



LATEX

Lagrangian Transport Experiment

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et équipe LATEX



PROJET LATEX (LAgrangian Transport EXperiment)

GOAL

to better understand the coupling between physics and biogeochemistry at (sub)mesoscales

STRATEGY

a combined use of satellite data, numerical modelling, and Eulerian and Lagrangian in situ measurements

TIMING

LATEX = LATEX00 (projet pilote) + LATEX

The diagram illustrates the timing of the LATEX project. It shows the equation **LATEX = LATEX00 (projet pilote) + LATEX**. Below "LATEX00 (projet pilote)" is a horizontal arrow pointing to the right, with "2007" written underneath it. Below "LATEX" is another horizontal arrow pointing to the right, with "2008-2010" written underneath it.

Anticyclons in the west of the Gulf of Lion

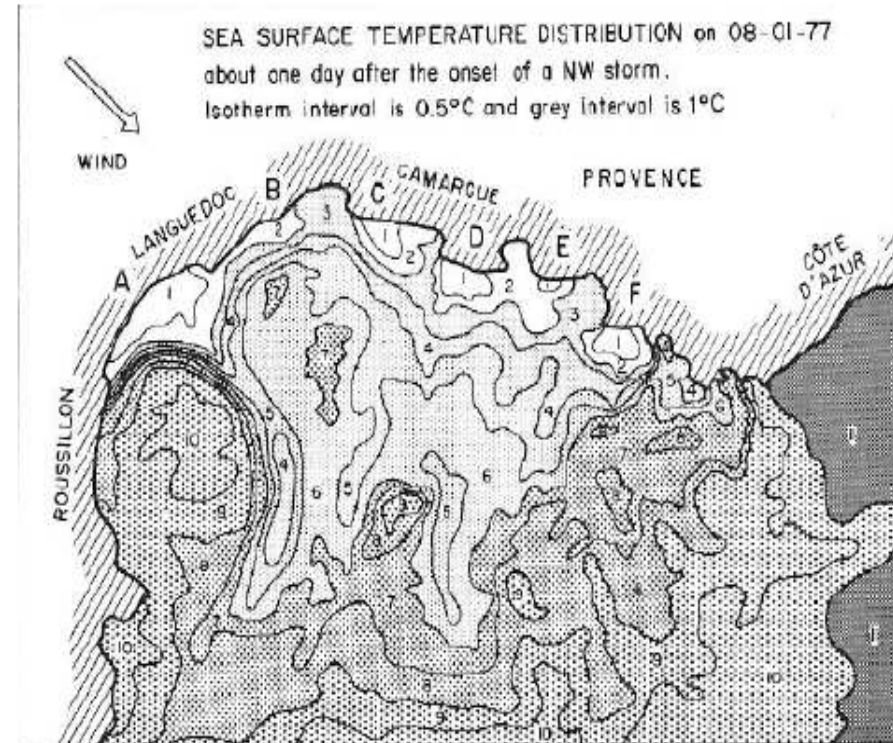
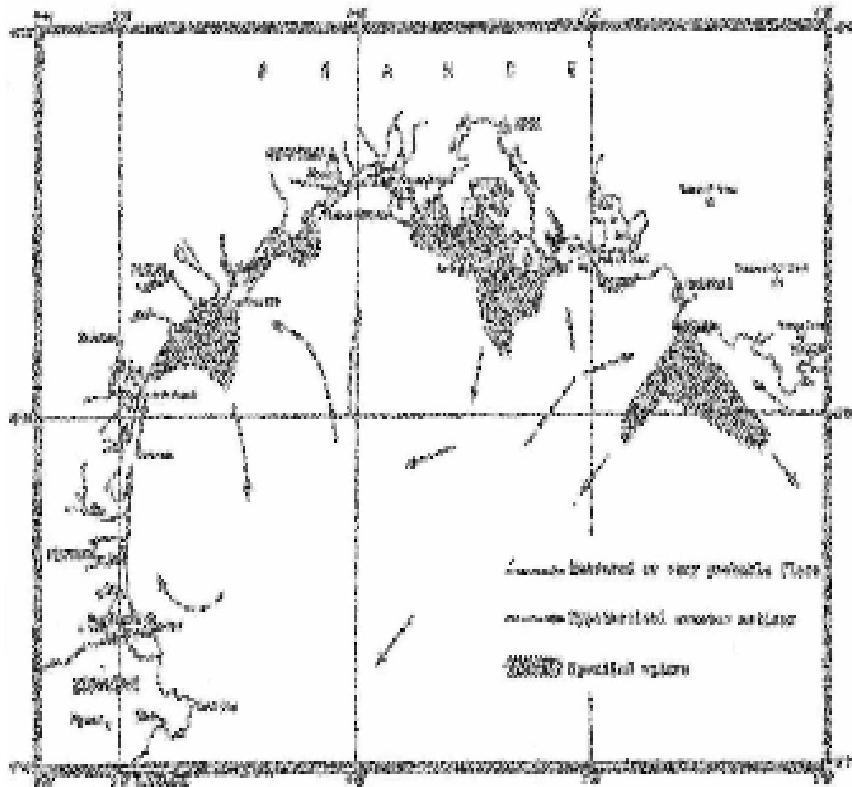


Figure 11 from Millot [1979], with a sketch of wind-induced circulation at the surface drawn coherently with infrared and in situ data.

Figure 2 from Millot [1982], showing the infrared thermography obtained on the August 1, 1977 at about 09 00 TU

LATEX - LAgrangian Transport Experiment

MODELLING

Ad-hoc modelling

(SYMPHONIE)

with C.Estournel et P.Marsaleix [POC, Toulouse]

Wavelet analysis of relative modelled vorticity fields

(WATERS)

Lagrangian floats (ARIANE)

with BBlanke et NGrimas [LPO, Brest]

Coupled Physical (Symphonie)

Biogeochemical (Eco-3M)

