

# Progress on model development at Mercator Océan

Jérôme Chanut



## 2010 highlights (1/4)



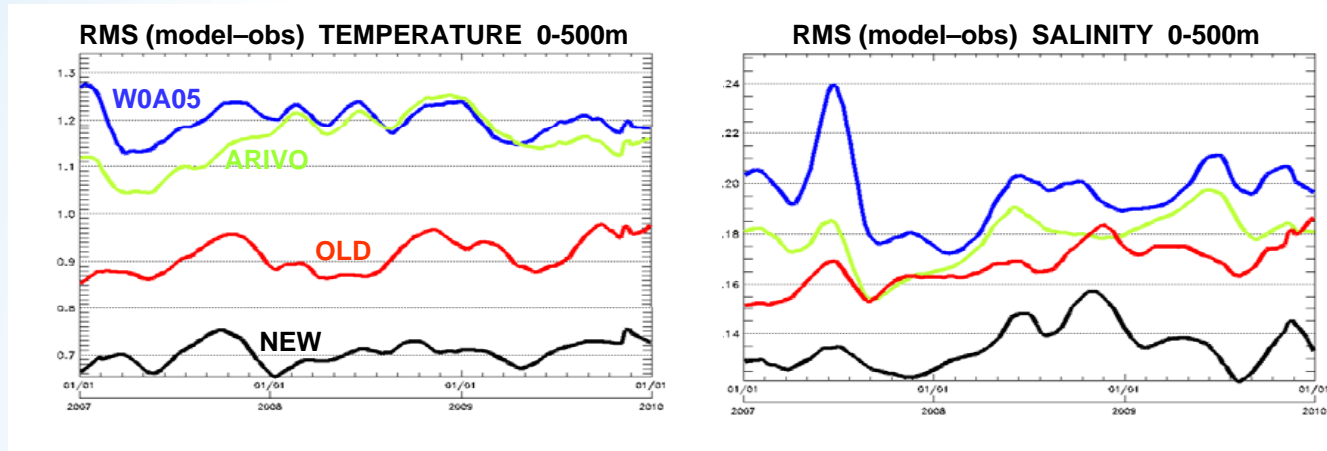
- **Major update of large scale forecasting systems for MyOcean project**
- **New systems released in December 2010 (MyOcean V1):**
  - Psy2v4: North Atlantic and Med sea at  $1/12^\circ$  (nested in global  $1/4^\circ$ )
  - Psy3v3: Global eddy permitting  $1/4^\circ$

## **Main improvements of the Operational Systems PSY2 / PSY3**

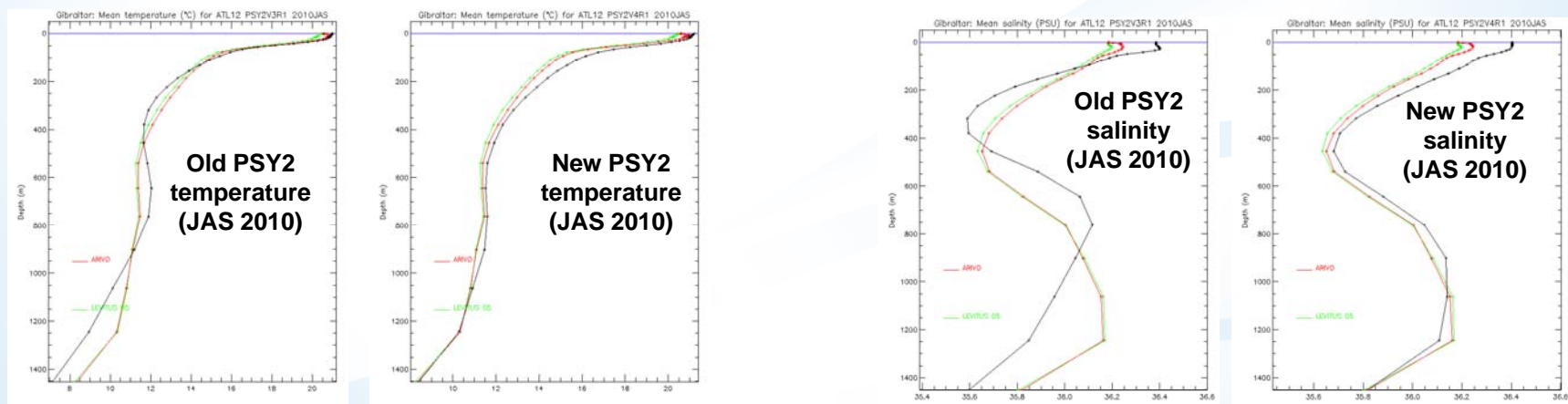
- High frequency (3h) atmospheric forcings including the diurnal cycle.
- CORE bulk formulation.
- New vertical mixing scheme.
- LIM2-EVP ice model.
- Insertion of the zonal and meridional velocity components into the control vector.
- IAU procedure.
- New observational operators.
- New MSSH.
- Introduction of pseudo-observations (innovations equal to zero) to overcome the deficiencies of the background errors, in particular for extrapolated variables.
- Include bias correction based on a variational approach which takes into account cumulative innovations on recent period (typically 3 months) in order to estimate a large scale bias.

