

TRANSMED: a (future) network of low cost thermosalinometers in the Mediterranean

I. TAUPIER-LETAGE, G. ROUGIER, A. MONTIES and T. FABIANI

CNRS/UNIVERSITÉ DE LA MÉDITERRANÉE
ANTENNE DE TOULON, FRANCE

(itaupier@ifremer.fr)

www.hymex.org

www.ciesm.org



dépasser les frontières

HyMeX

HYdrological cycle in Mediterranean EXperiment



CENTRE
D'OcéANOLOGIE
DE MARSEILLE

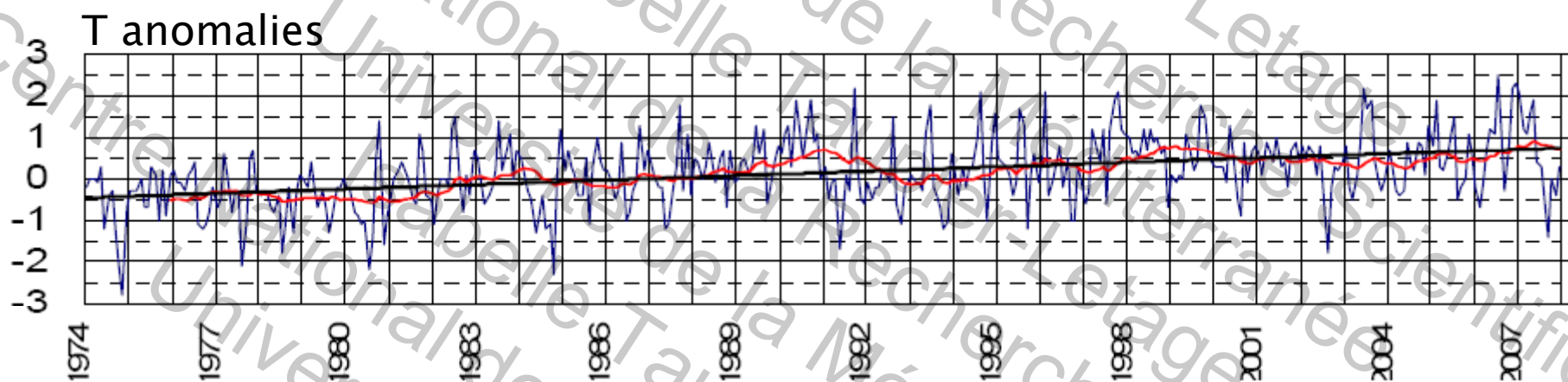
UNIVERSITÉ DE LA MÉDITERRANÉE
AIX-MARSEILLE II



Division Technique UPS 855
Institut National des Sciences de l'Univers

The Mediterranean: a sea to monitor

Weak climatological changes can be detected at the surface



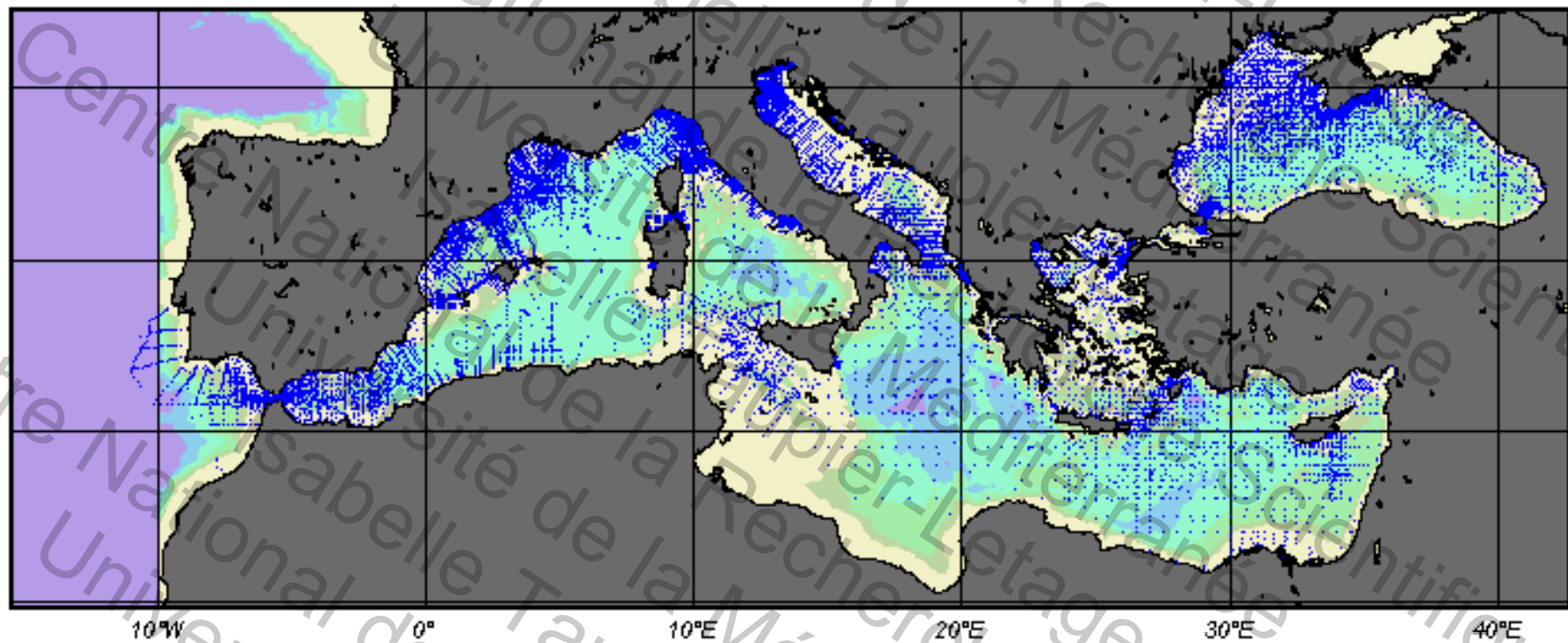
Increase of the sea surface temperature:

$1.1^{\circ}\text{C} / 27 \text{ years} = 0.04^{\circ}\text{C} / \text{year}$
(from « manual » hydrology)

From Salat et Pascual, 2002. CIESM
Workshop Series #16 on: « Tracking long-
term hydrological change in the
Mediterranean Sea »

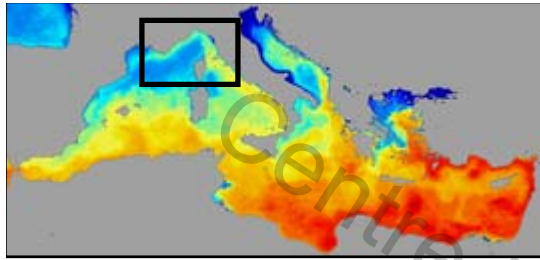
The Mediterranean: a sea to be explored yet

MedatlasII_good salinity data ~ 2000

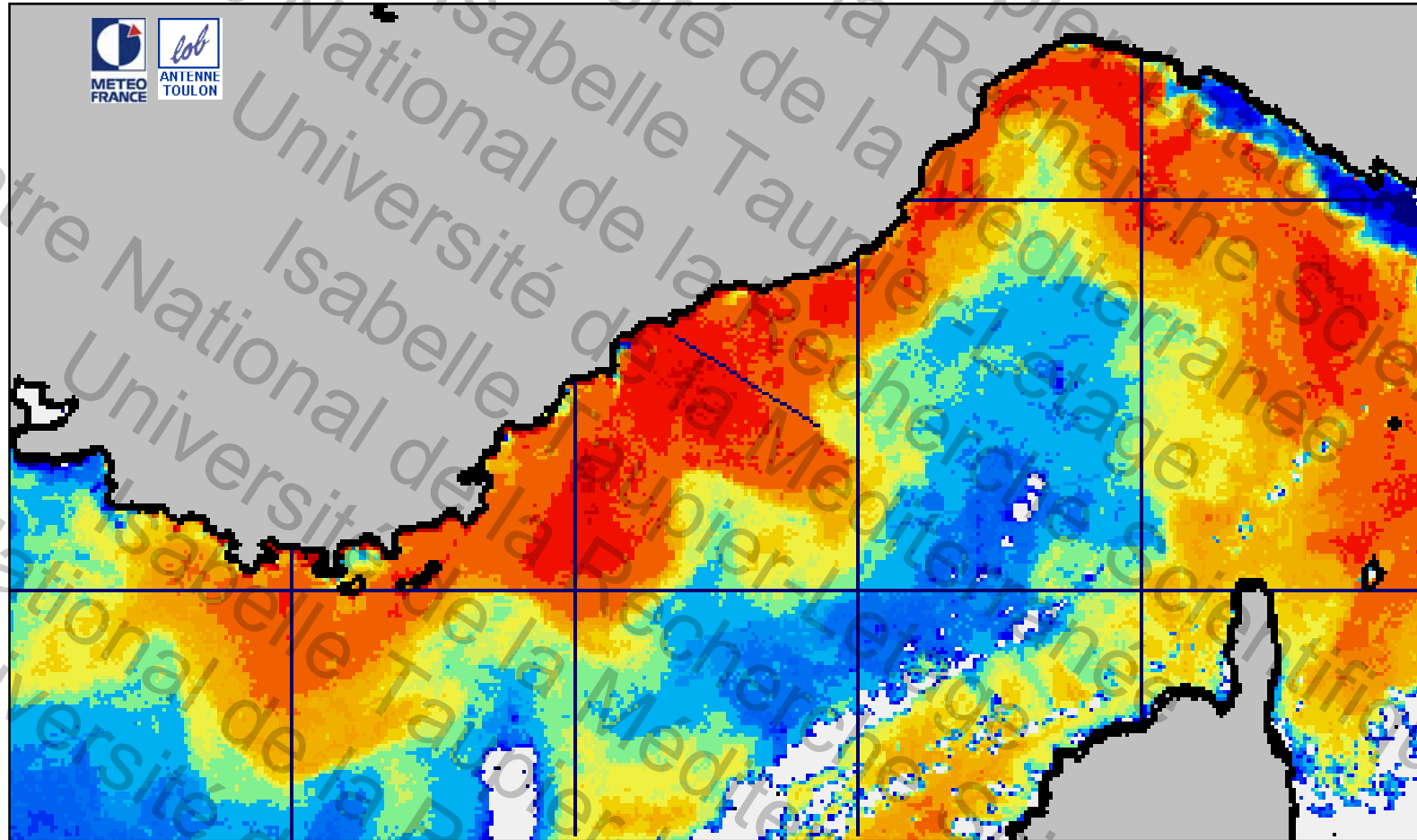


Data missing:

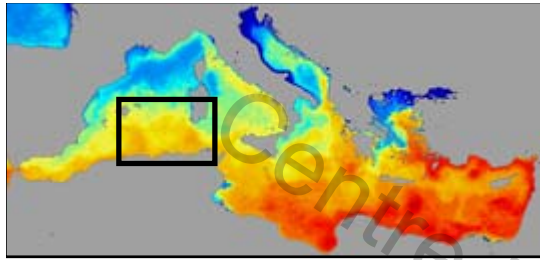
- central zones
- southern parts (Eastern basin)