Modelling

EXPERIMENTAL

Sept 07 - Tests of real-time communication with floating buoys

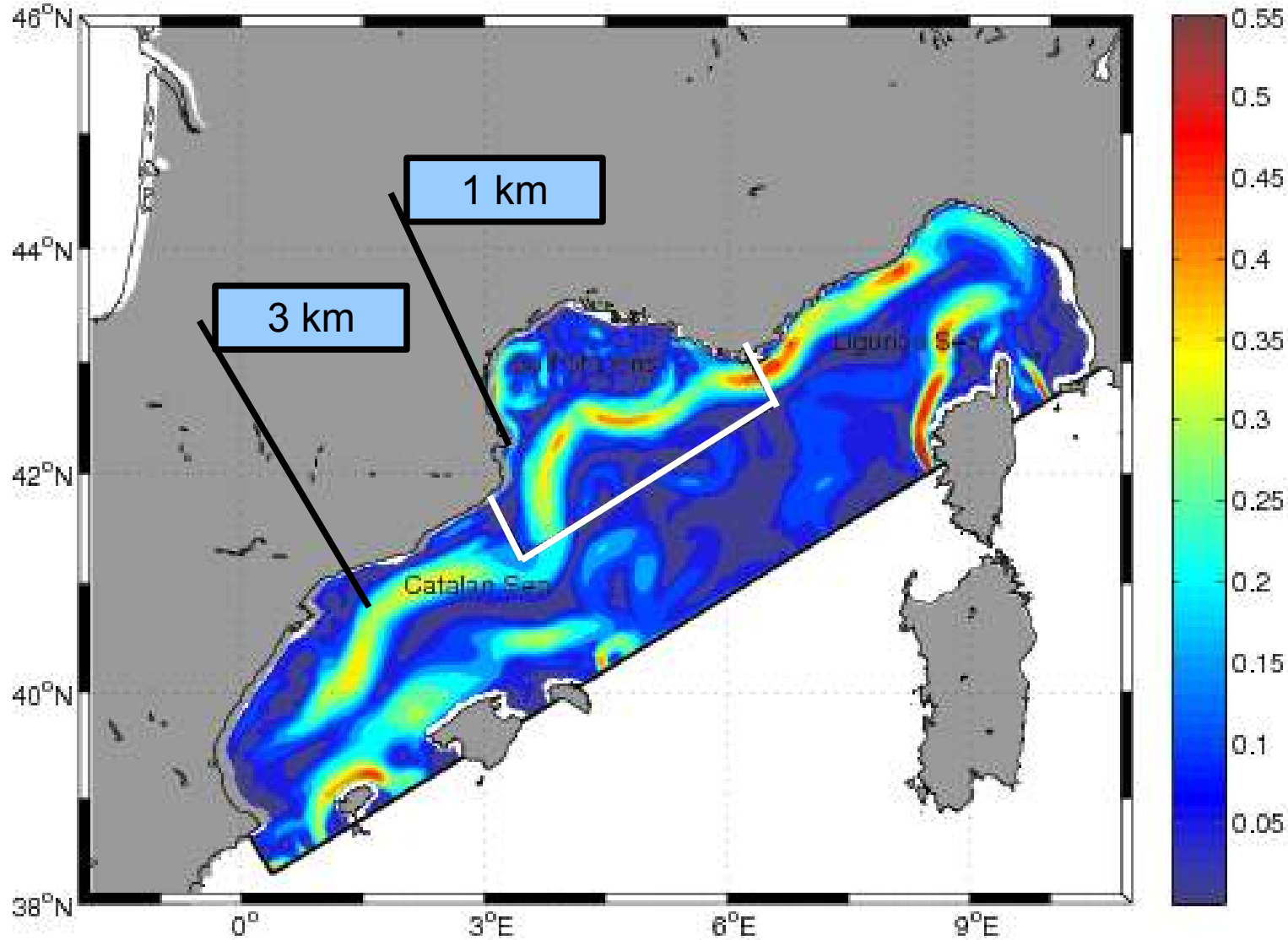
Sept 08 – Eddy mapping

Sept 09 – Moorings

Sept 10 – CRUISE with RVs Suroît and Téthys II

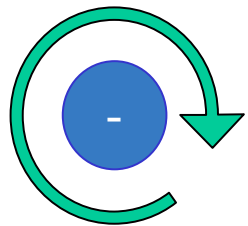
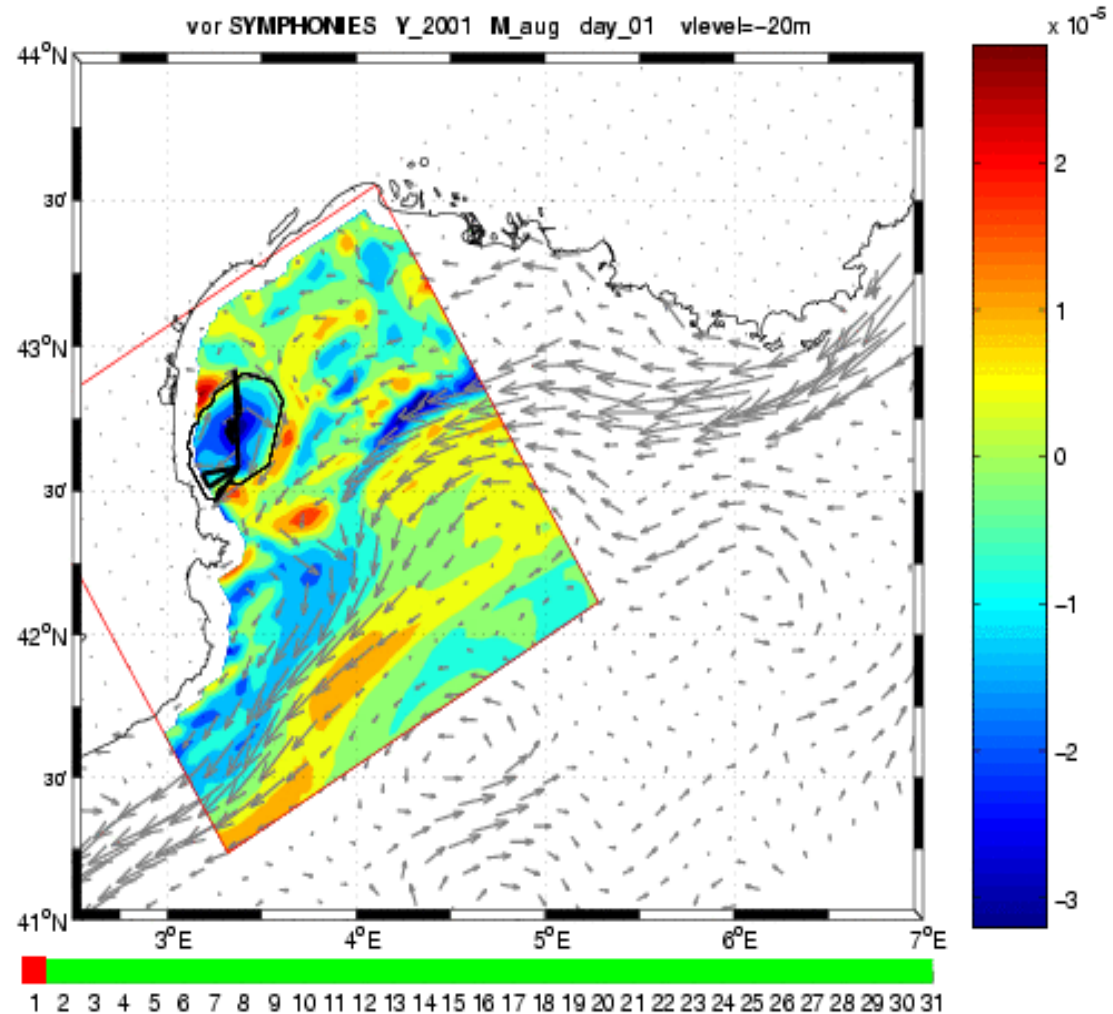
Ad-hoc modelling (SYMPHONIE)

with C. Estournel et P. Marsaleix [POC,Toulouse]

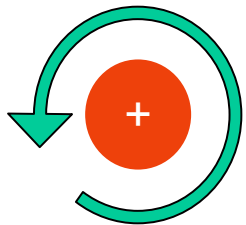


Horizontal slice of the modeled speed intensity on July 25, 2001 at 20-m depth for *exp1* (3 km) and *exp4* (1 km, in the GoL). The simulations reproduce the major features in the GoL: the NC, eddies and filaments.

Wavelet analysis of relative modelled vorticity fields (WATERS)



Anticyclonique



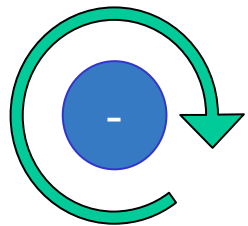
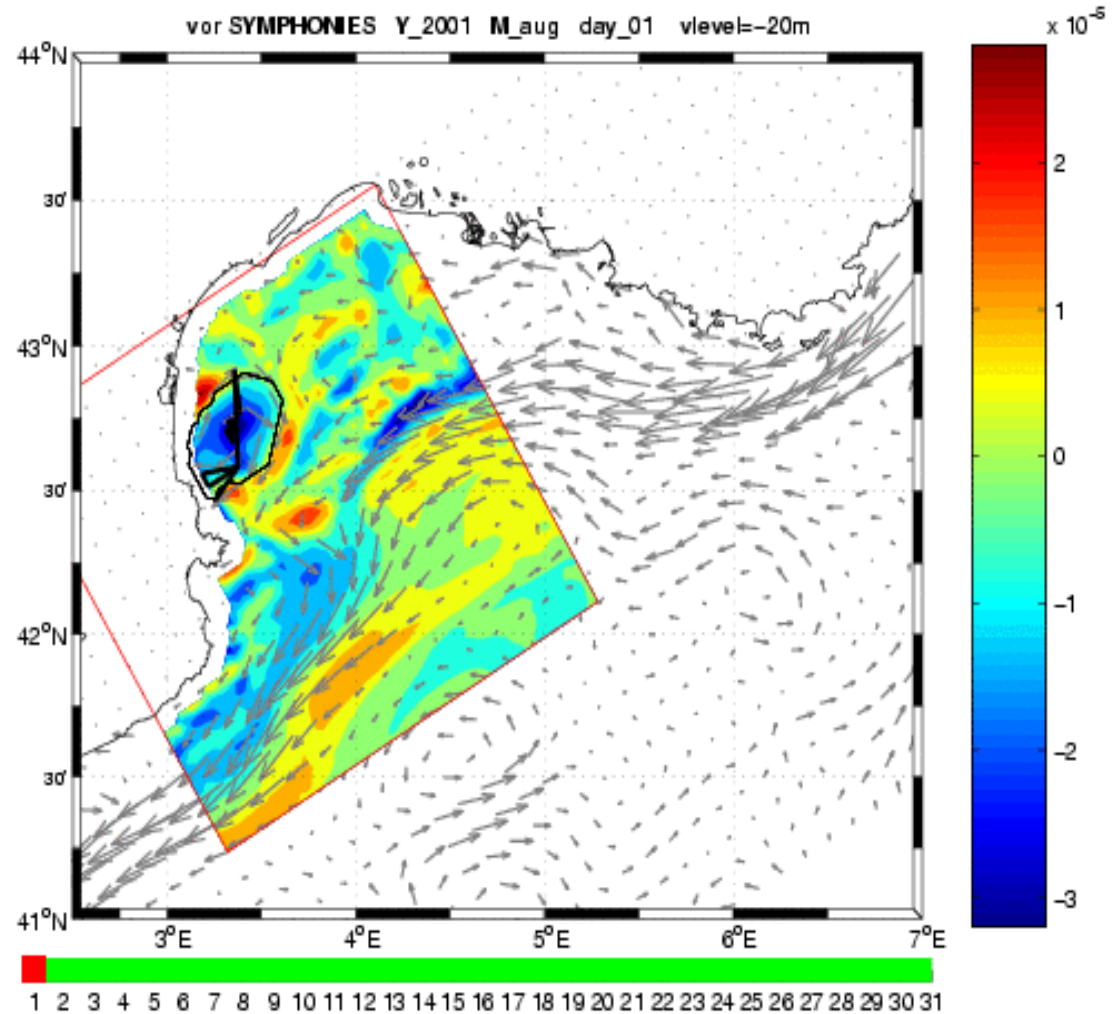
Cyclonique

