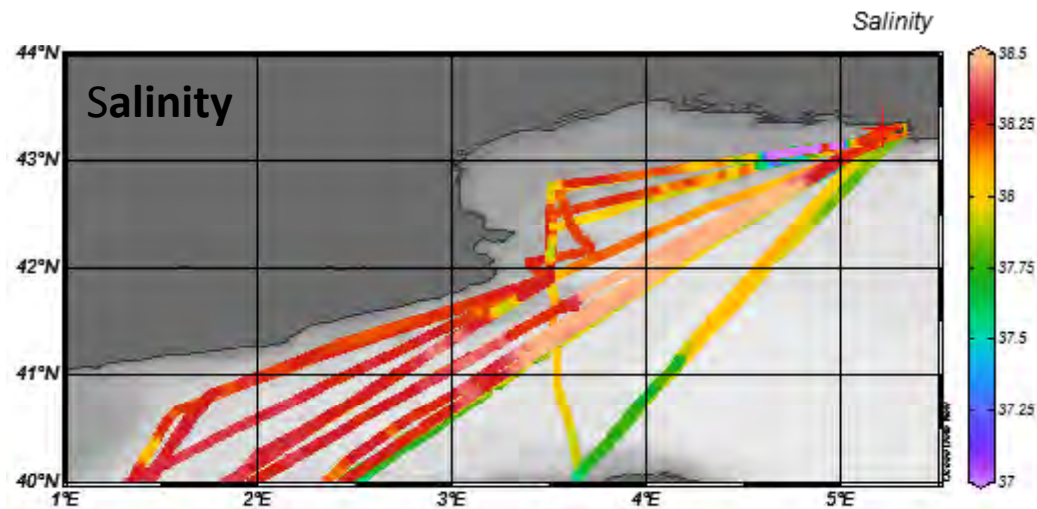
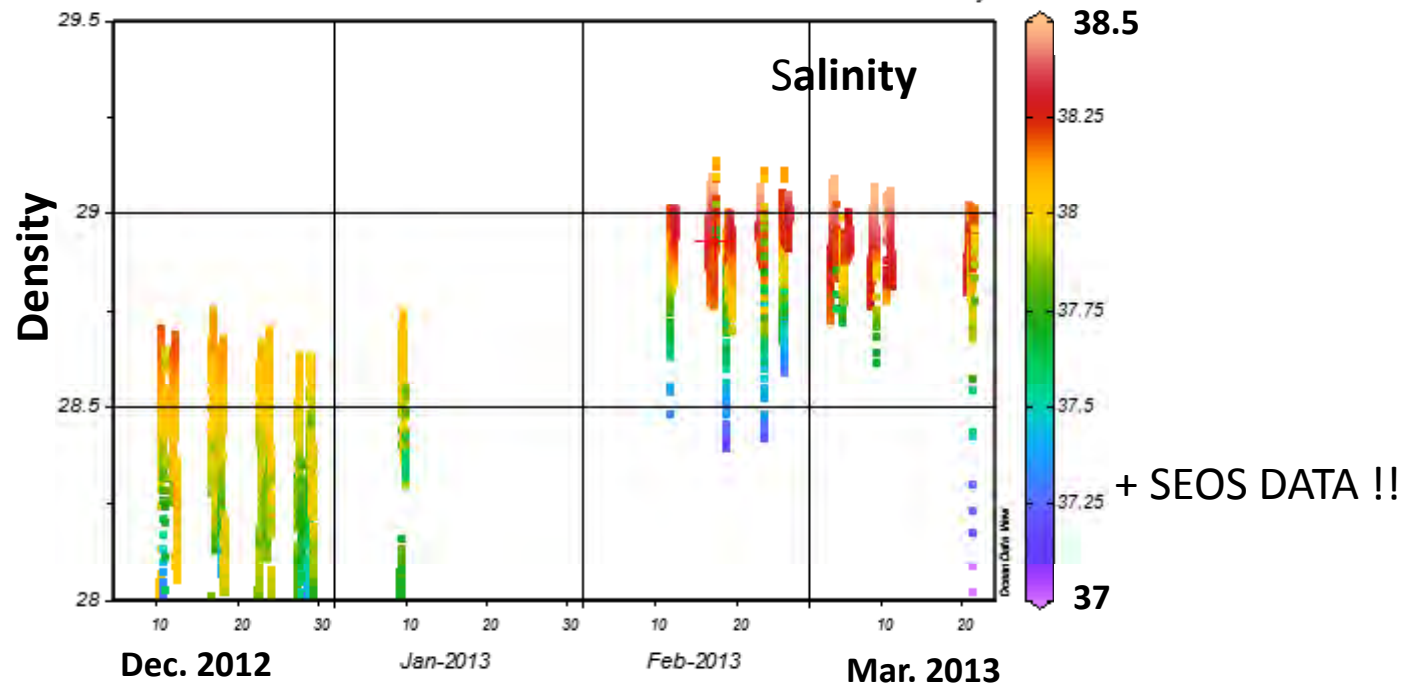
**No Shelf DWF (no DWF?)**