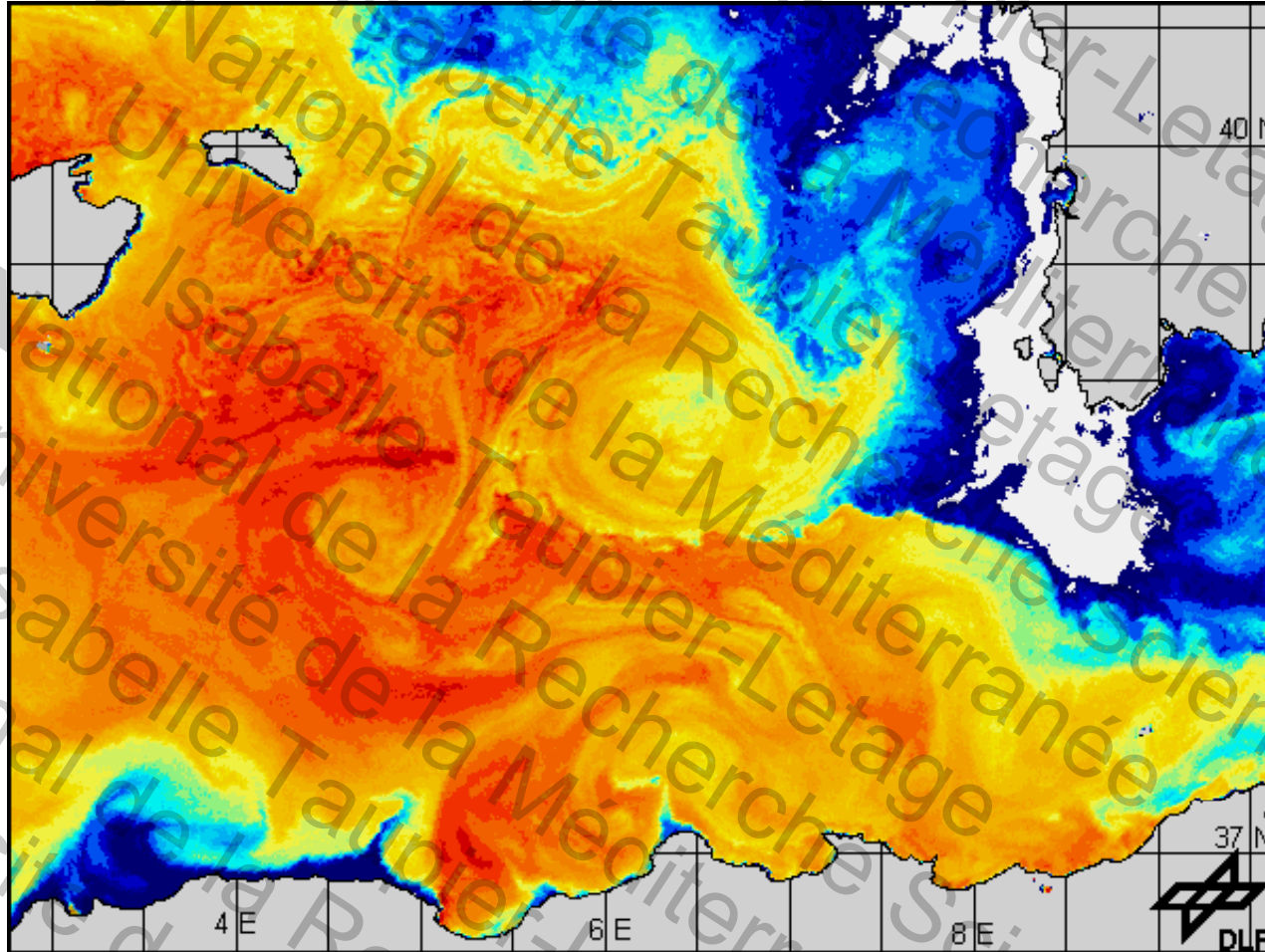
No continental shelf => the coastal circulation is directly influenced by the general circulation



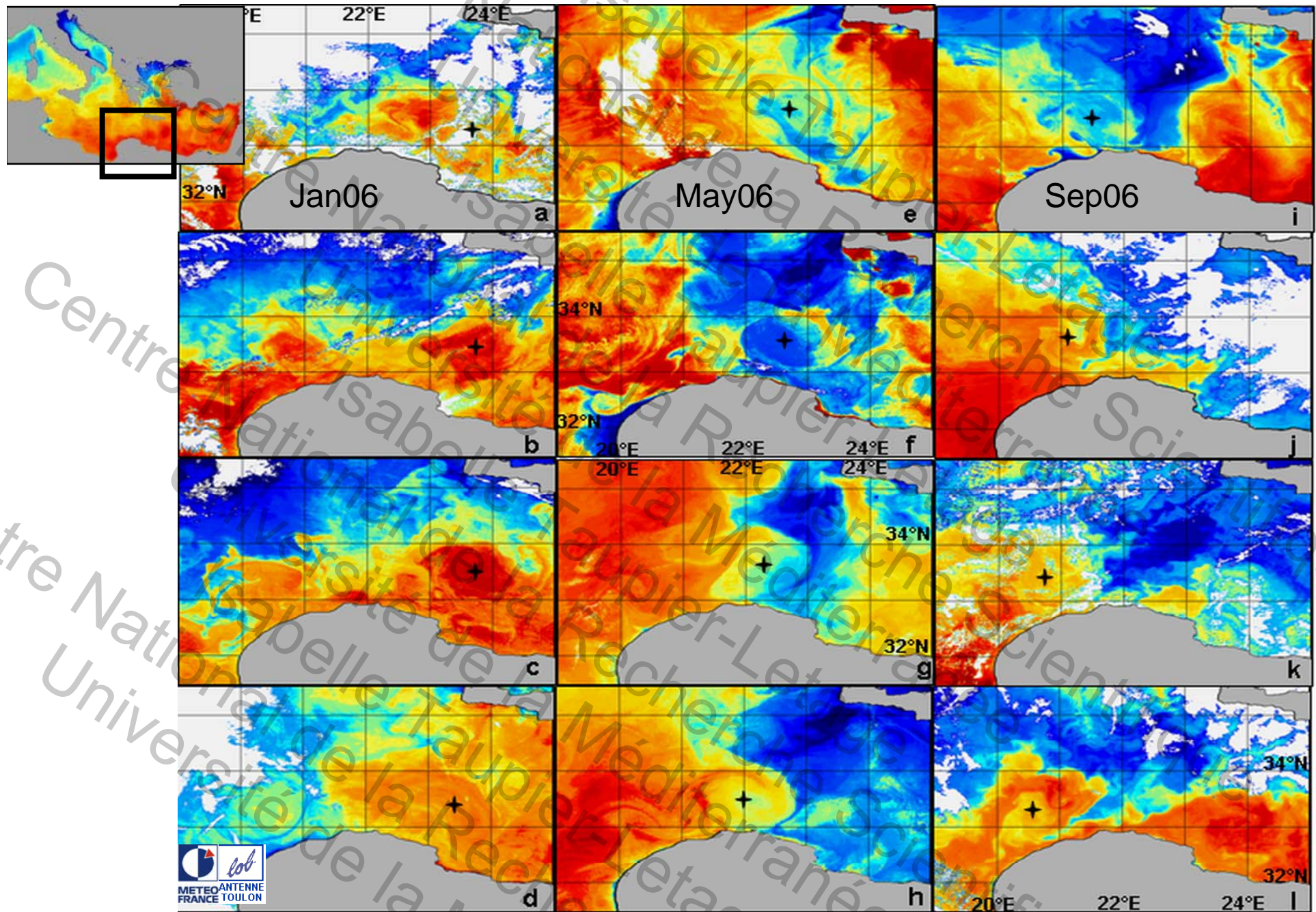
In the North: seasonal variability: instability during wintertime => Propagating meanders (up to vortex dipoles)