Hémisphère Nord

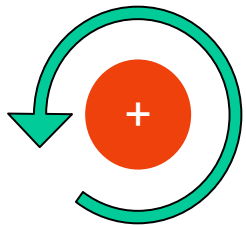
Site web ZiYuan Hu

<http://www.com.univ-mrs.fr/~hu/>

Tourbillon anticyclonique A1(01) durée: 32 jours animation montrée sur la dernière partie (1er – 18 août)



Anticyclonique



Cyclonique

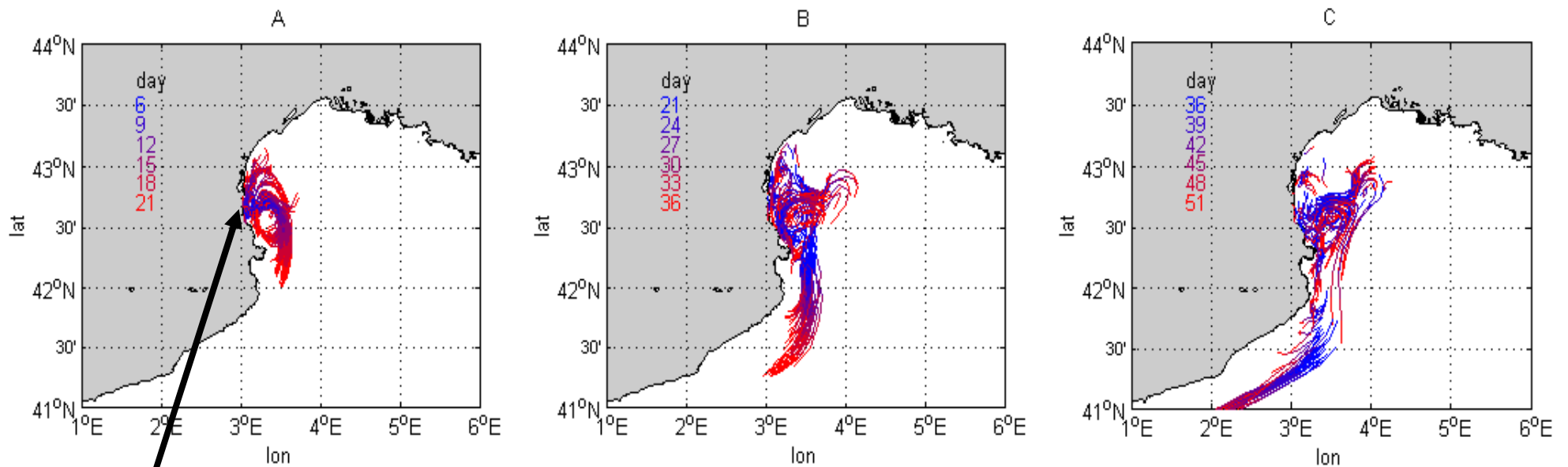
Hémisphère Nord

Site web ZiYuan Hu

<http://www.com.univ-mrs.fr/~hu/>

Lagrangian floats (ARIANE)

with B.Blanke et N.Grimas [LPO,
Brest]



170 numerical particles tracked for 51 days

Interaction with the Northern Current

Coupled Physical-Biogeochemical Modelling

(SYMPHONIE - Eco-3M)

6 groupes fonctionnels de plancton:

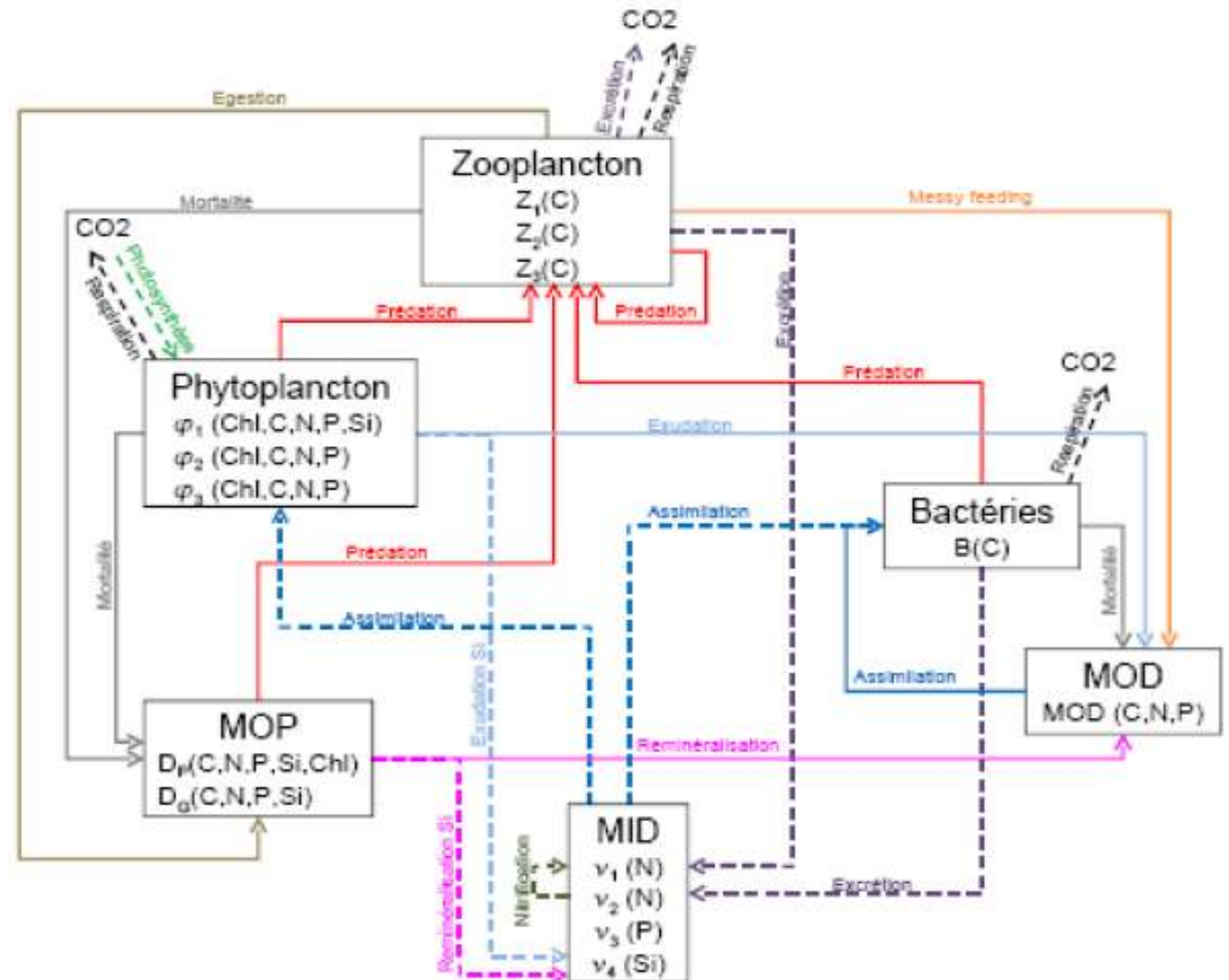
1. diatomées
2. groupe hétérogène de nanophytoplancton,
3. synechococcus
4. copépodes
5. ciliés
6. flagellés

