

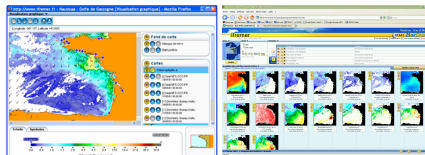
COASTAL APPLICATIONS USING SST AND OCEAN COLOR SUPPORT BY NAUSICAA IMAGE BROWSER

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Ifremer-Centre de Brest

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Ifremer-Centre de Brest

Joint GlobCOLOUR 1st/Medspiration 4th user consultation meeting,
Villefranche-Sur-Mer, 5th December 2006



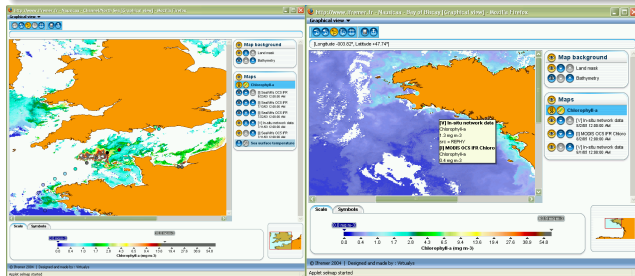
OUTLINE

- 1 **NAUSICAA : A SUPPORT TO THE USE OF SST AND OCEAN COLOR DATA**
 - Motivation
 - Requirements
- 2 **MAIN FEATURES OF NAUSICAA IMAGE BROWSER**
 - Visualization
 - Access to data
 - Data featured
- 3 **SOME COASTAL APPLICATION AT IFREMER**
 - Hydrodynamical model validation
 - Physical and Biological processes
 - Other various application
- 4 **PERSPECTIVE**
 - Improvements
 - New applications

NAUSICAA IN A FEW WORDS

OVERVIEW

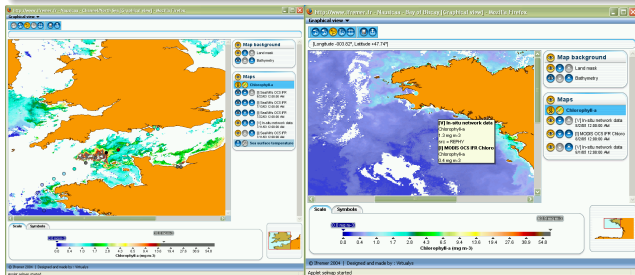
- Nausicaa is an image-based data explorer (satellite, in situ and model outputs)



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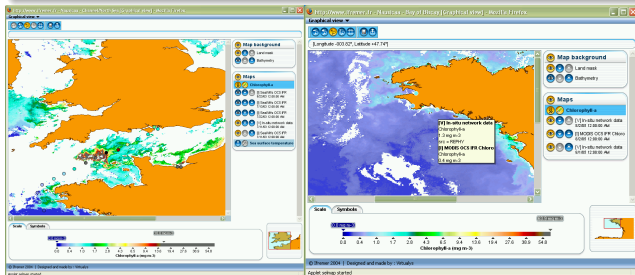
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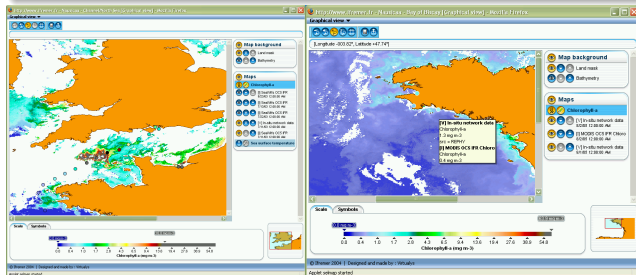
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 - several years of archive with browsing facilities



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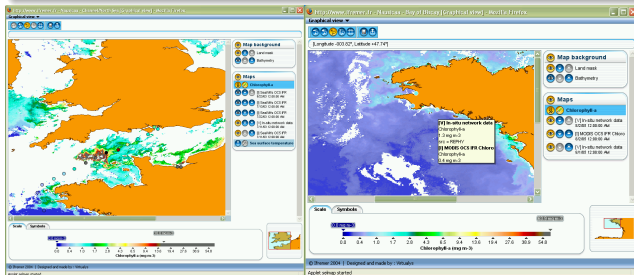
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- Implemented in the frame of ROSES and Marcoast programs



ISSUES WITH USING THE DATA

AVAILABILITY OF SATELLITE DATA

Many high quality data are available at providers or aggregated by various projects (Medspiration, Globcolour) *but* :

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 - poor hardware and software equipment (for instance in coastal stations). We do not address only big modelling centers!!
 - technical issues for storing, reading, displaying or intercomparing the data
- practices
 - how to bring people used to in situ data to the use (and trust) of satellite data?

HOW TO INCREASE USE OF SATELLITE DATA?

NEEDS

- bring the data to the users
with no effort

HOW TO ACHIEVE THAT?

- easy access (no explicit download, file handling, no tools to install nor open) : web based application, fast and light data browsing implying pre-computed images

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- homogeneous access to all data sources : same grid/projection, same operations (for visualization, tools,...)