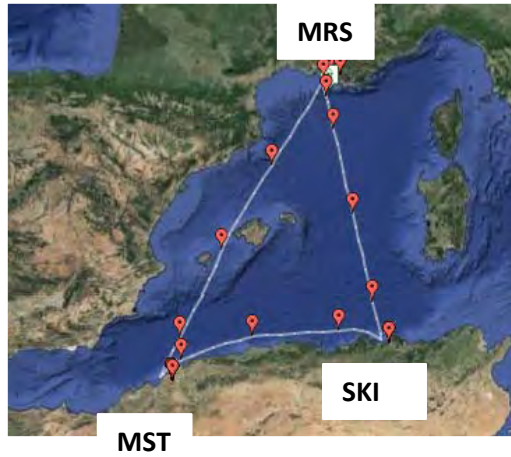


Jan – Mar 2015

**DWF**

**NEW ROUTE : 42N-5E + shelf** (=> gridded fields)

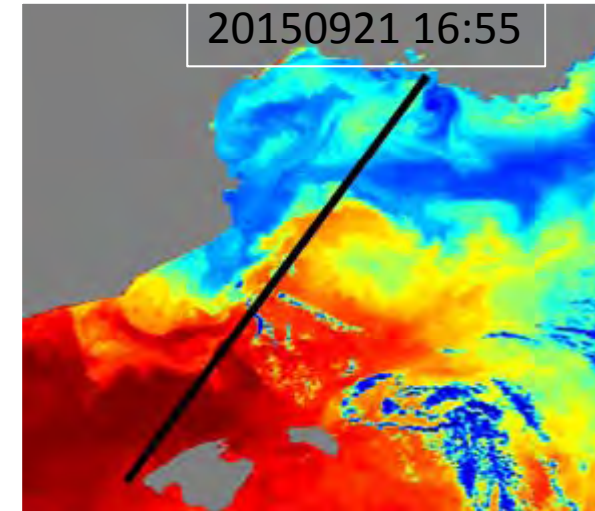




Circuit: ~10 days

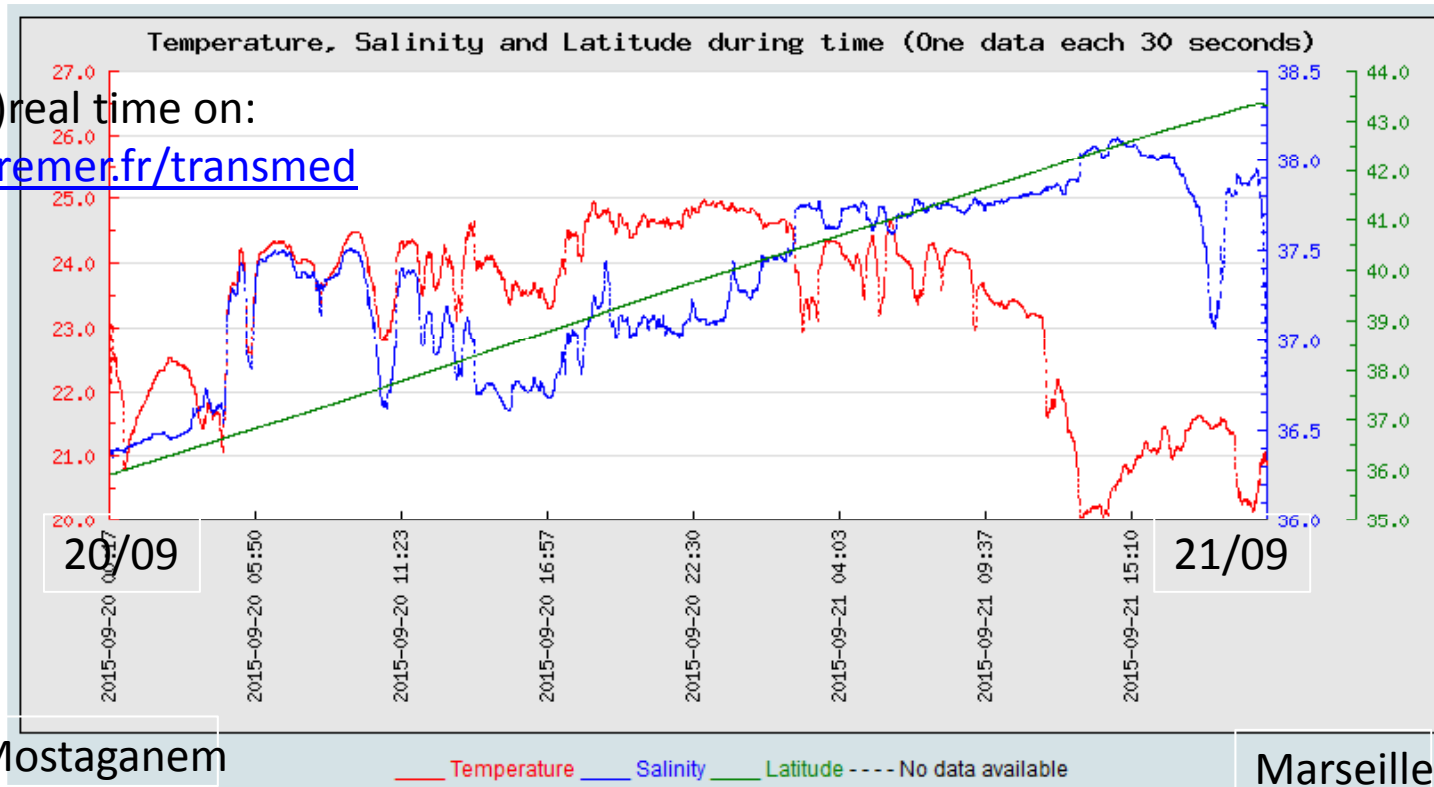


Ro-Ro « Cap Camarat »  
Feb. 2015 -> present



Data in (near-)real time on:

<http://www.ifremer.fr/transmed>



## DATA FLOW (as of sept. 2014)

Freq.	Processing	Origin	Destination
10s	acquisition	ship	local storage
1h	<ul style="list-style-type: none"> <li>1h-data file sent</li> <li>1h-data file checked and processed on the fly (errors, missing data, thresholds...)</li> </ul>	Ship MIO/La Seyne	Mail MIO/La Seyne TRANSMED DB
24h	<ul style="list-style-type: none"> <li>24h of data from TRANSMED DB decimated (2min median)</li> <li>24h of data (re)checked, quality flags added</li> </ul>	DT INSU CORIOLIS	CORIOLIS MIO OCEAN GOSUD
1 month	data from TRANSMED DB manually screened for doubtful data, routines for computation of derived parameters, decimation (2min median) ... => <b>monthly provisory data files</b> of good quality	MIO/La Seyne	TRANSMED DB* HyMeX/ SEDOO
1 year	<ul style="list-style-type: none"> <li>recalibrations of probes (« as is » + systematic cleaning and replatinization of the conductivity cell)</li> <li>replay of 1 year of data to account for sensors drifts (~ null)</li> </ul> => <b>monthly definitive data files</b>	SBE MIO/La Seyne	TRANSMED DB* HyMeX/ SEDOO <small>* not implemented yet</small>

**real time**

[www.ifremer.fr/transmed](http://www.ifremer.fr/transmed)