4 type de nutriments:

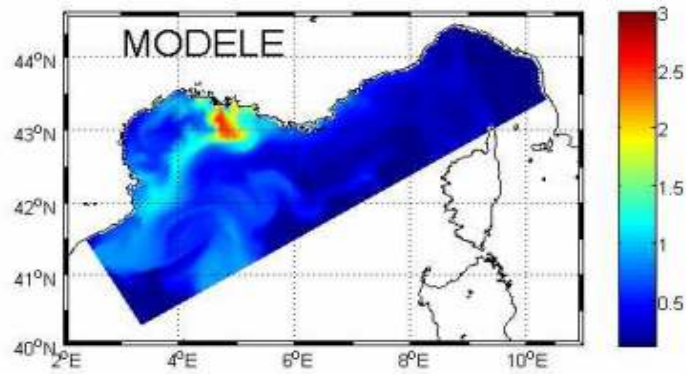
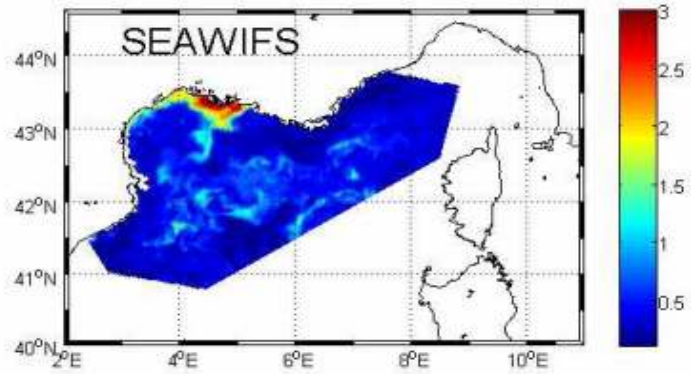
C, N, P, Si

matière organique

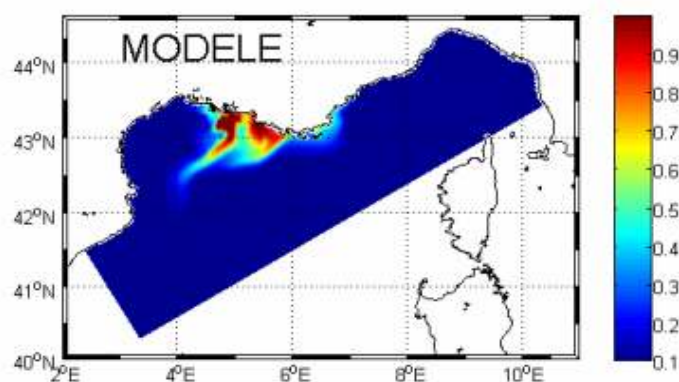
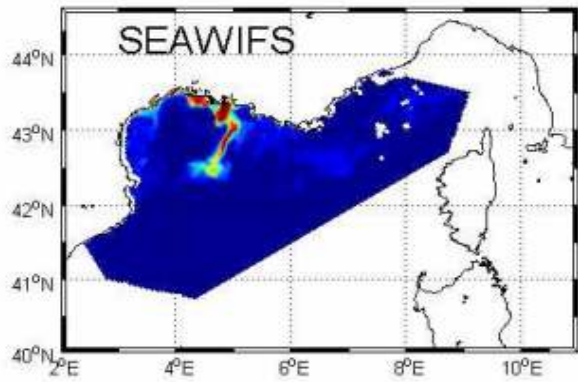
particulaire et dissoute



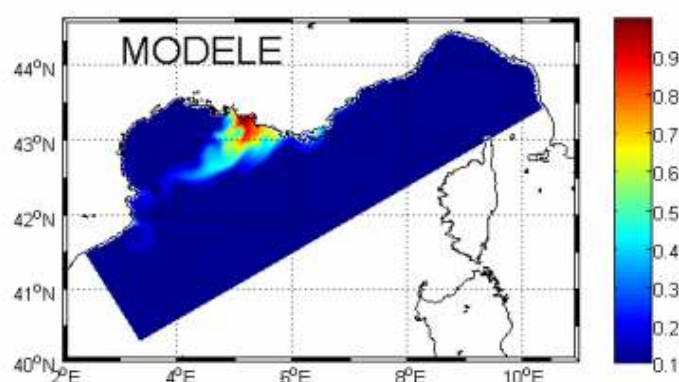
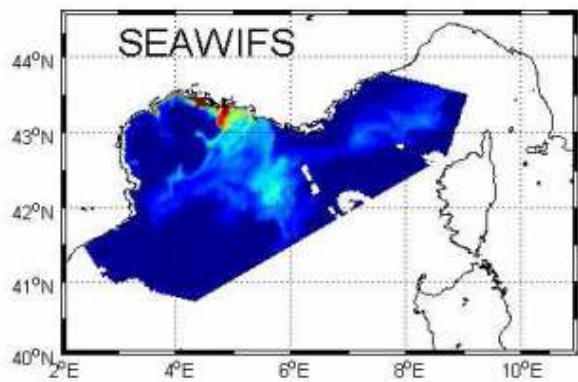
Période printanière (ex. du 26 avril 2001)



Période estivale, durant laquelle le tourbillon est présent (ex. du 22 juillet 2001)

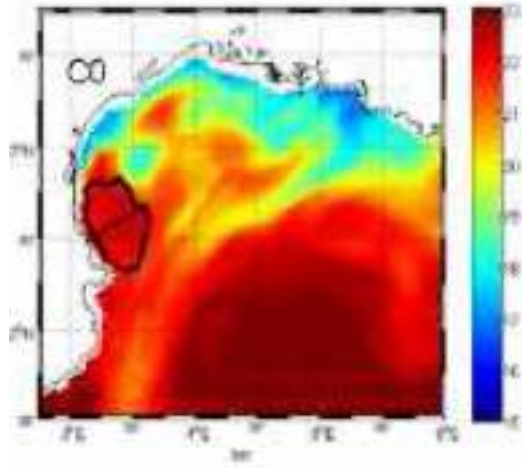


Période automnale (ex. du 12 septembre 2001)



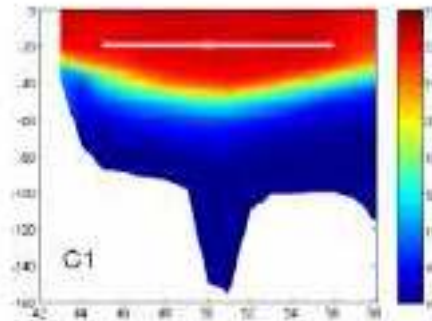
!!! Work in progress !!!

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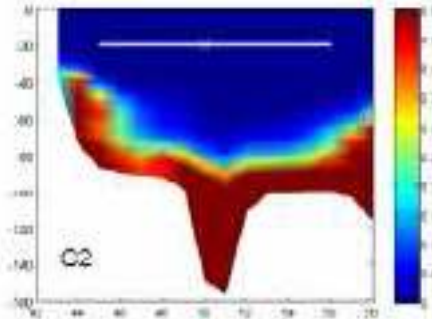


Localisation
de la coupe
(13/08/2001)

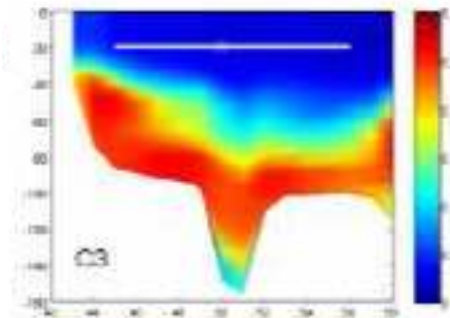
Température



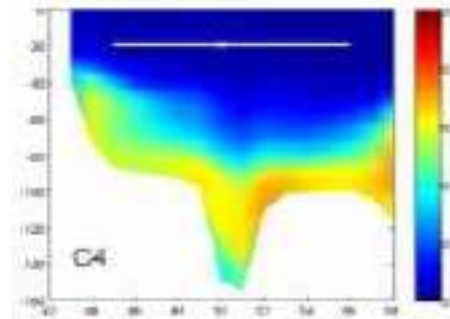
Nitrate
(mmolN/m³)