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- display in situ validation data

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- provide easy cross-comparison means with what users already know or use, to enforce confidence in satellite data
- **provide expertise**

HOW TO ACHIEVE THAT?

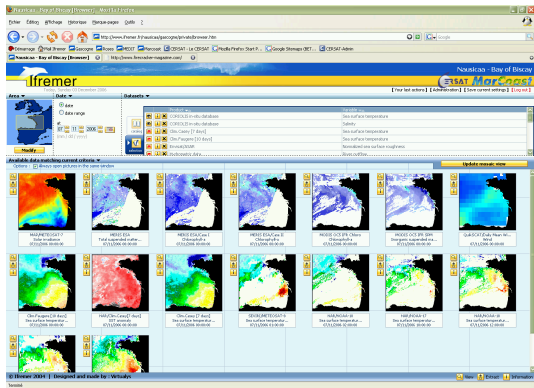
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- interactive functionalities to display several data at the same time, check values
- display in situ validation data
- user support, documentation, examples, typical situation

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MOSAIC VIEW

4 Data browsing



MOSAIC VIEW

4 Data browsing

- date selection
- daily snapshot or time series

Date ▾

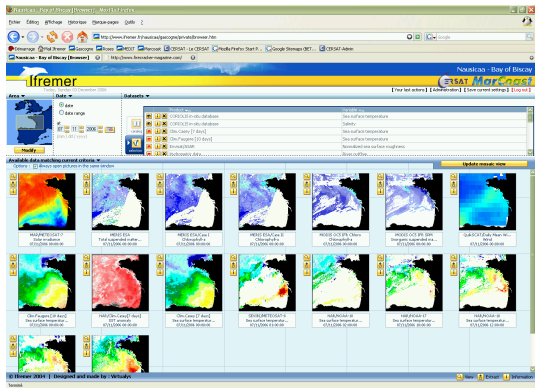
date

date range

at

01 25 2006 17:05

(mm / dd / yyyy)



MOSAIC VIEW

4 Data browsing

- date selection
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date

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of

01 25 2006 17:05

(mm / dd / yyyy)

- display what you want

The screenshot displays the Nausicaa image browser interface. At the top, there is a navigation bar with the Ifremer logo and a search bar. Below this, a map of the study area is shown. The main content area is a grid of 18 satellite images, each with a small thumbnail and a title. The titles include parameters like 'Sea surface temperature', 'Chlorophyll a', and 'Sea surface salinity'. On the left side, there is a 'Date' selection panel and a 'Data menu' with various data layers. The bottom of the interface shows a status bar with the year 2006 and navigation icons.

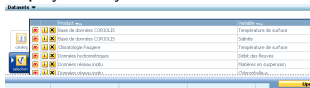
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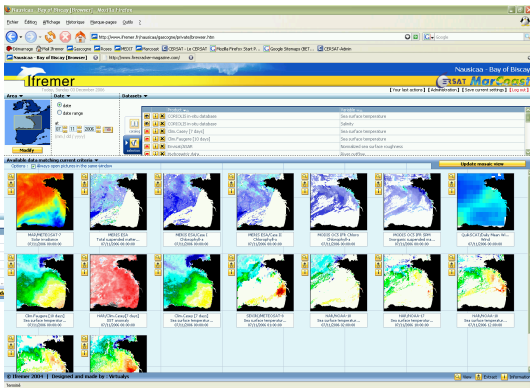


- display what you want



2 possible actions on imageries

- getting information
- data export (extraction) shortcut
- full resolution visualization



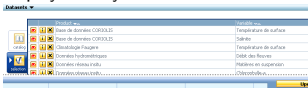
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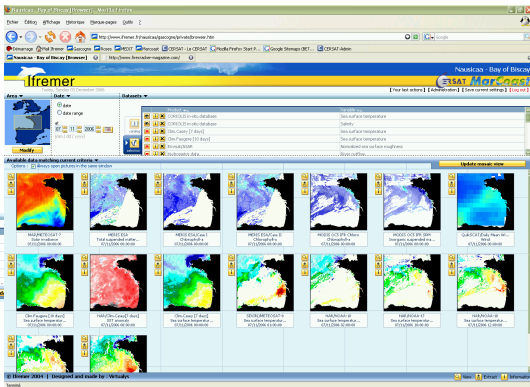
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2 possible actions on imageries

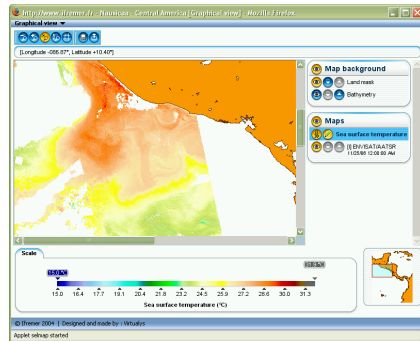
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3 Information warning and display about an interesting phenomena or event