# Old vs new NATL system

- Water masses



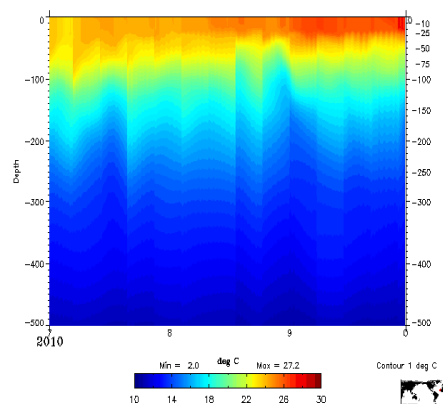
- Mediterranean Waters



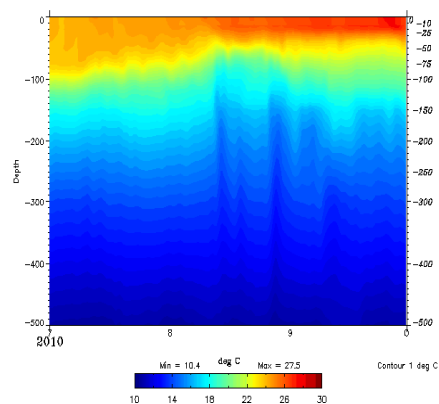
# Old vs new global system

## High frequency behavior at moorings in Tropical Atlantic

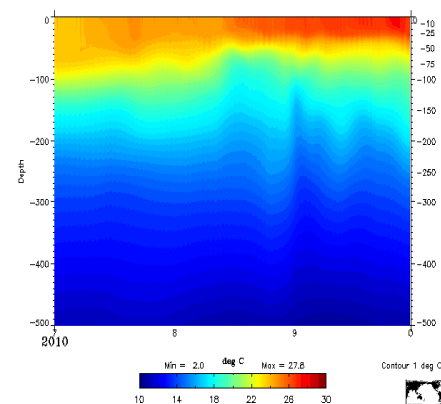
**OLD SYSTEM**



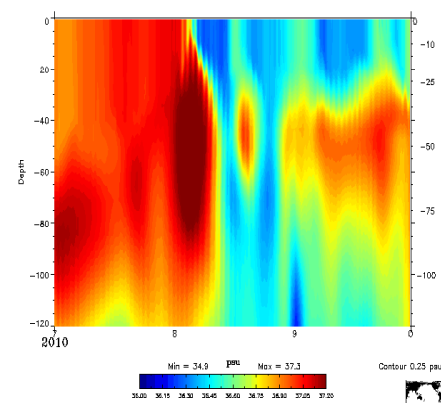
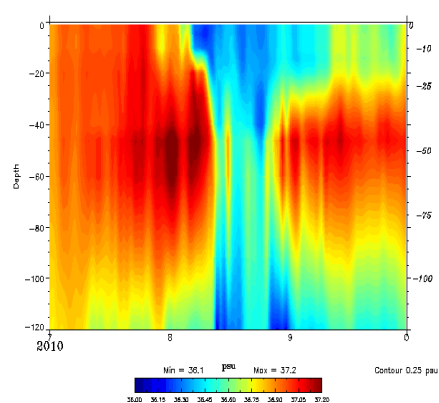
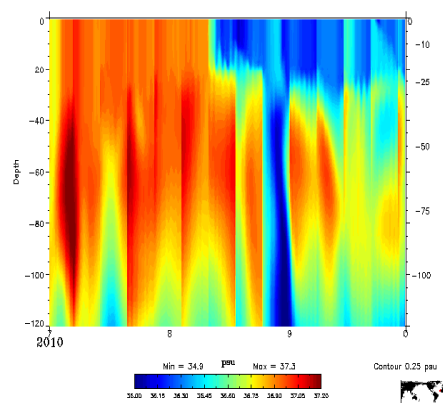
**OBS. PIRATA**



**NEW SYSTEM**



Temperature



Salinity

## 2010 highlights (2/4)

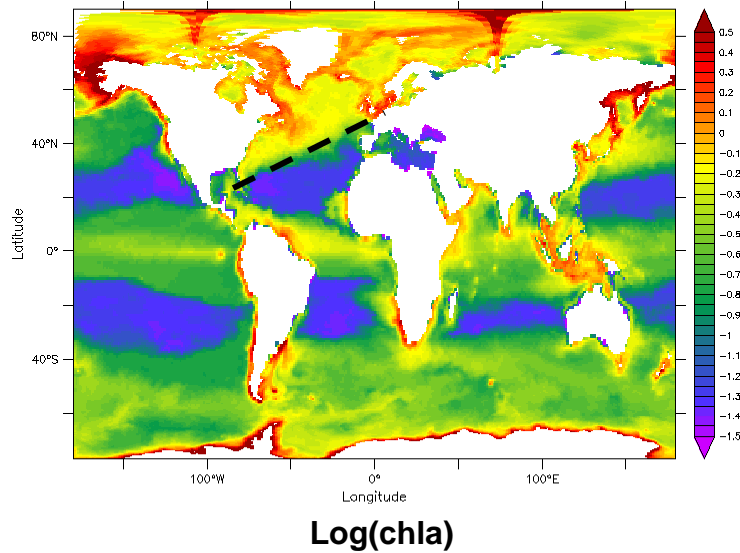