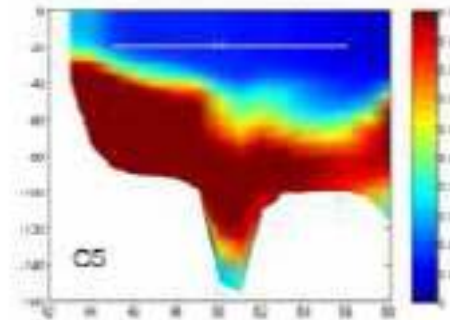
Résultats préliminaires
(exp 0; A constant; 3 km)



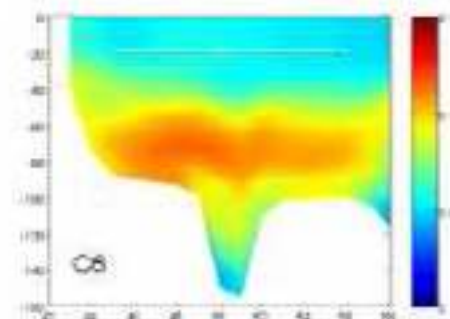
Nano-
phytoplankton
(mmolChl/m³)



Diatomées
(mmolChl/m³)



Synechococcus
(mmolChl/m³)



Bactéries
(mmolC/m³)

[Campbell, 2008]

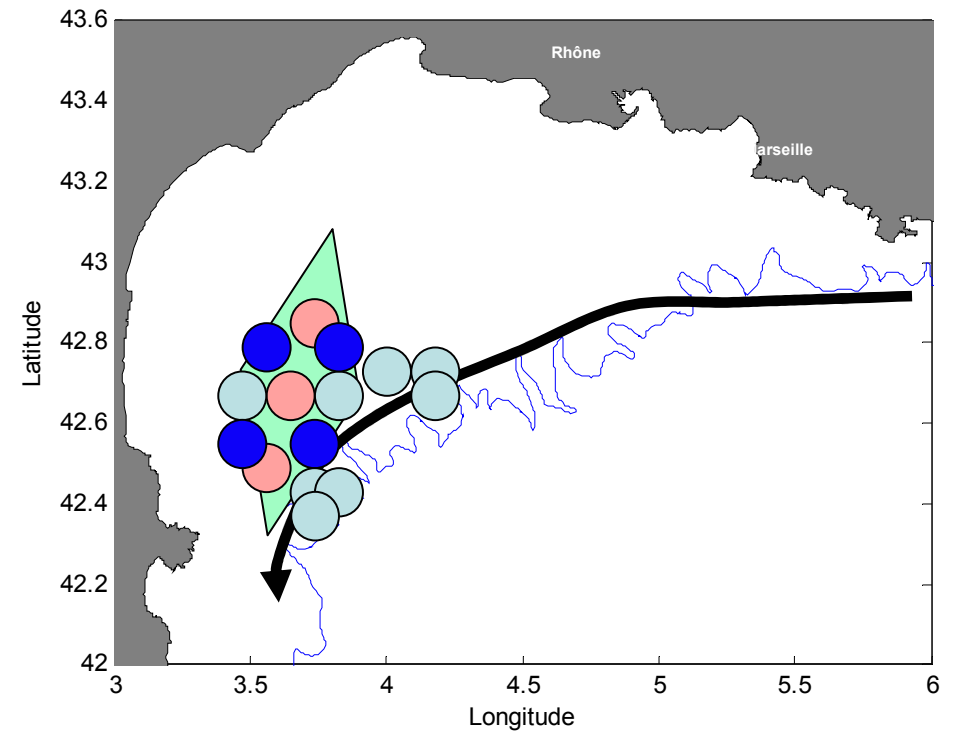
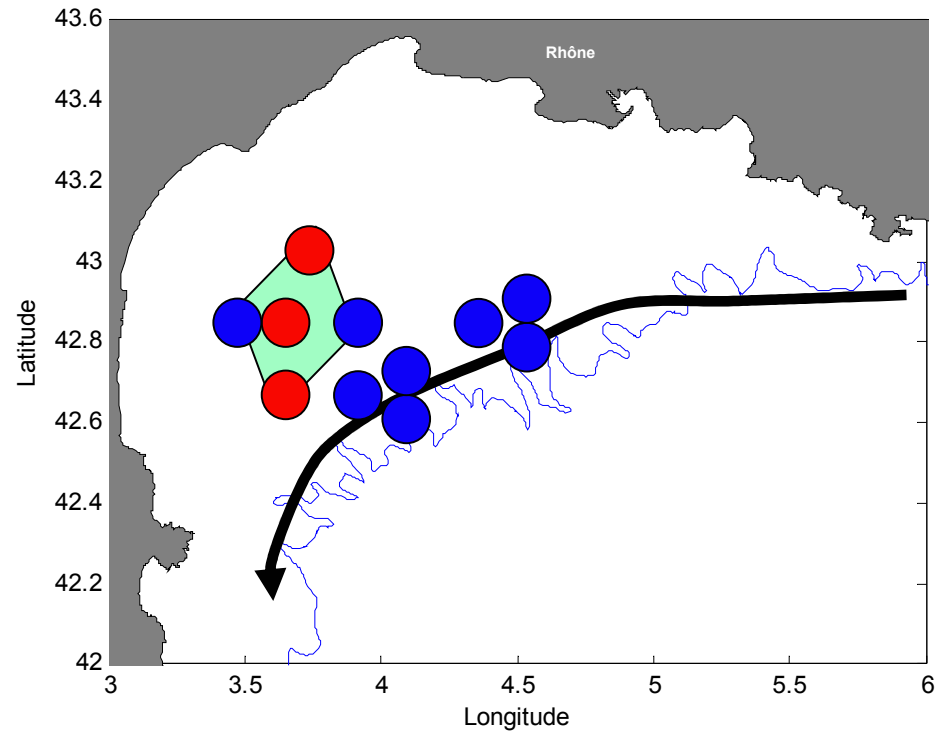
EXPERIMENTAL