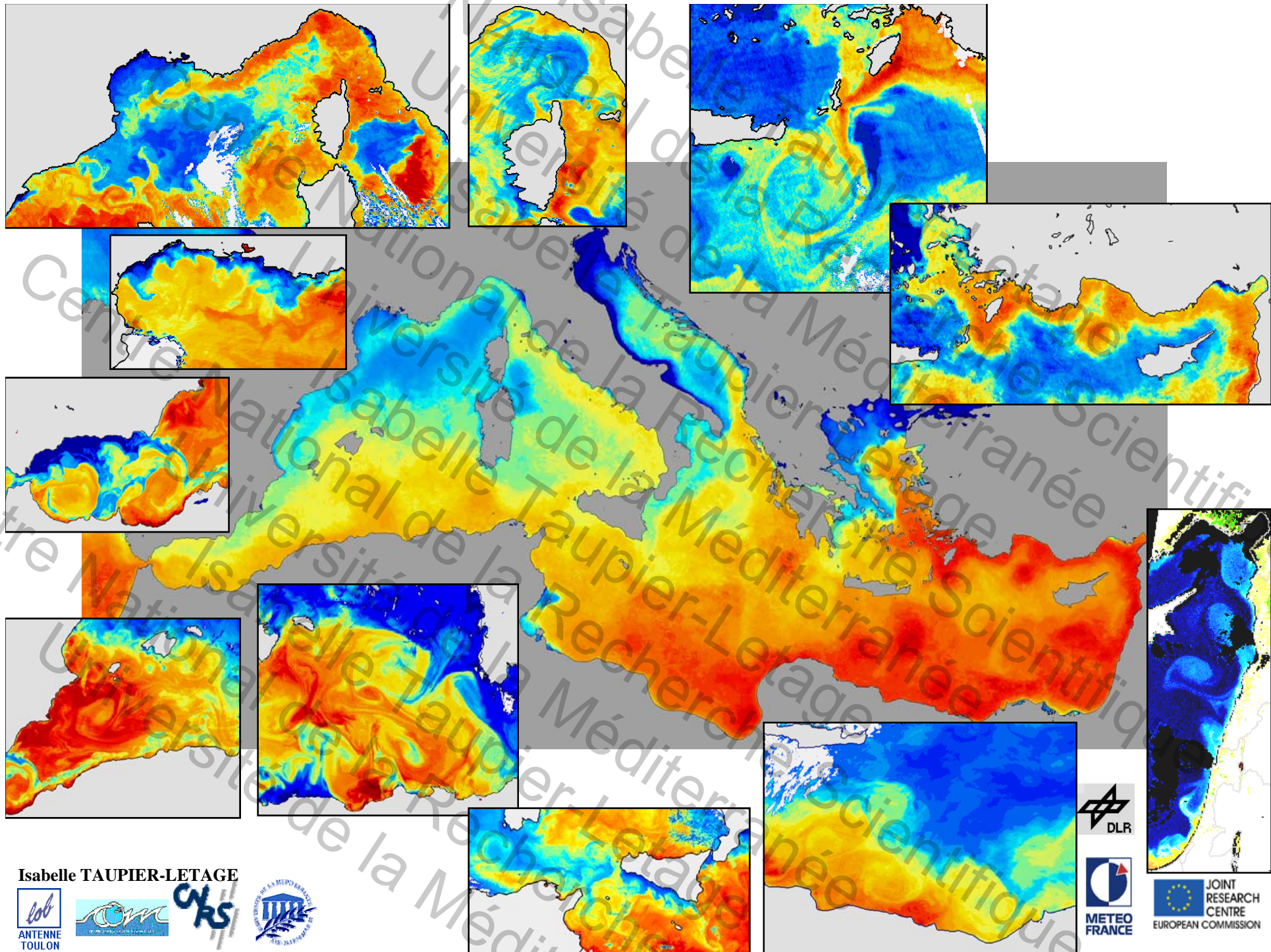
No continental shelf => the coastal circulation is directly influenced by the general circulation



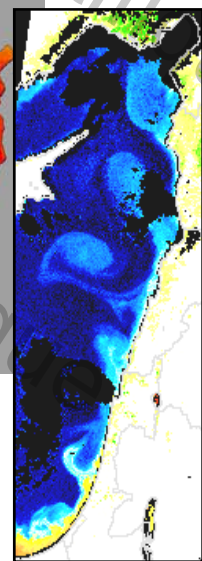
In the South: mesoscale variability => eddies that reach the bottom (reverse the general circulation during several months)