**near- real time**



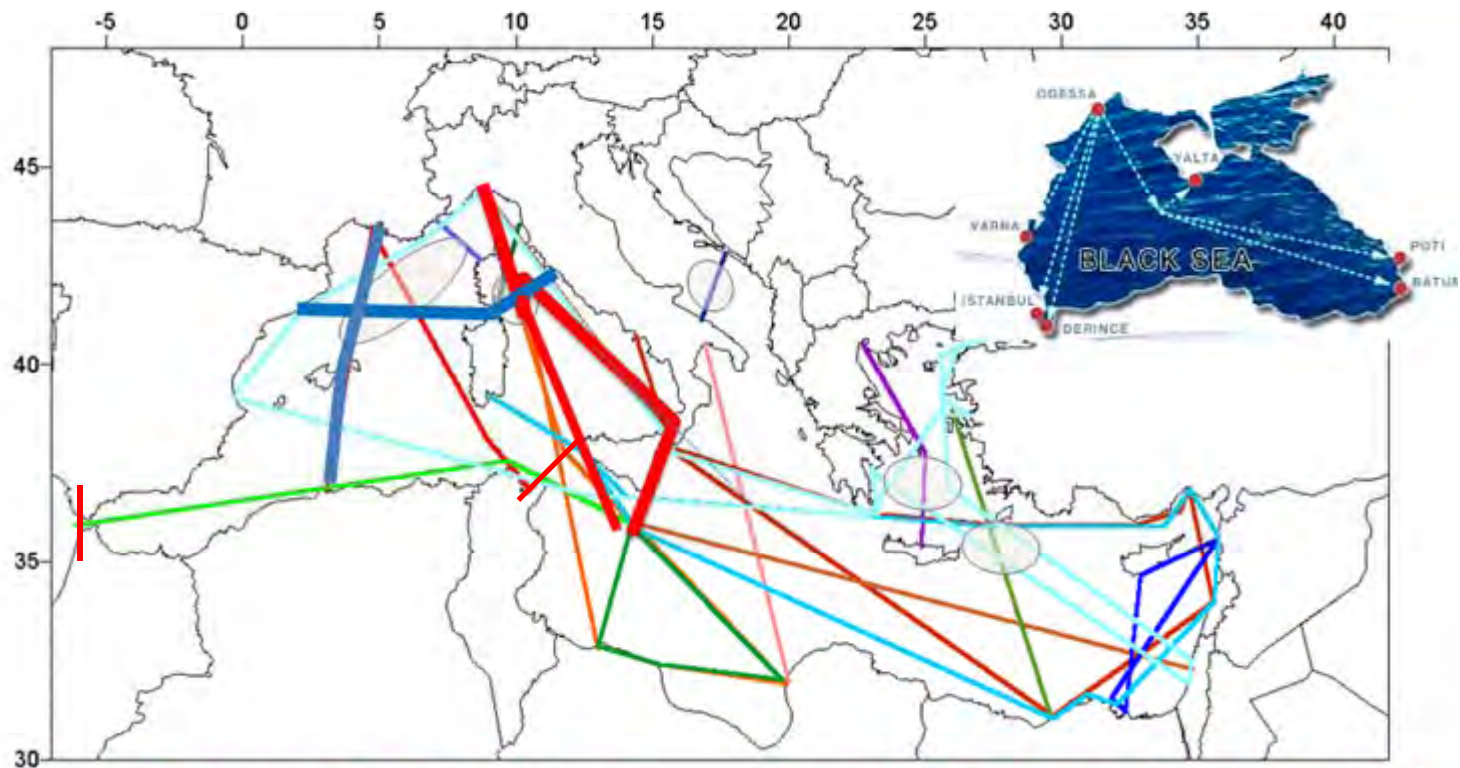


**delayed mode**

<http://mistrals.sedoo.fr/HyMeX/>







Data synoptic at basin-scale

Samples both coastal and open sea



TS with MeteoFrance package SEOS



○ Dense Water Formation zone

**SST and SSS: « Meteo » data only => WMO agreement #40**

**Soft in open source, system fully operational:**

**WHO WANT (CAN) INSTALL ONE ??**

-  Actual routes / projected FerryBox routes 
-  DWF zones
-  STRAITS (evolution of Atlantic Water !!??)



**SST and SSS: « Meteo » data only => WMO agreement #40**

**Soft in open source, system fully operational:**

**WHO WANT (CAN) INSTALL ONE ??**

HyMeX

# Acknowledgements



## Acknowledgements to crews, staffs and sponsors



C/F « Méditerranée » (2005-2007)



M/V « Jolly Indaco » (2010-2013)  
M/V « Jolly Grigio » (2013)



M/V « Marfret Niolon » (2012-2014)



M/V « Cap Camarat » (2015-??????)