LATEX 2008

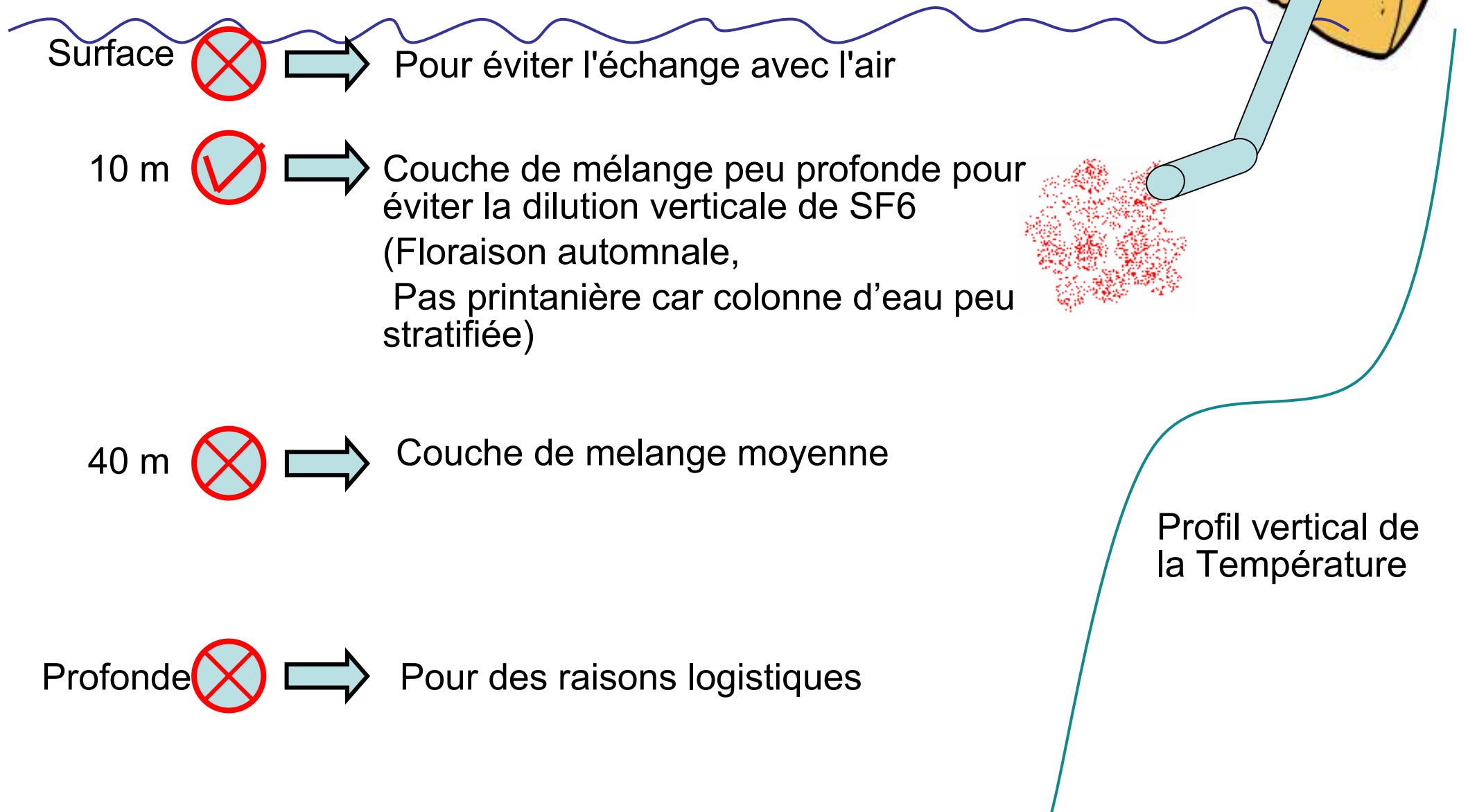


The basic idea



SF_6 = Hexafluorure de soufre

Traceur passif (gaz inerte)



Test of lagrangian navigation

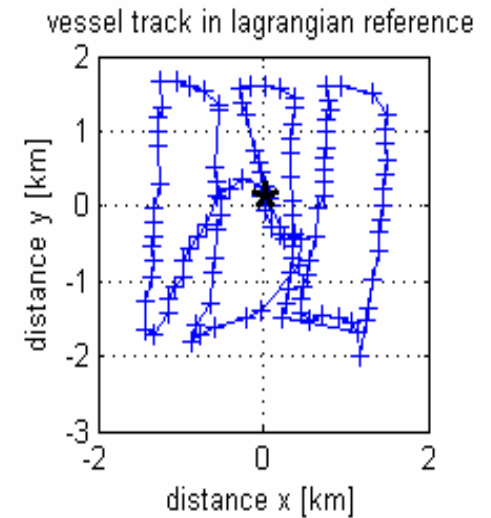
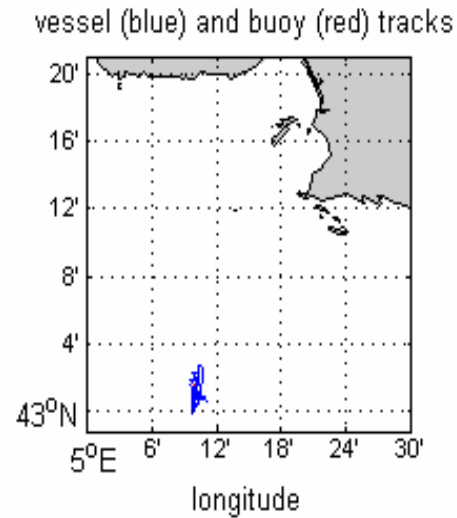
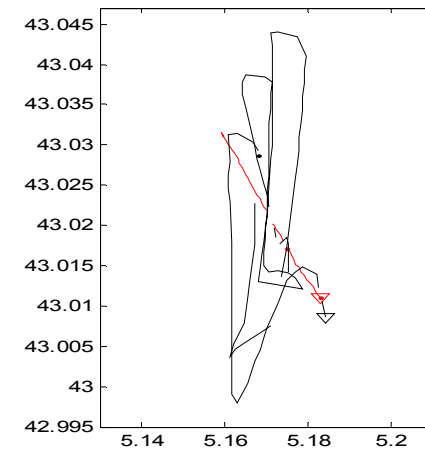
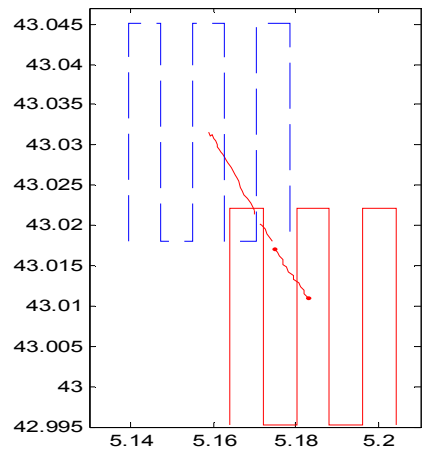
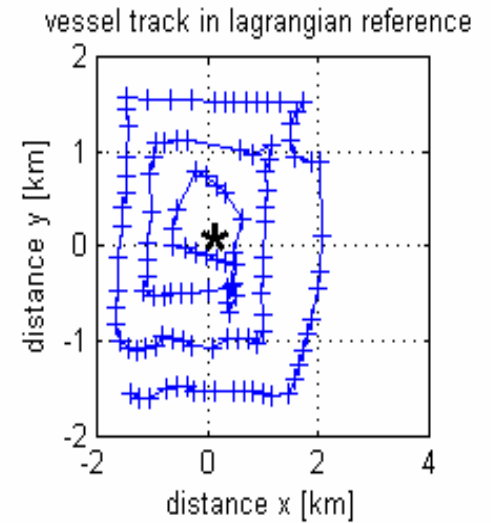
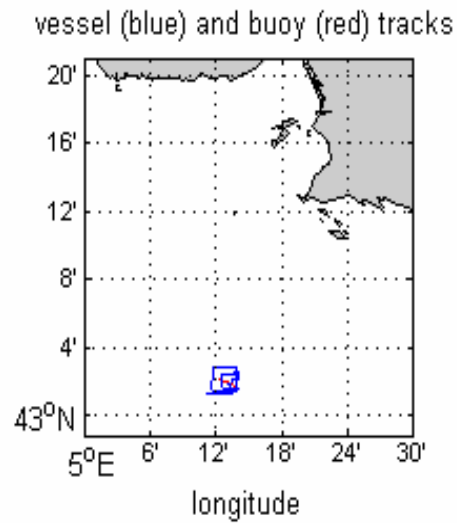
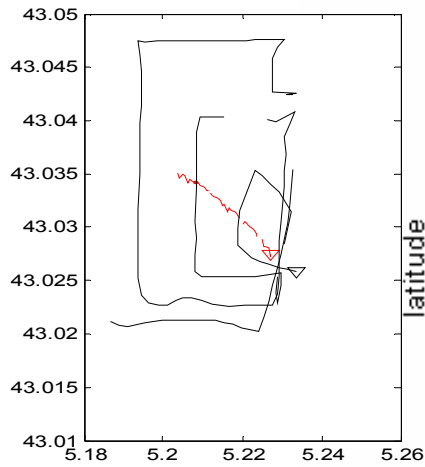
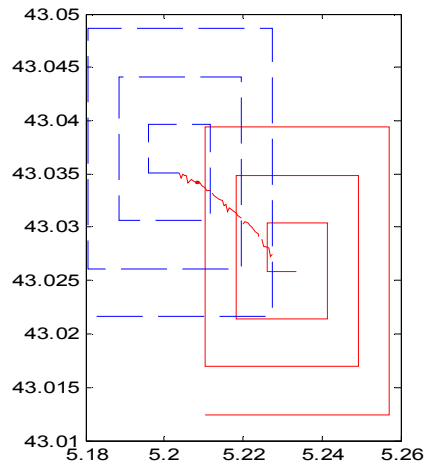
LATEX 00 9-11 juin 2007