Long-lived (1-3 years) propagating eddies



Isabelle TAUPIER-LETAGE



TRANSMED:

Main objective:

monitoring the surface water characteristics (T and S), with a fine spatial and temporal sampling interval (**=> sample extreme events**) along **regular ferry or shipping routes**, using **time series** (**=> relevant statistics**) of hydrological and bio-geochemical parameters), over the **whole Mediterranean** (**=> synopticity**)

Coordination: Isabelle TAUPIER-LETAGE

www.hymex.org



TRANSMED:

Requirements:

- run several routes simultaneously (network)
- system fully autonomous (short routes /duration ~24h =>no crew involvement)
- portable system (ship assigned to an other route with (ultra)short notice)
- support this effort on the long term (>10 years)
- Economical and geographic context => cheap
- Southern/southeastern countries involvement

THE solution: simple stupid* LOW COST system (T S only)

*: see multiparametric systems used in northern seas (www.ferryboxes.org)



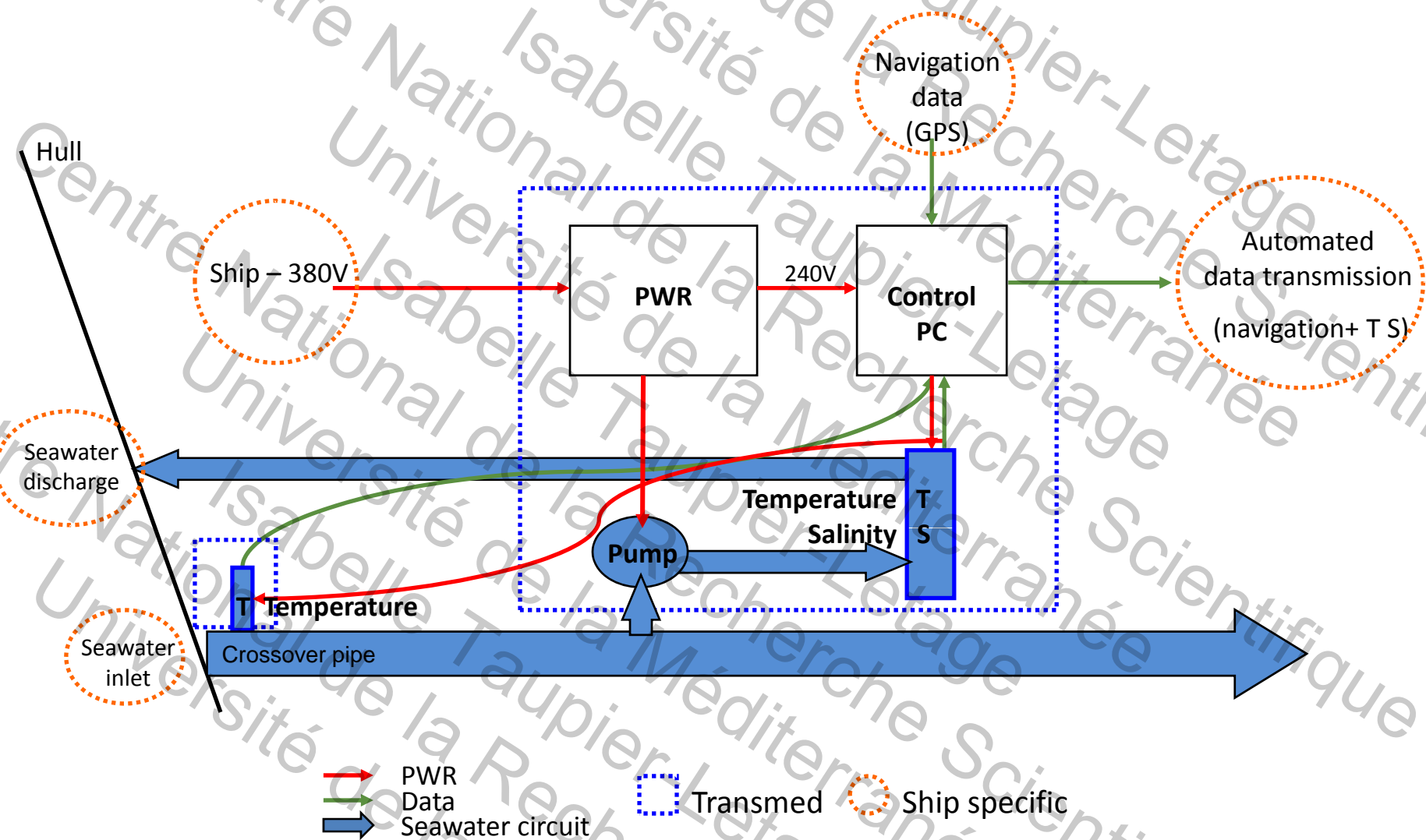
The module TRANSMED

- Funding : CIESM (the Mediterranean Science Commission), Division Technique INSU(CNRS), Program HYMEX (MISTRALS, CIO Environment)
- Conception phase : late 2005
- 1st Prototype available and successfully tested on RV « *Tethys 2* » in 2006
-
- Late 2009: Prototype update (funding for engineer's salary: program HYMEX (MISTRALS, CIO Environment)
- Mid-May 2010: installation on a container ship

From 1 system to a network

- ▶ ON/OFF of the pump autonomous (data acquisition/stop in function of the speed, auto reboot after PWR failure)
- ▶ START/STOP of data acquisition in function of the speed or geographical areas, automatic proc. if PWR failure
- ▶ Automated full resolution data transmission in near real time (GSM, internet, Iridium SBDM)
- ▶ No requirement for freshwater, anti-fouling solution
- ▶ Basic system, interchangeable, all identical, 1 configuration standard file (but adaptations to each ship)
- ▶ Cheaper installation: no through-hull valves
- ▶ Softs in open source

Schematic operating diagram





T (SBE38)