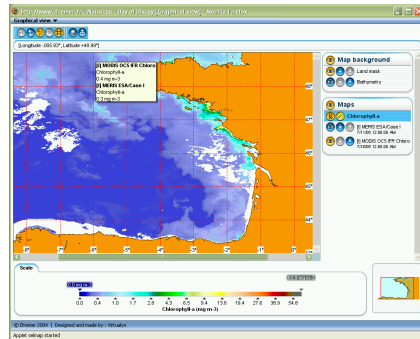
VISUALIZATION WINDOW

- 1 full resolution image display



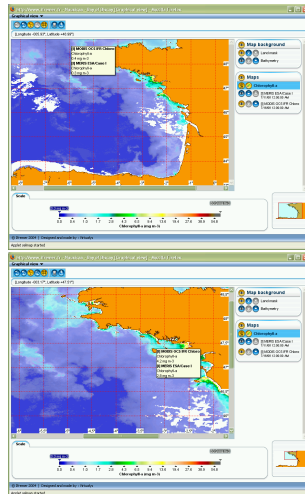
VISUALIZATION WINDOW

- 1 full resolution image display
 - location and geophysical values over mouse



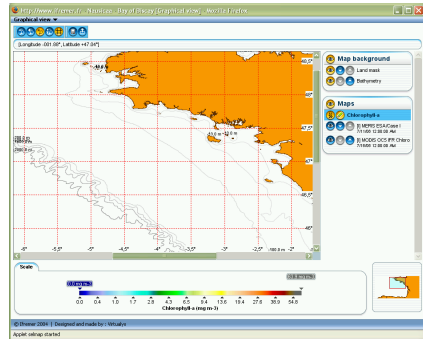
VISUALIZATION WINDOW

- 1 full resolution image display
 - location and geophysical values over mouse
 - zoom in/zoom out



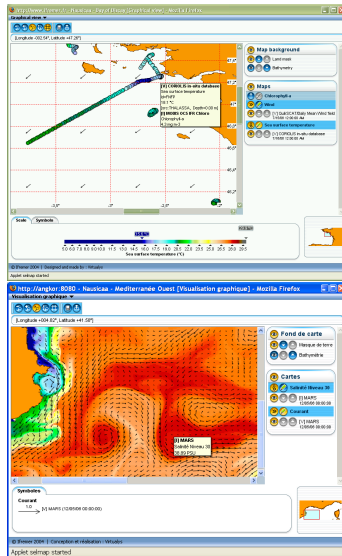
VISUALIZATION WINDOW

- 1 full resolution image display
 - location and geophysical values over mouse
 - zoom in/zoom out
 - static layers
 - land mask
 - grid
 - bathymetry



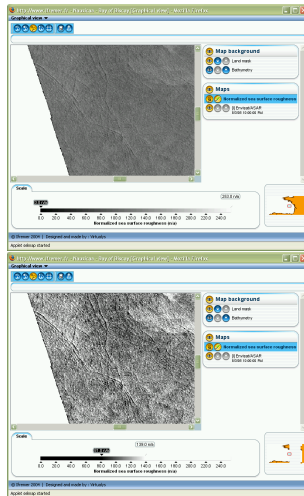
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- 2 vectorial data display
 - marks for in situ (point) data (with associated URLs for interoperability with other display applications)
 - vectors (wind, currents)



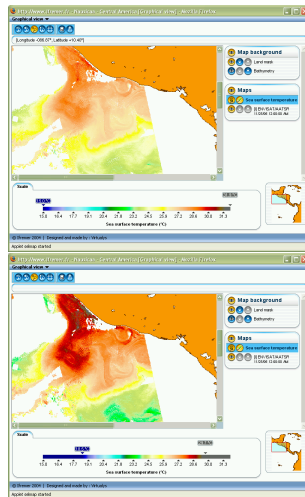
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- 3 Color palettes
 - linear, log, ...
 - palette contrast adjustment



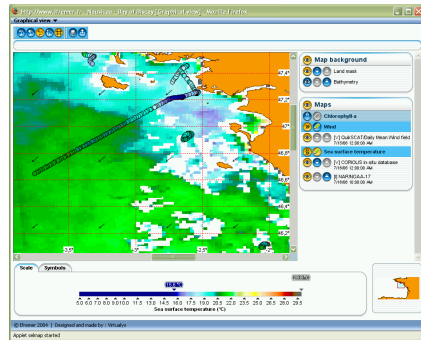
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- 4 multiple layer management
 - only one geophysical parameter displayed at once, but multiple images can be overlaid
 - possible ordering of the layers
 - vectorial layers can overlay image layers



USER CUSTOMIZATION

USER REGISTRATION

- tracking of system use and users
- restricted access on some datasets
- user profile

USER PROFILE

- custom settings
- variable selection in mosaic
- zoom area for full resolution visualization
- display options, session opening (on current day or last saved day)



DATA EXPORT

- 1 Extraction of numerical values
 - link to netCDF/HDF data files
 - extraction of a time series possible
- 2 Extraction of images
 - multiple image formats (" 'naked'" image)
 - animation (time series) possible

COMING...