### Major update of forecasting systems for MyOcean project:

- **New systems released in December 2010 (MyOcean stream 1 V1):**
  - Psy2v4: North Atlantic and Med sea at  $1/12^\circ$  (nested in global  $1/4^\circ$ )
  - Psy3v3: Global eddy permitting  $1/4^\circ$
- **Biochemistry modelling: Global  $1^\circ$  1993-2010 hindcast available in June 2011 (MyOcean stream 2 V1)**



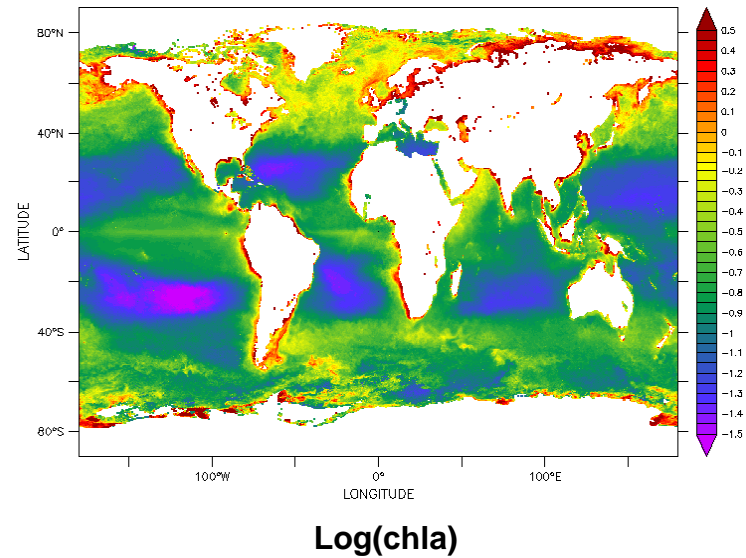
**BIOMER\_ORCA025\_BIO1**  
Coupled with non assimilated physics