SBE45 bypassed for tests

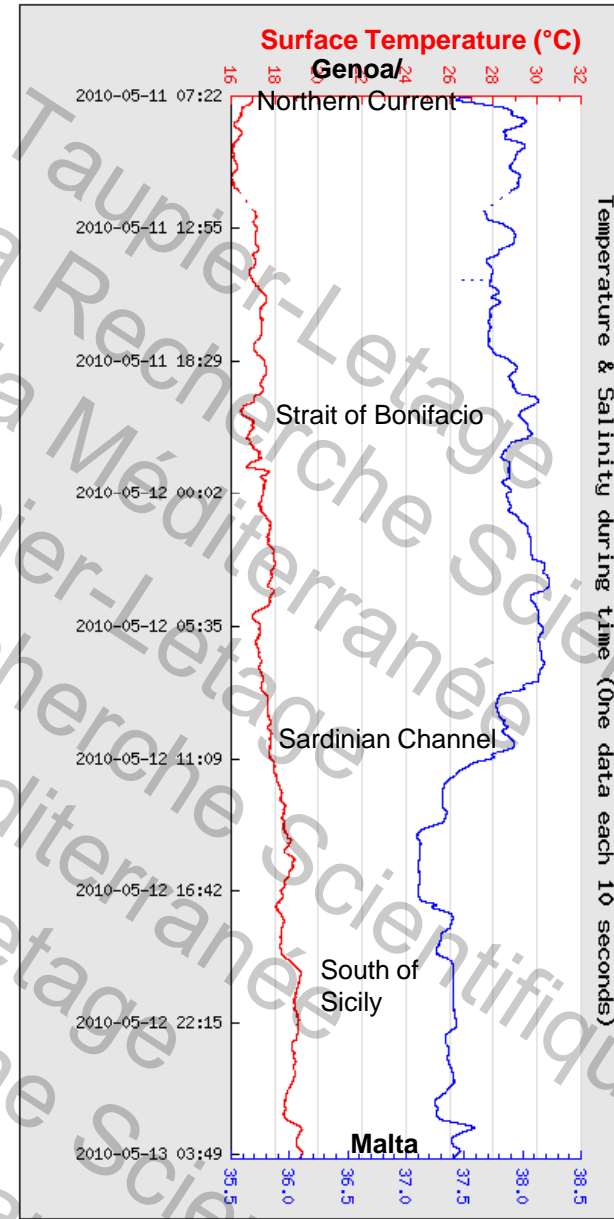


PWR chest

Control PC chest

TS (SBE45)

First trip **TRANSMED** May 2010
(Genoa, Malta, Tripoli, Genoa)



www.ciesm.org



www.hymex.org



dépasser les frontières



Division Technique UPS.855
Institut National des Sciences de l'Unjvers



CENTRE D'OcéANOLOGIE DE MARSAILLE



UNIVERSITÉ DE LA MÉDITERRANÉE AIX-MARSAILLE II



- . Transmed
- . Map
- . Data
- . Users
- . Ships

Veuillez remplir les informations ci-dessous pour procéder à l'affichage des graphiques:

Bateau

Mai 2010							
sm.	Lu	Ma	Me	Je	Ve	Sa	Di
17	26	27	28	29	30	1	2
18	3	4	5	6	7	8	9
19	10	11	12	13	14	15	16
20	17	18	19	20	21	22	23
21	24	25	26	27	28	29	30
22	31	1	2	3	4	5	6