- Export to GIS format SIG (GeoTiff/ShapeFile)
- Pretty image extraction (including date, palette, contrast adjustment settings, legend)
- export to GoogleMap or Ifremer/GIS

AVAILABLE DATA

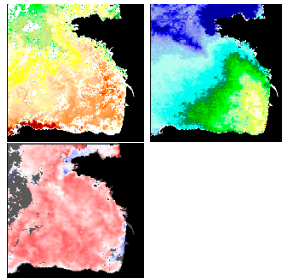
SATELLITE



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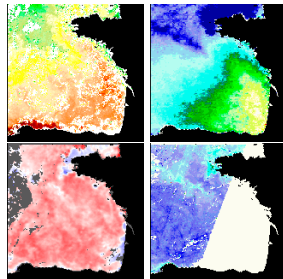
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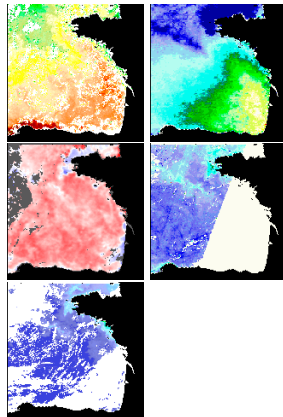
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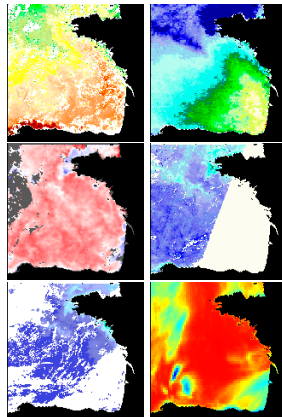
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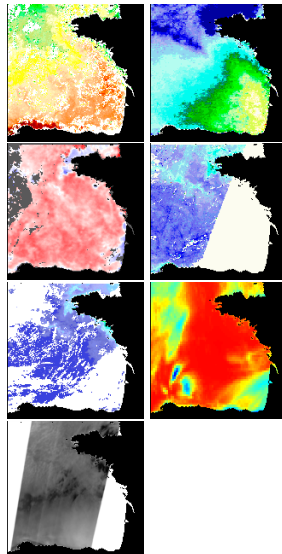
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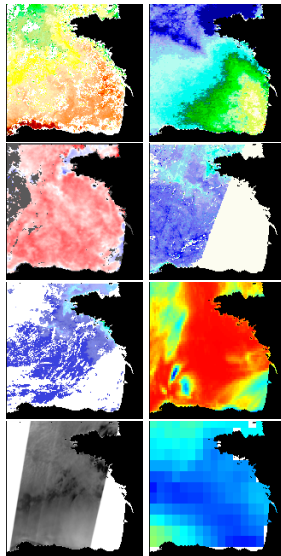
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- QuikSCAT winds



Nausicaa : a support to the use of SST and Ocean color data
Main features of Nausicaa image browser
Some coastal application at Ifremer
perspective

Visualization
Access to data
Data featured

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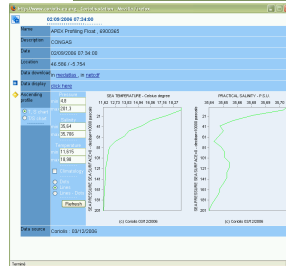
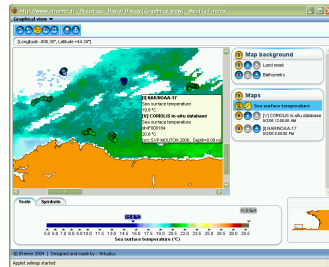
IN SITU



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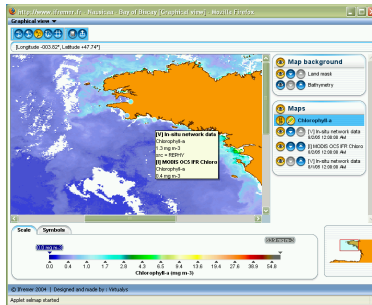
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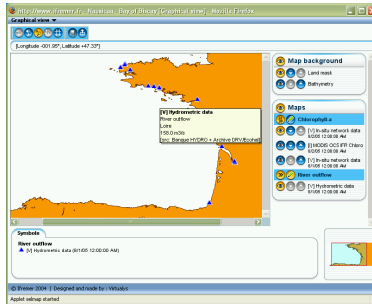
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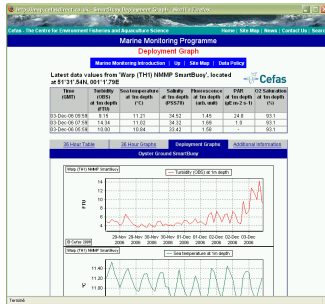
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- River outflows from various agencies
- CEFAS (Centre for Environment Fisheries and Aquaculture Science) smartbuoy turbidity
- Planned : maregraphs, other sources



NAUSICAA CURRENT STATUS

COVERED AREAS

General access page, tutorial, examples :