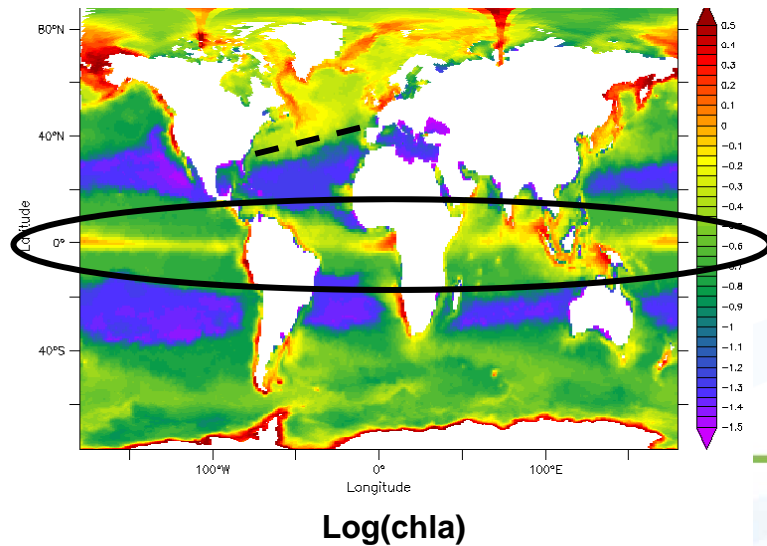
## Log(Chla) annual mean (2002)



**Data** Seawifs, Meris, Modis  
Année 2002



**BIOMER\_GLORYS1V1\_BIO1**  
Coupled with data assimilated physics



- PISCES model (1° horiz. resolution)
- Weekly offline coupling with global 1/4° data assimilated system

## 2010 highlights (3/4)



### Major update of forecasting systems for MyOcean project:

- **New systems released in December 2010 (MyOcean stream 1 V1):**
  - Psy2v4: North Atlantic and Med sea at  $1/12^\circ$  (nested in global  $1/4^\circ$ )
  - Psy3v3: Global eddy permitting  $1/4^\circ$
- **Biochemistry modelling: Global  $1^\circ$  1993-2010 hindcast available in June 2011 (MyOcean stream 2 V1)**
- **Completed new 1993-2009  $1/4^\circ$  global reanalysis: GLORYS2**