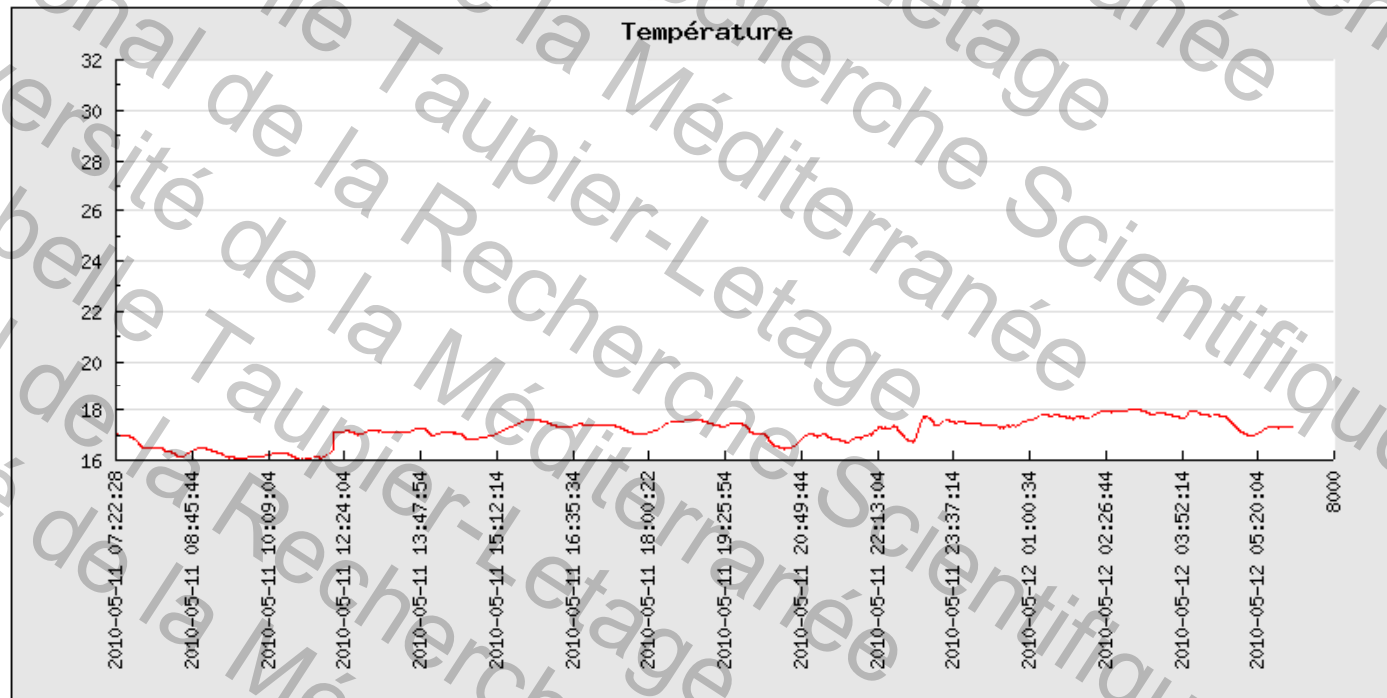
Aujourd'hui 01:03 am

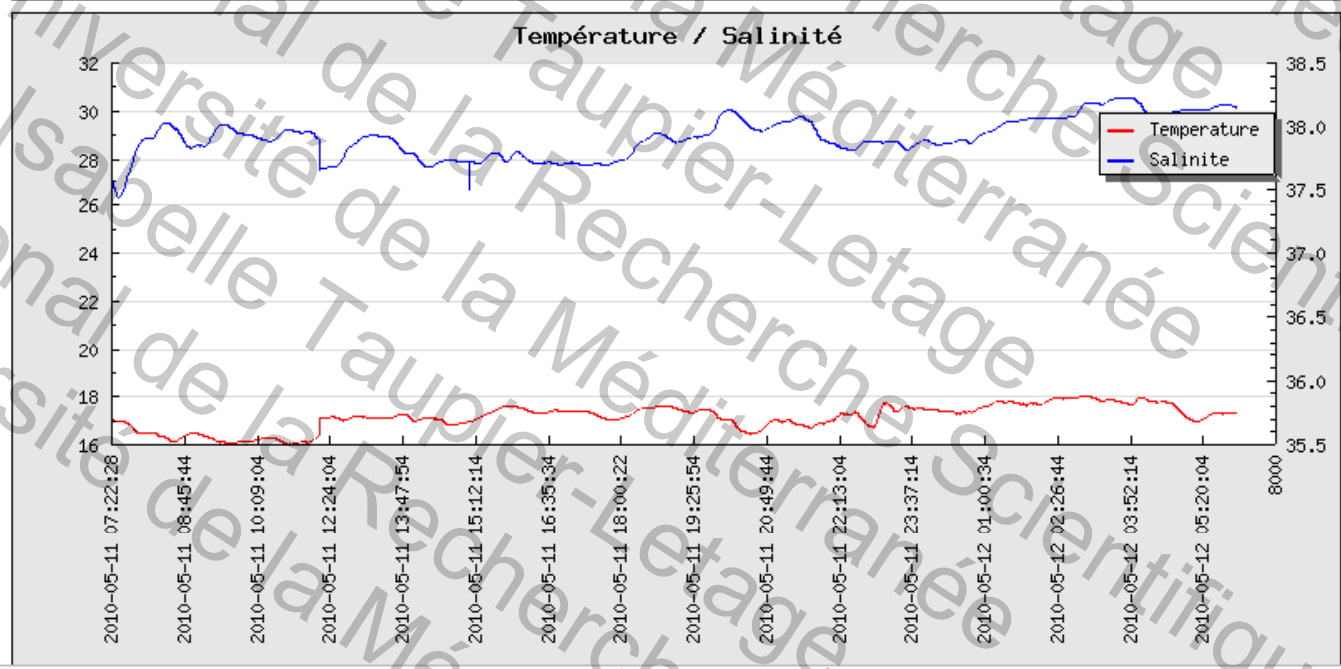
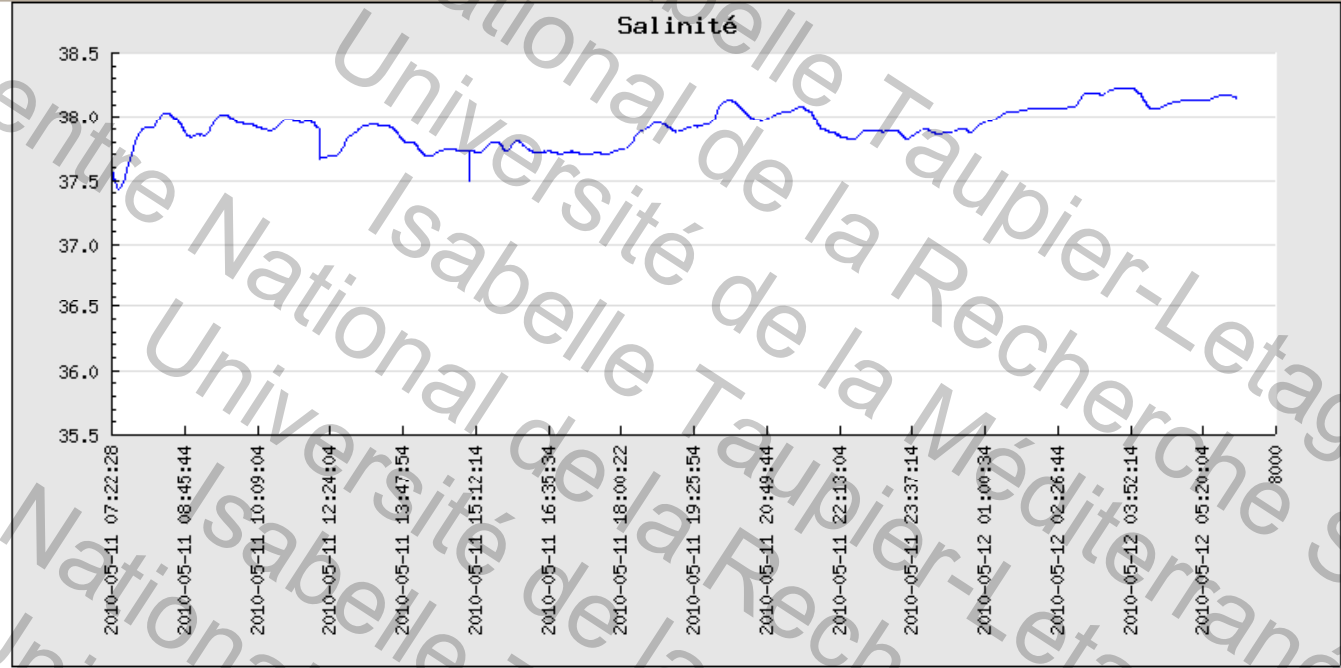
Mai 2010							
sm.	Lu	Ma	Me	Je	Ve	Sa	Di
17	26	27	28	29	30	1	2
18	3	4	5	6	7	8	9
19	10	11	12	13	14	15	16
20	17	18	19	20	21	22	23
21	24	25	26	27	28	29	30
22	31	1	2	3	4	5	6