théorique

réelle

réelle
zoom out

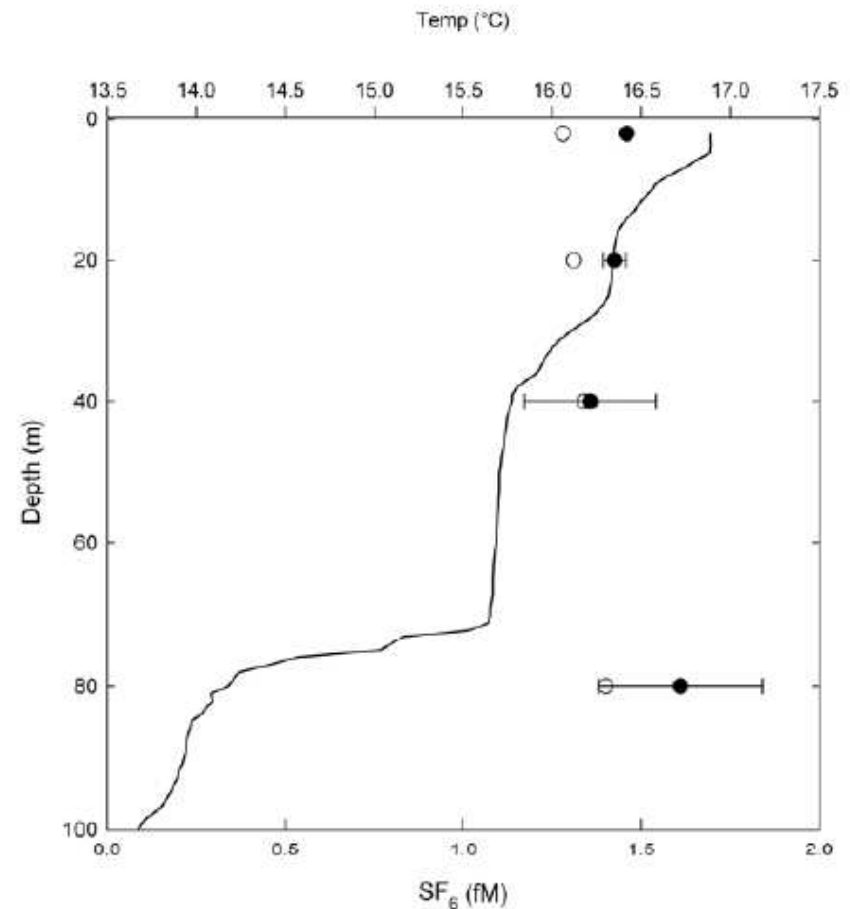
repère lagrangien



SF₆ Environmental concentration

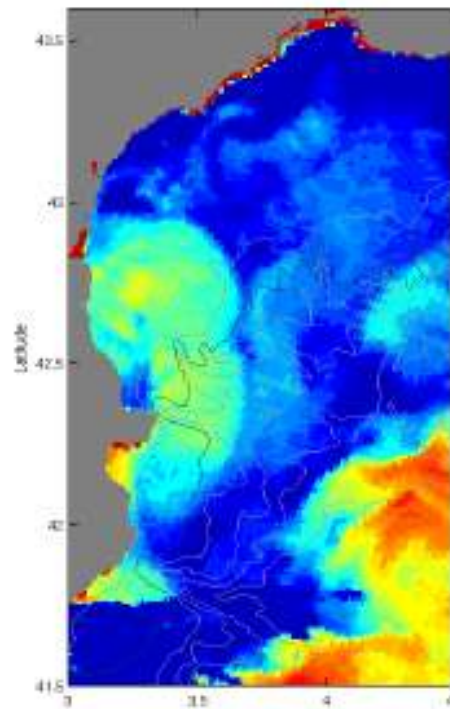
Côté expérimental, nous avons vérifié que la concentration en SF₆ ne dépassait pas les valeurs attendues dans le golfe du Lion (Figure 5).

Figure 5 (droite): Profils verticaux de la concentration ambiante en SF₆ (ronds) et de la température (ligne noire) à la station MOLA (42.52°N, 3.54°E) mesurés le 25 mai, 2007. Les ronds pleins indiquent la valeur moyenne en SF₆ (n=2) ; les barres d'erreur sont indiquées. Les ronds ouverts sont la solubilité en SF₆ dans de l'eau de mer à la salinité et température mesurés par la CTD pour une fraction molaire de SF₆ dans l'atmosphère de 6.1 pptv en 2007.

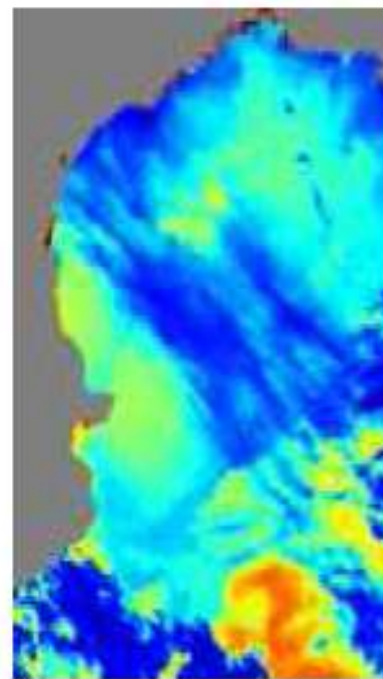


Latex 08 (1er – 6 sept 2008)