<http://cersat.ifremer.fr/data/view/nausicaa>

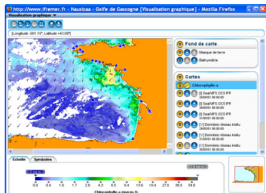
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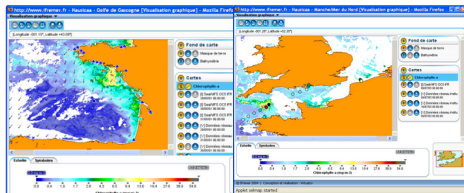
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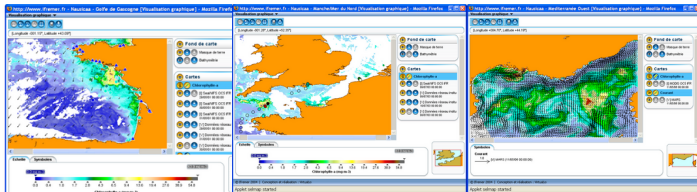
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- Channel/North Sea, <http://www.ifremer.fr/nausicaa/rozes/index.htm>
- Gulf of Lion - Corsica, <http://www.ifremer.fr/nausicaa/medit/index.htm>



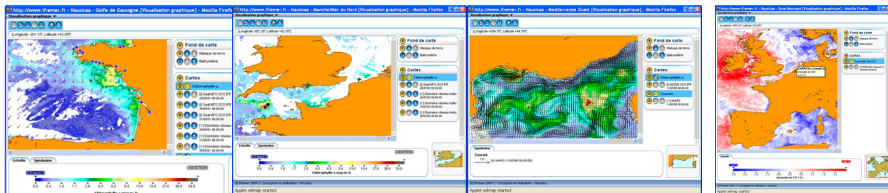
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- Gulf of Lion - Corsica, <http://www.ifremer.fr/nausicaa/medit/index.htm>
- Marcoast area (North-West Europe),
<http://www.ifremer.fr/nausicaa/marcoast/index.htm>



NAUSICAA AUDIENCE

USAGE

- access opened since April 2006
- more than 240 users registered (including Ifremer users)
- 1/3 of non-ifremer users connected at least once in last month
- most accessed server (non-Ifremer users) is Biscay
- operational use in coastal stations

OUTLINE

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 - Motivation
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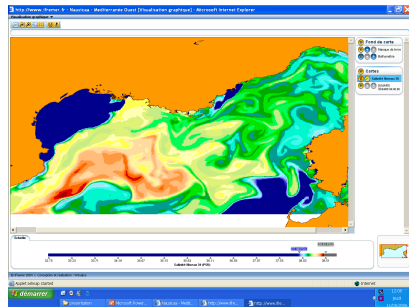
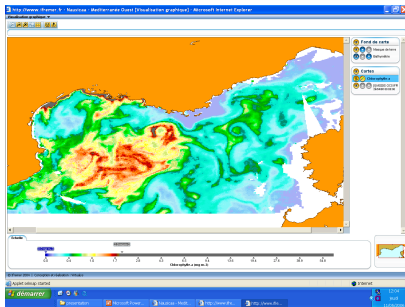
VALIDATION OF AN HYDRODYNAMICAL MODEL OF THE MEDITERRANEAN SEA

PIERRE GARREAU, IFREMER, DÉPARTEMENT DYNAMIQUES DE L'ENVIRONNEMENT CÔTIER

INTERCOMPARISON WITH SATELLITE SURFACE DATA (I)

Example of a daily use for model outputs control and validation

- Sea surface salinity from MARS3D model (ifremer)
- Chlorophyll from MODIS
- May 2006

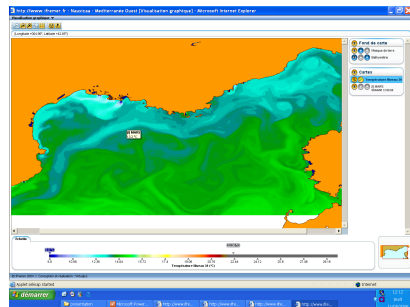
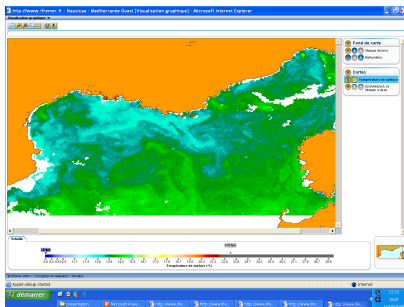


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INTERCOMPARISON WITH SATELLITE SURFACE DATA (II)

- Sea surface temperature from MARS3D model (ifremer)
- Sea surface temperature from Medspiration NAR/AVHRR data
- April 2006

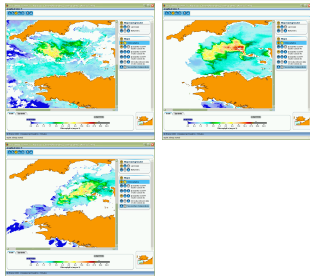


THE ENVIRONMENTAL CONDITIONS DURING A STRONG KARENIA MIKIMOTOI BLOOM DURING THE 2003 SUMMER

ALICE VANHOUTTE AND AL., DÉPARTEMENT DYNAMIQUES DE L'ENVIRONNEMENT CÔTIER

BLOOM OBSERVATION FROM OCEAN COLOR

From June to August 2003, the bloom of *Karenia mikimotoi* is observed eastwards as the summer stratification takes place (SeaWiFS-derived Chlorophyll-a, [IFREMER])