## 2010 highlights (4/4)



### Major update of forecasting systems for MyOcean project:

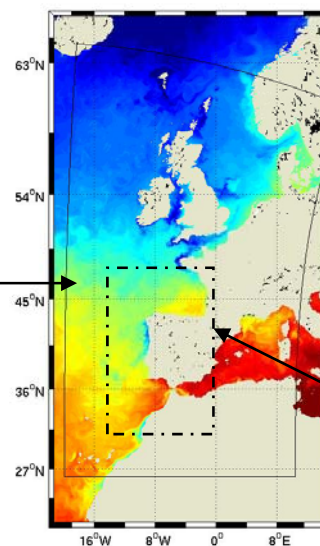
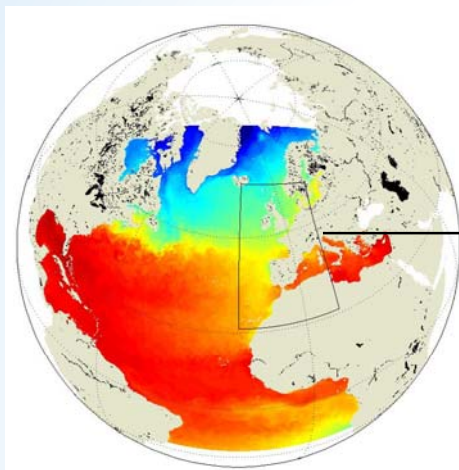
- New systems released in December 2010 (MyOcean stream 1 V1):
  - Psy2v4: North Atlantic and Med sea at  $1/12^\circ$  (nested in global  $1/4^\circ$ )
  - Psy3v3: Global eddy permitting  $1/4^\circ$
- Biochemistry modelling: Global  $1^\circ$  1993-2010 hindcast available in June 2011 (MyOcean stream 2 V1)
- Completed new 1993-2009  $1/4^\circ$  global reanalysis: GLORYS2
- Progress on IBI  $1/36^\circ$  regional system: products available in June 2011 (MyOcean stream2 v1).
- => Tailored product for coastal modelers with improved physics and resolution.  
=> Focus on operational robustness (two identical systems operated at the same time by PdE and Mercator).

# IBI V1 vs PSY2V4



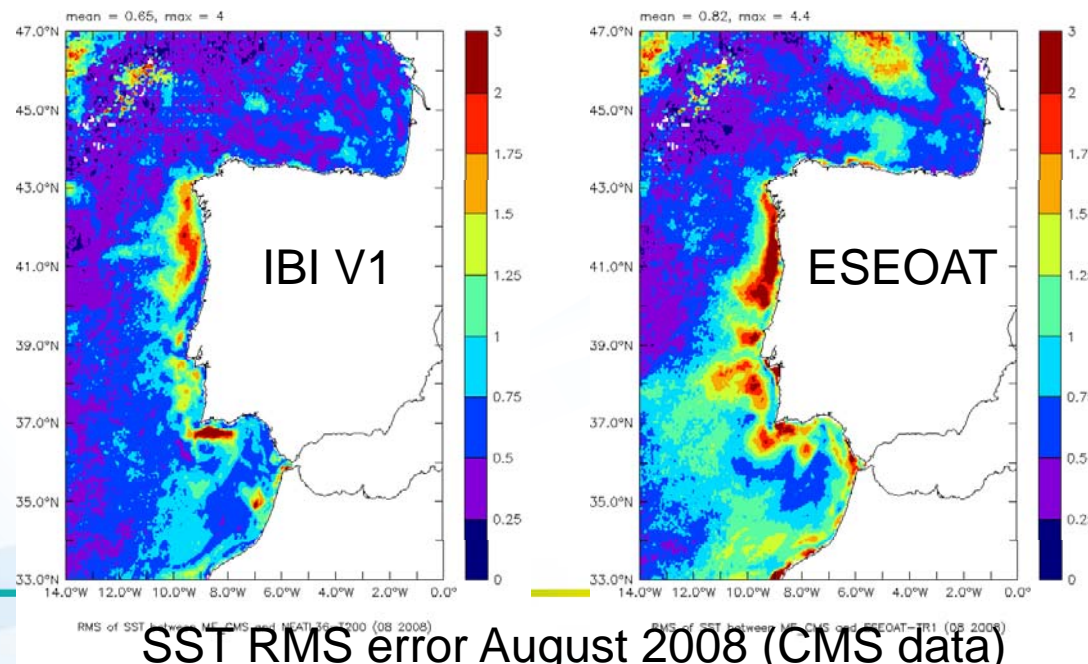
	IBI V1	PSY2v4
NEMO version	2.3	3.1
Horizontal resolution	1/36° (2 km)	1/12° (6-7 km)
Vertical coord.	$z^*=f(ssh)$ 50 levels Partial bottom cells	$z$ 50 levels Partial bottom cells
Bathymetry	Composite (GEBCO_08 + different local databases)	ETOPO + GEBCO
Free surface	Explicit, non-linear, time-splitting	Explicit, Linear, filtered
Open boundary data	From daily 1/12° NATL	GLOBAL ¼° (PSY3)
Vertical mixing	k-epsilon	TKE
Tracer advection	QUICKEST + ULTIMATE	TVD
Rivers	As lateral point sources Monthly climatology (GRDC)	“Pseudo-precipitations”
Atm. forcing	ECMWF (3h) + diurnal cycle	ECMWF (3h) + diurnal cycle
Surge capability	Yes	Ø
Tides	Yes	Ø
Ocean color effects	Merged SEAWIF/IFREMER kpar climatology	Ø
Operation scheduling	Weekly initialization from PSY2 Daily 5 day forecast	Weekly analysis, Weekly 14 days forecast
Data Assimilation	Ø	SEEK. IAU Data: SLA, SST, T/S profiles