Avant la campagne

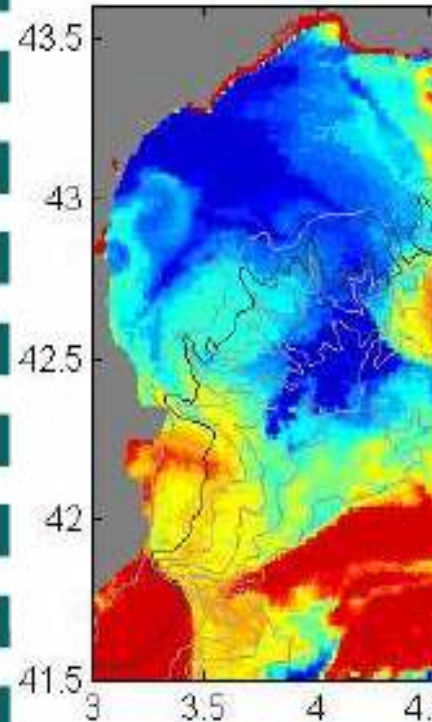


24 août
10h34

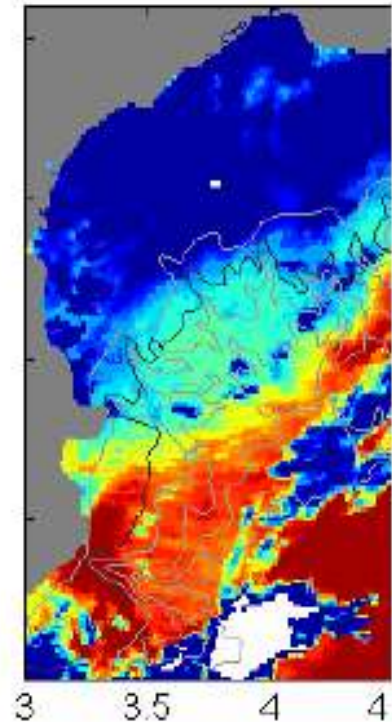


26 août
12h49

Pendant la campagne



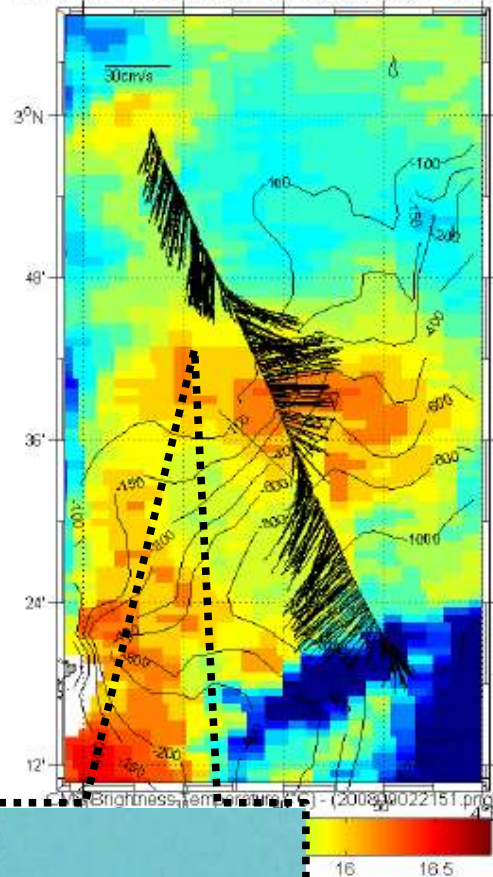
2 sept.
10h26



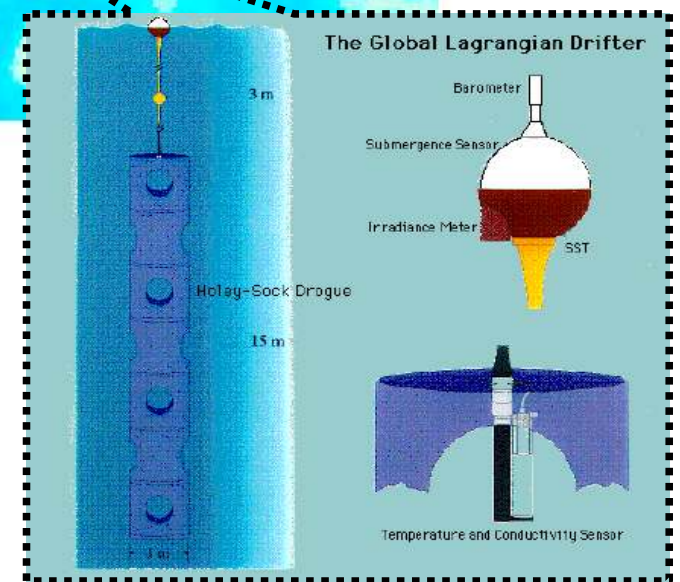
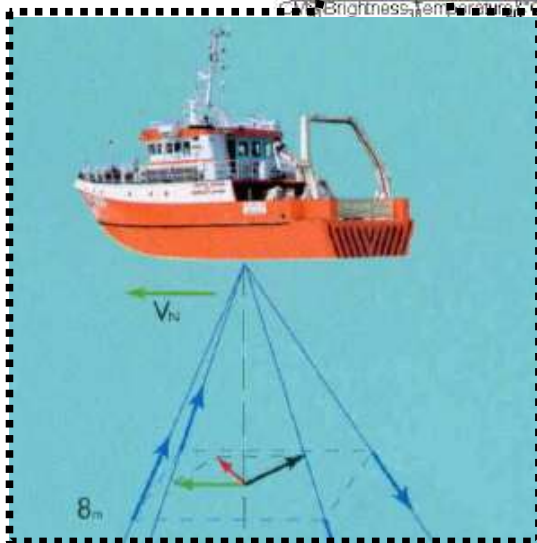
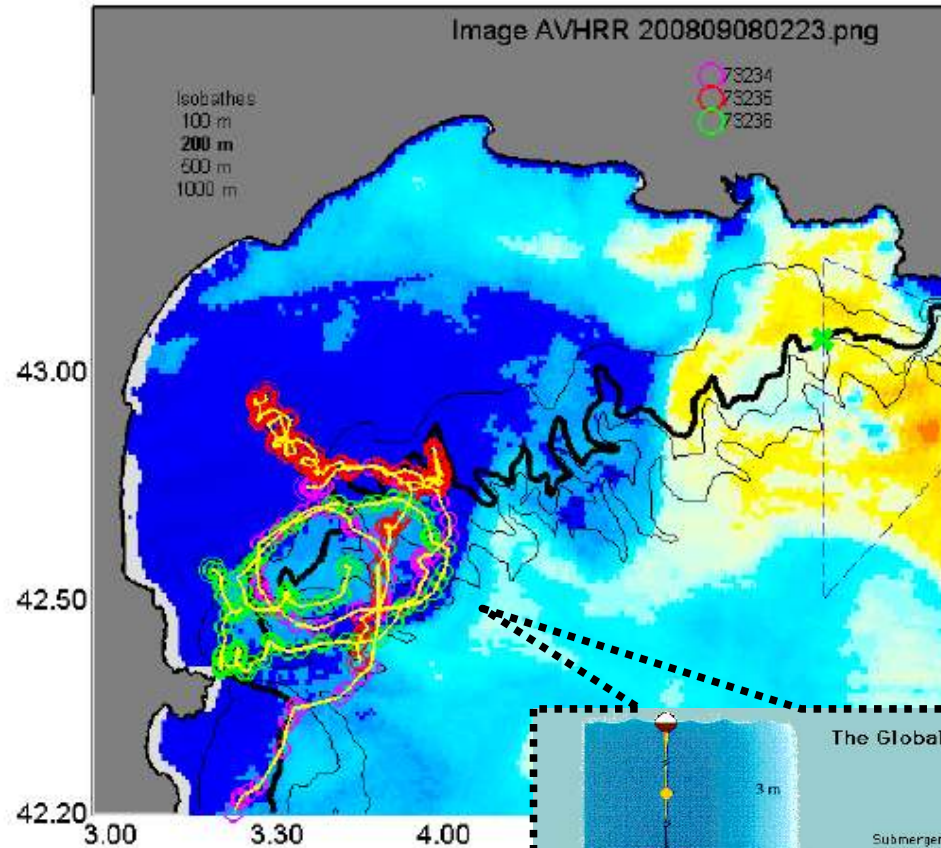
3 sept.
21h28

PROPOSITION DE CAMPAGNE A LA MER
IFREMER - IPEV - IRD

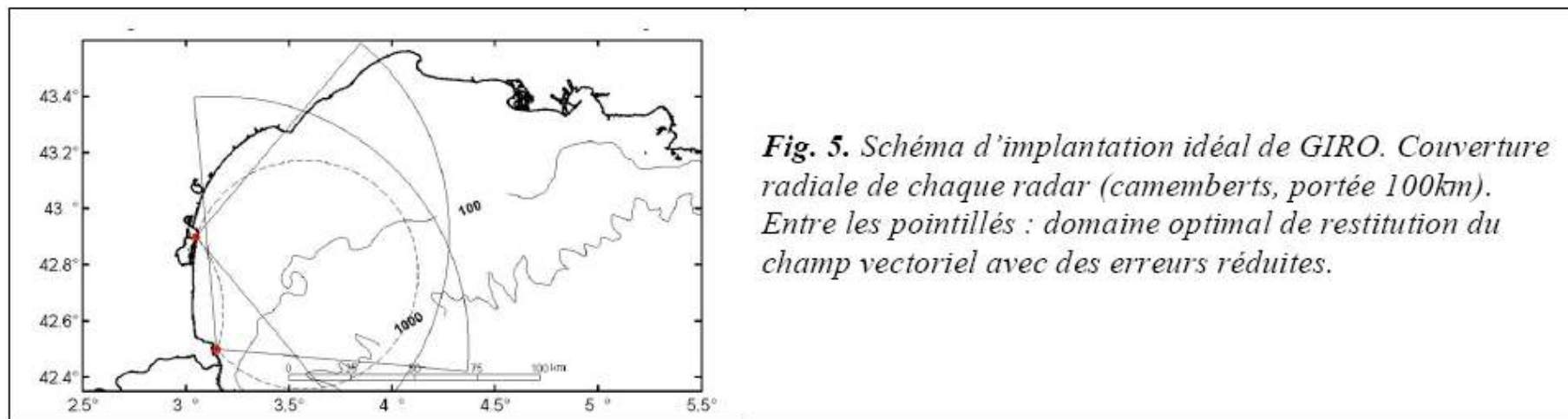
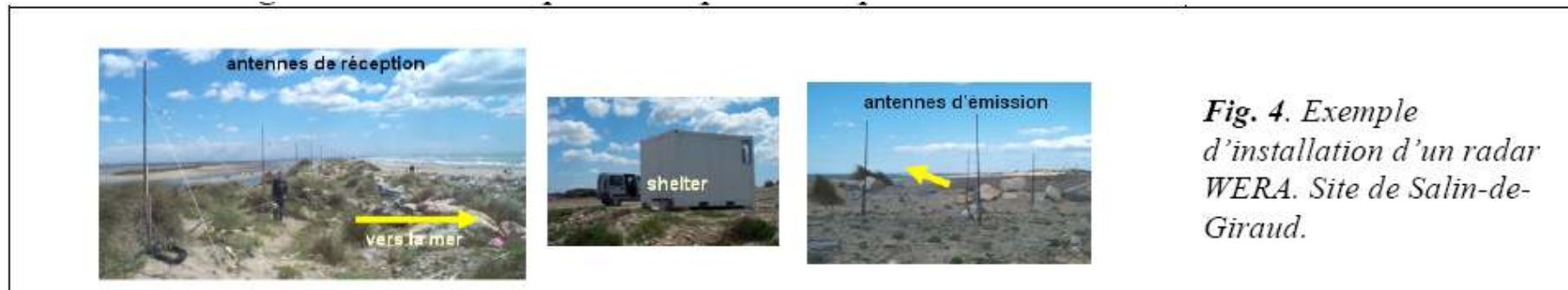
des courants session Latex: 6 Bin: 2 (12.28m), Alpha=1.0045, Phi



Latex01 - Positions des bouees le 15-Sep-2008 a 7h 1m



Sept 09 – Moorings (& radar)



Sept 10 – CRUISE with RVs Suroît and Téthys I

Merci !

Thank

you !