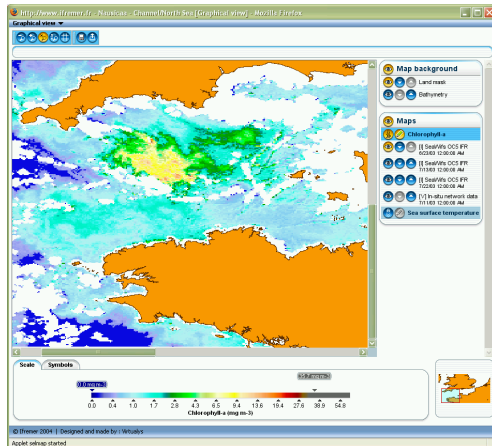
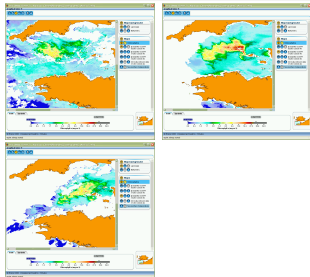


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23TH JUNE 2003

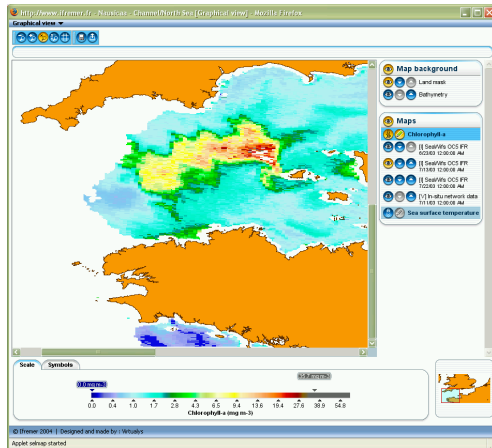
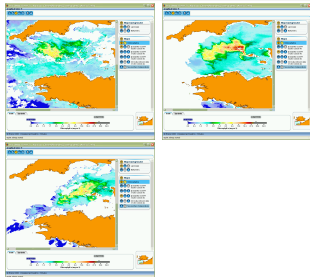


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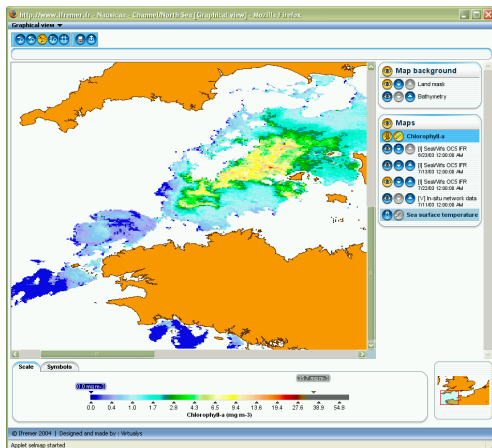
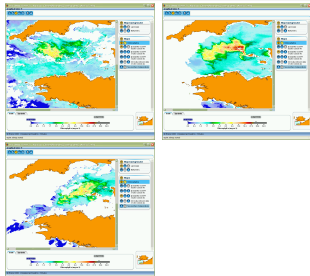
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22 JULY 2003

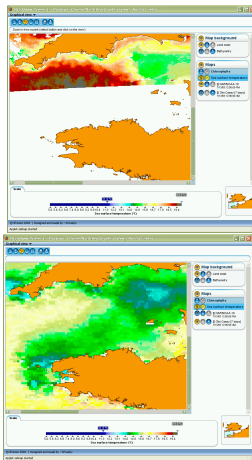
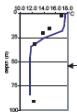


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BLOOM CONDITION FROM SST

Thanks to the climatology the anomaly in the surface temperature, meaning higher stratification and optimal condition for the HAB, is well observed from the avhrr data [CASEY CLIMATOLOGY, SAF O&SI NAR16]



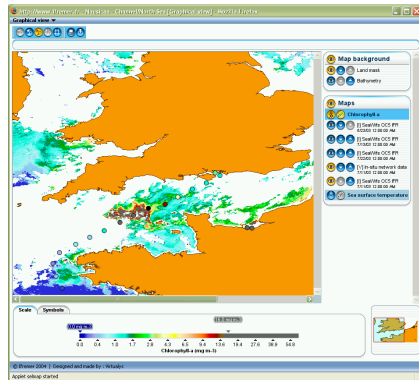
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INTERCOMPARING IN SITU AND SATELLITE DATA

More and more in situ data are added
to the Nausicaa servers

- here data of the ferry
Porthmouth-Bilbao [COURTESY OF
DAVID HYDES AND MOHAMMED
QURBAN, NOCS]



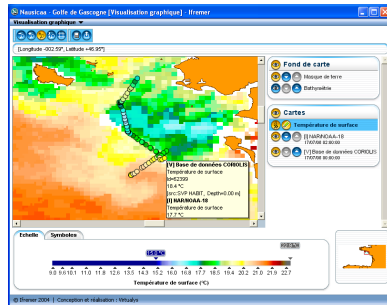
SATELLITE MAPS DISSEMINATION TO OCEANOGRAPHIC SHIPS