## IBI V1 vs ESEOAT



=> Comparison with ESEOAT system show overall equivalent performances

ESEOAT



SST RMS error August 2008 (CMS data)

News & Events - MyOcean - Mozilla Firefox

Fichier Édition Affichage Historique Marque-pages Outils ?

http://www.myocean.eu/web/16-news-events.php?item=62

Les plus visités Débuter avec Firefox À la une

News & Events - MyOcean

**myOcean**

ABOUT US

MARINE SAFETY  
» Products and services

MARINE RESOURCES  
» Products and services

COASTAL & MARINE ENVIRONMENT  
» Products and services

WEATHER, CLIMATE & SEASONAL FORECASTING  
» Products and services

CONTACT US

NEWS & EVENTS

FOCUS ON

IMAGE OF THE MONTH

EDUCATION  
» Observation  
» Modeling  
» Ocean parameters

PRESS/EDITION CORNER  
» all corners


Home > News & Events

## NEWS & EVENTS

### MYOCEAN PHYSICAL SYSTEMS IN REGIONAL SEAS - A FOCUS OF MERCATOR OCEAN'S QUARTERLY NEWSLETTER(ISSUE 39)

News and Events - January 28, 2011

Laurence Crosnier (WP17), head of the editorial team of Mercator Ocean's Quarterly Newsletter, proposes to discover the latest issue focusing on the MyOcean Physical Systems within the Regional Seas.

 [Mercator Ocean Quarterly Letter Issue 39](#)

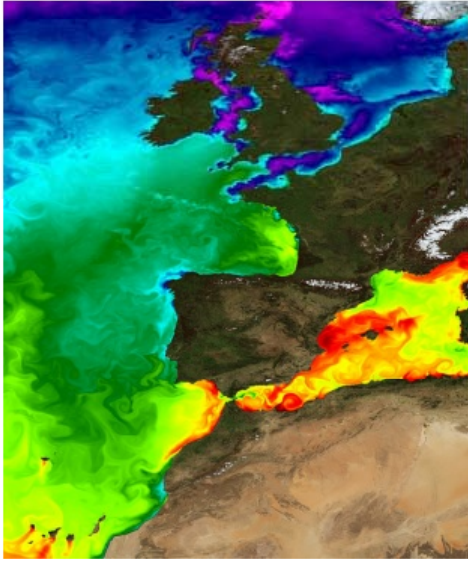
This newsletter is devoted to some of the regional seas within the MyOcean project

and to the numerical systems that allows describing the ocean physics in those areas.

Contents:

- The FERRYBOX component in **MyOcean**, by *Dominique Durand, Are Folkedal, Kai Soerensen*
- The new regional generation of Mercator Ocean system in the Iberian Biscay Irish (**IBI**) area, by *Sylvain Cailleau, Jérôme Chanut, Bruno Levier, Claire Maraldi, Guillaume Refray*