Aujourd'hui 11:58 pm

Date de début

Date de fin





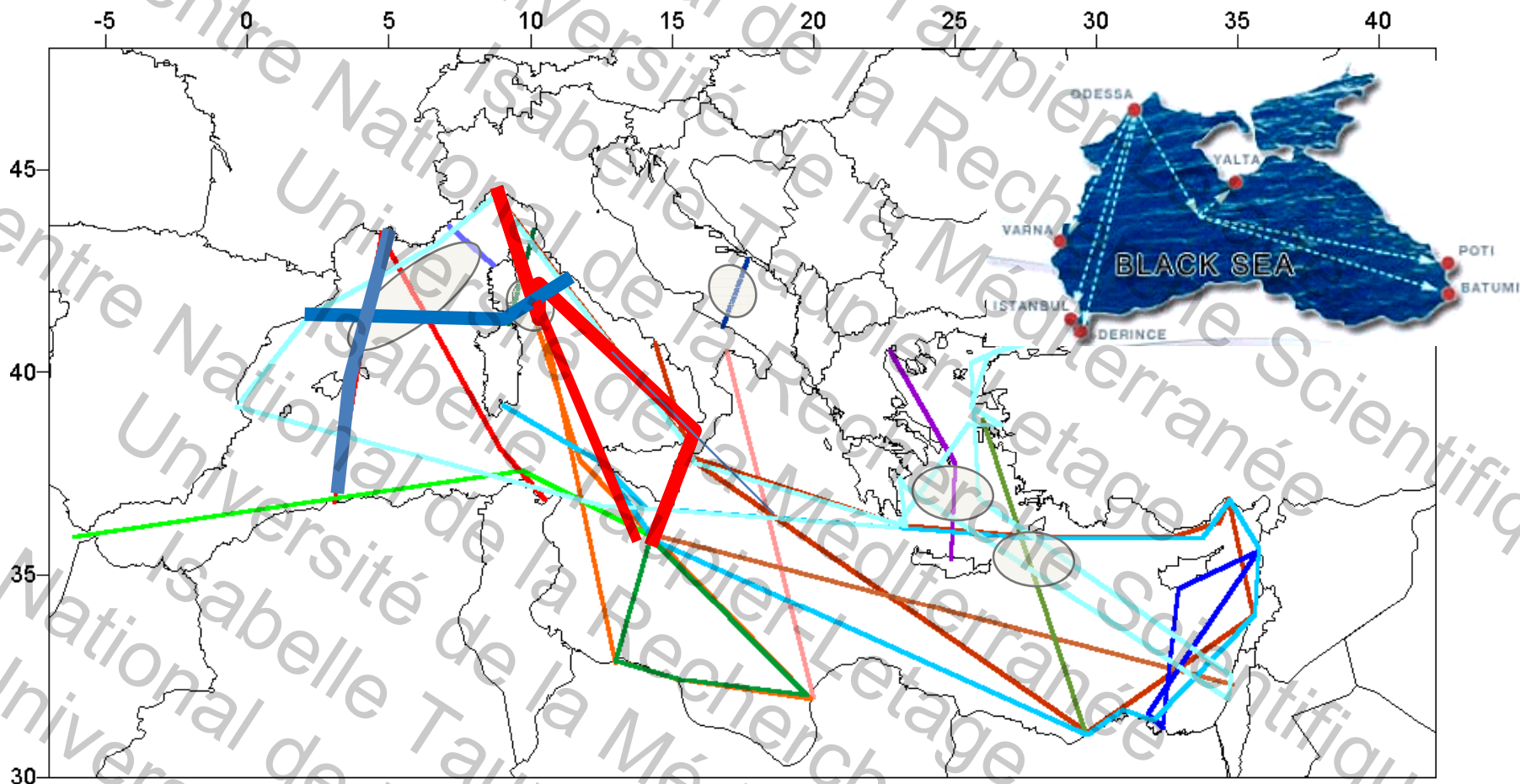
Major advantages of such a strategy:

- provides synoptic data at basin-scale (limited to the surface)
- provides data both in coastal and open sea areas (allowing to link both areas)
- direct and rapid involvement of all riparian countries: data are sent and shared in (near)real-time through internet

Next steps

- Implement QA/QC protocols, links with Coriolis
- Implement database
- Replicate/industrialize the prototype?
- Contact the maritime companies
- From one system to a network:

TRANSMED POTENTIAL NETWORK



Data synoptic at basin-scale

Samples both coastal and open sea



TS with MeteoFrance package



Dense Water Formation zone

In the (very near) future:

- Link with meteorological sensor package (MeteoFrance/HYMEX)
- HYMEX priority line (and MOON too, discussions underway):
Marseilles-Algiers (by the end of 2010/early 2011)=> collaboration
with the RASMER Algerian network?
(+... staff issues)

In the future:

- Add multiparametric sensors (cf FerryBoxes in the northern seas)
- Request to the maritime industry: from the conception stage of a new ship dedicate a space and facilities to marine sciences (through-hull valves and wells to fit ADCP currentmeter and acoustic devices, freshwater supply, PWR and network cables, communication facilities...)

Special thanks to:

- The maritime companies managers
- The crews
- The technical staff from our lab
- ... and the CIESM staff (fully involved in real time issues of « nearly operational oceanography »...)