USING SATELLITE DATA IN CRUISE - 1

- Intercomparing Thalassa SST sampling (Mixed layer Temperature) and NAR18 SST (night skin temperature) [17th July 2006]
- SST skin is higher by 0.3/1.2 degrees (exceptional case where surface gradient occurs)

USING SATELLITE DATA IN CRUISE - 2

- ocean color / sst maps used for eddies tracking in Gulf of Biscay (Physical Oceanography)

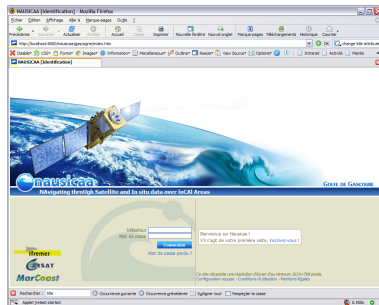


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NEW NAUSICAA VERSION

- 1 optimization (for managing high resolution data : SAR, SRR, SST,...)



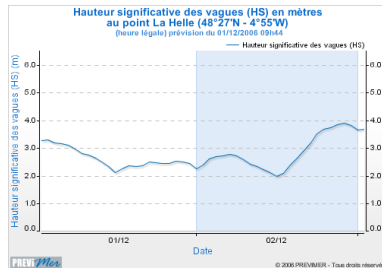
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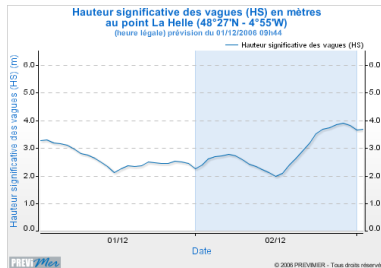
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 - transects, time series (at one point)
 - more static layers : rivers, water bodies



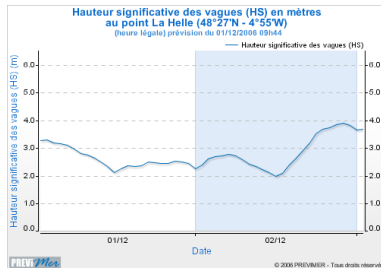
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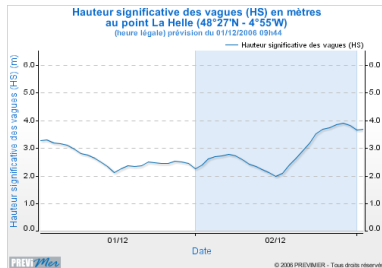
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BUT...

- keep it light, keep it fast
- web application, not GIS standalone client !

PLANNED OR POSSIBLE USE CASES

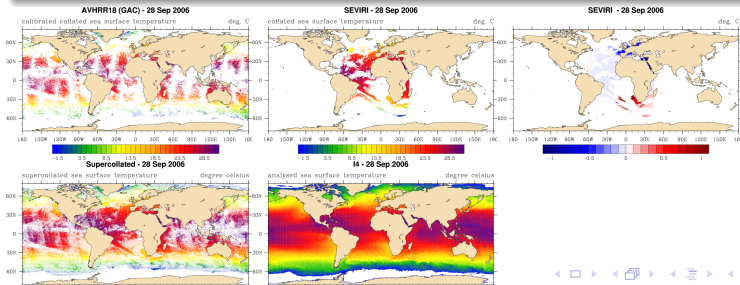
VALIDATION OF MERSEA SST ANALYSIS

- Using the Nausicaa abilities to investigate the analysis artefacts (sampling, sensor bias, contamination,...) by intercomparison of the various intermediate products and available ancillary data :