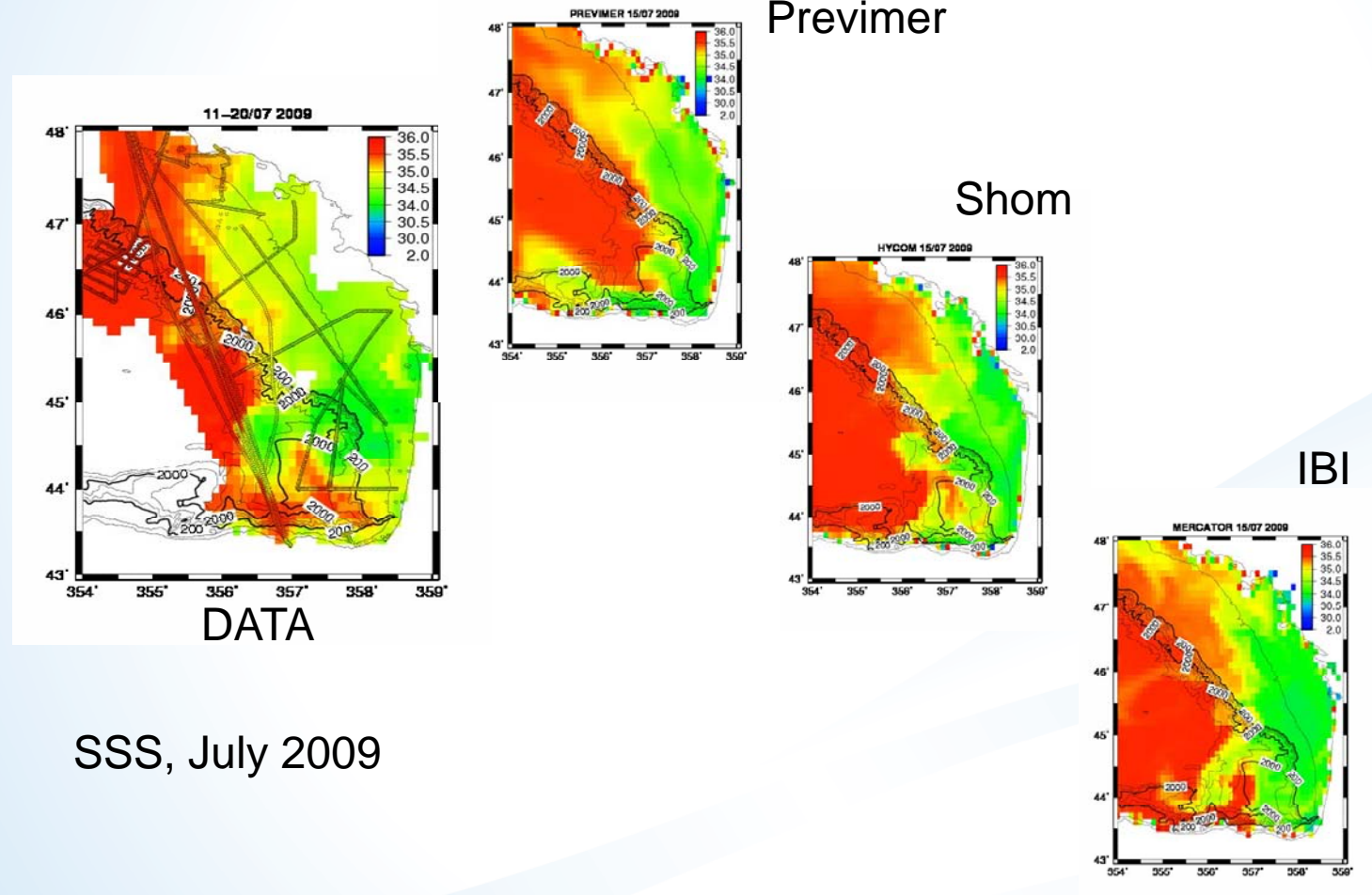
Terminé





# Bay of Biscay cross-shelf freshwater export in Summer 2009

Reverdin et al., 2010: Freshwater from the Bay of Biscay shelves in 2009, submitted for publication



# Xynthia storm (27-28 Feb 2010) as seen by IBIV1 system

TIME : 27-FEB-2010 01:30 (box smoothed by 3 pts)