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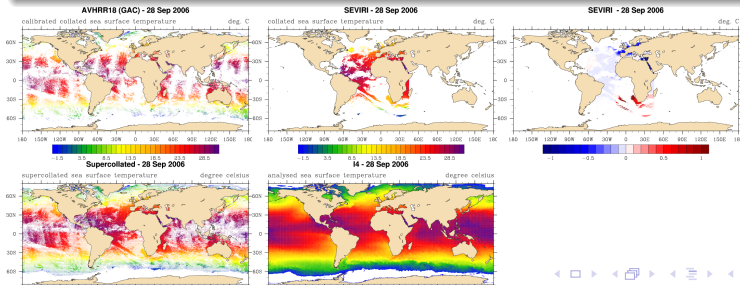
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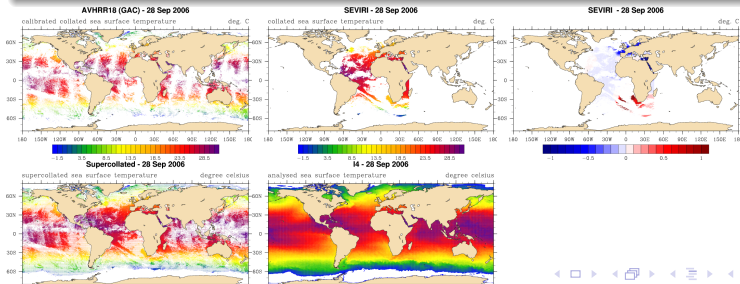
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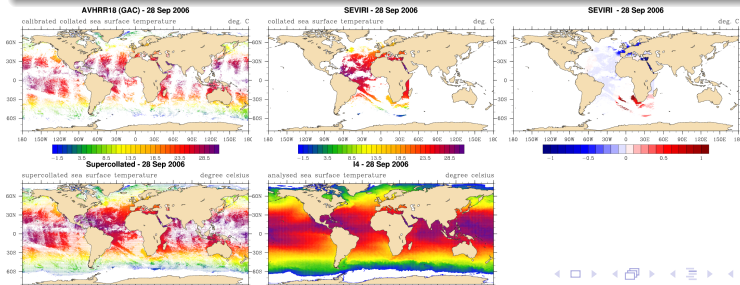
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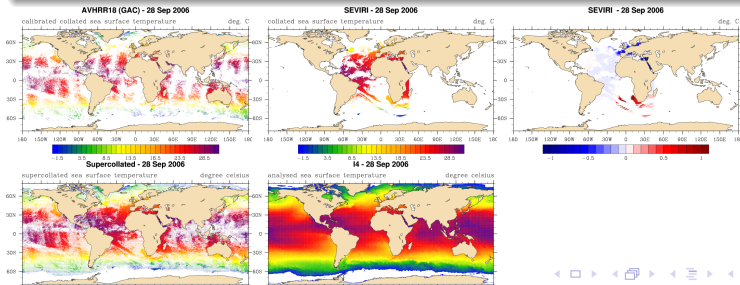
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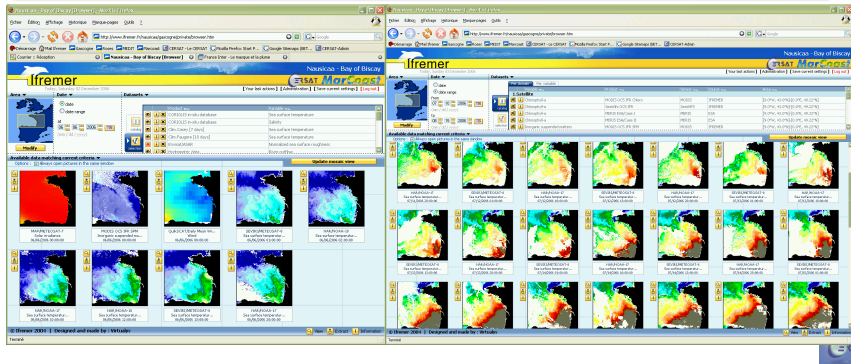
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- focusing on supersites (typical cases)
- including other available analysis (OSTIA, Reynolds)
- can be a combined effort (Nausicaa can remotely access to images)



PLANNED OR POSSIBLE USE CASES

DIURNAL CYCLE STUDY

- displaying all involved parameters "in a glance"
- adding in situ data, (DW or weather) model outputs
- new time series graphs feature will bring a significant improvement



PLANNED OR POSSIBLE USE CASES

NEW REGIONAL AREAS

- Cooperation with Argentina : Rio De La Plata

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PLANNED OR POSSIBLE USE CASES

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- High latitude server (for sea-ice)

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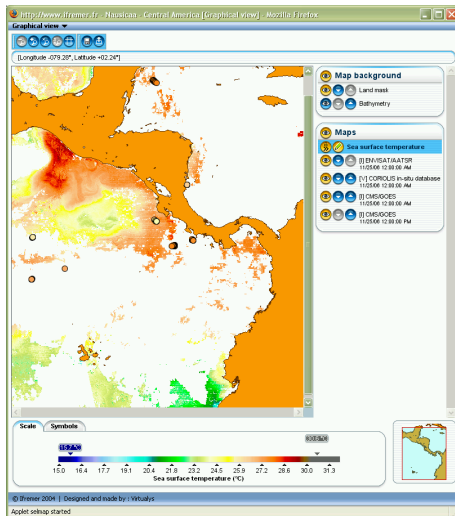
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- Cooperation with Miami : Virgin Islands
- High latitude server (for sea-ice)
- Supersites for SMOS cal/val
- Others? Ex: Central America/Galapagos



<http://www.ifremer.fr/nausicaa/central-ameri>

SUMMARY

- 1 Highly configurable tool : can include any datasets (converted to images or vectorial data) over any area
- 2 It is not only about the tool but also about the selection of served data
- 3 ...and data alone, whatever quality, need attractive and easy tools for accessing wider user communities

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ACCESS

General access page, tutorial, examples :

<http://cersat.ifremer.fr/data/view/nausicaa>

- Bay of Biscay, <http://www.ifremer.fr/nausicaa/gascogne/index.htm>
- Channel/North Sea, <http://www.ifremer.fr/nausicaa/roses/index.htm>
- Gulf of Lion - Corsica, <http://www.ifremer.fr/nausicaa/medit/index.htm>
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