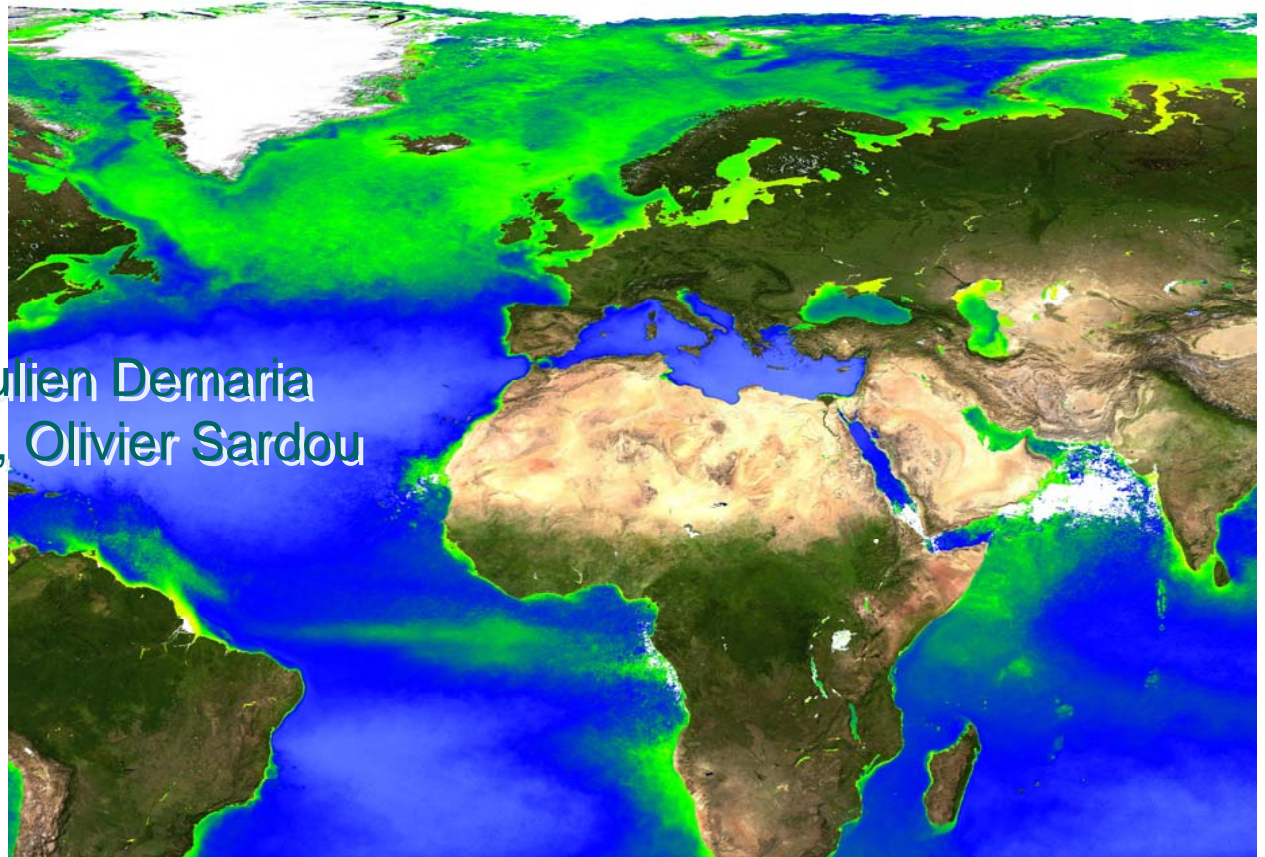


GlobColour Products

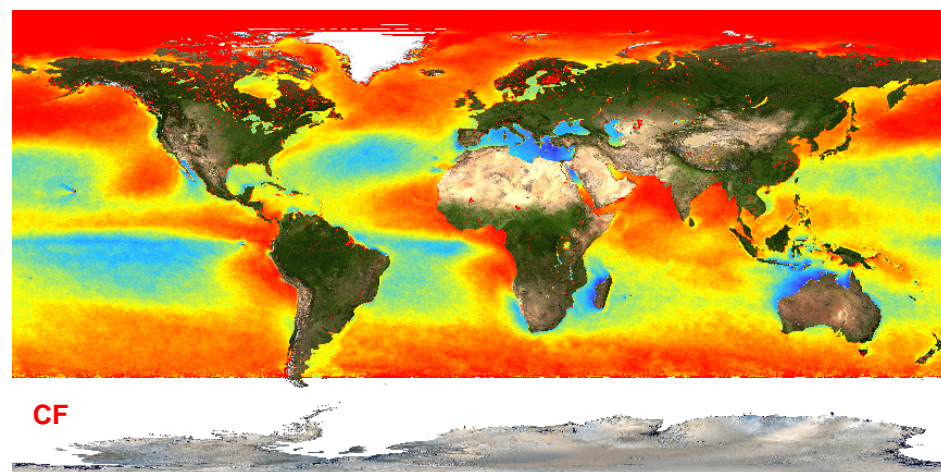
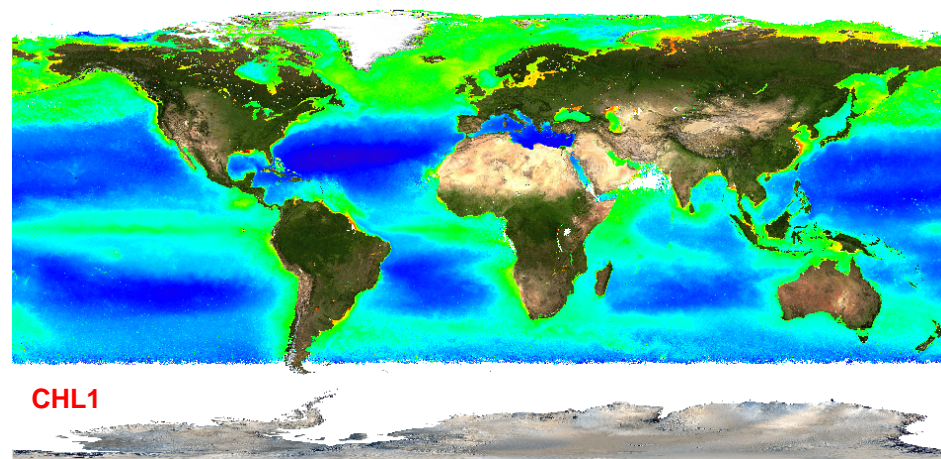
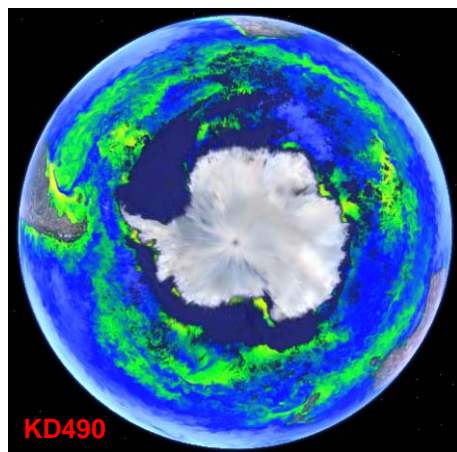
Processing and Data Access

Gilbert Barrot, Julien Demaria
Philippe Garnesson, Olivier Sardou



Outline

- GlobColour products
- Operation status
- Data distribution
- Perspectives



July climatologies

What is GlobColour data today ?

- **Merged data set of 3 ocean-colour sensors**
SeaWiFS (1997->), MERIS (2002->), MODIS (2002->)
- 21 official parameters +4 demonstration parameters
 - Photosynthetic Available Radiation (PAR)
 - Depth of the Heated Layer (ZHL)
 - Secchi Disk Depth (ZSD)
 - Primary Production (PP)
- 4.6 km global maps (fps)
- 1.0 km and 4.6 km local maps (fixed dds and user defined RoI)
- Products contain: average value, flags and error estimates
- More than 893,000 products (4.5 Tb)

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No change since UCM #2

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- Products contain: average value, flags and error estimates
- **More than 893,000 products (4.5 Tb)**

How do we produce them ?

Three processing chains:

Start date: March 2007

- Global archive processing
- Global NRT processing
- Local NRT processing on subscription

Input data: MERIS L2_RR + MODIS L2_LAC + SeaWiFS L2_GAC

Output data: fps (global) - dds (local)

4.6 km ISIN, 0.25°, 1.00° PC (global)

1.0 km PC and 4.6 km ISIN (local)

netCDF + png

84 daily global products per day: 21 parameters x

84 weekly products per week

84 monthly products per month

i.e. 2956 products per month

Controlled configuration

- 4.6 km ISIN grid
- 0.25° PC
- 1.00° PC
- PNG

How do we produce them ?

Three processing chains:

Start date: July 2008

- Global archive processing
- **Global NRT processing**
- Local NRT processing on subscription

Input data: MERIS L2 + MODIS L2

Output data: fps (global)

4.6 km ISIN

0.25°, 1.00° PC

netCDF + png

84 daily products

Controlled configuration

How do we produce them ?

Three processing chains:

Start date: September 2008

- Global archive processing
- Global NRT processing
- **Local NRT processing on subscription**

Input data: MERIS L2_RR + MODIS L2_LAC

Output data: local

1.0 km or 4.6 km

<10° or <40°

ISIN or PC

2 products per request (*netCDF* + *png*)

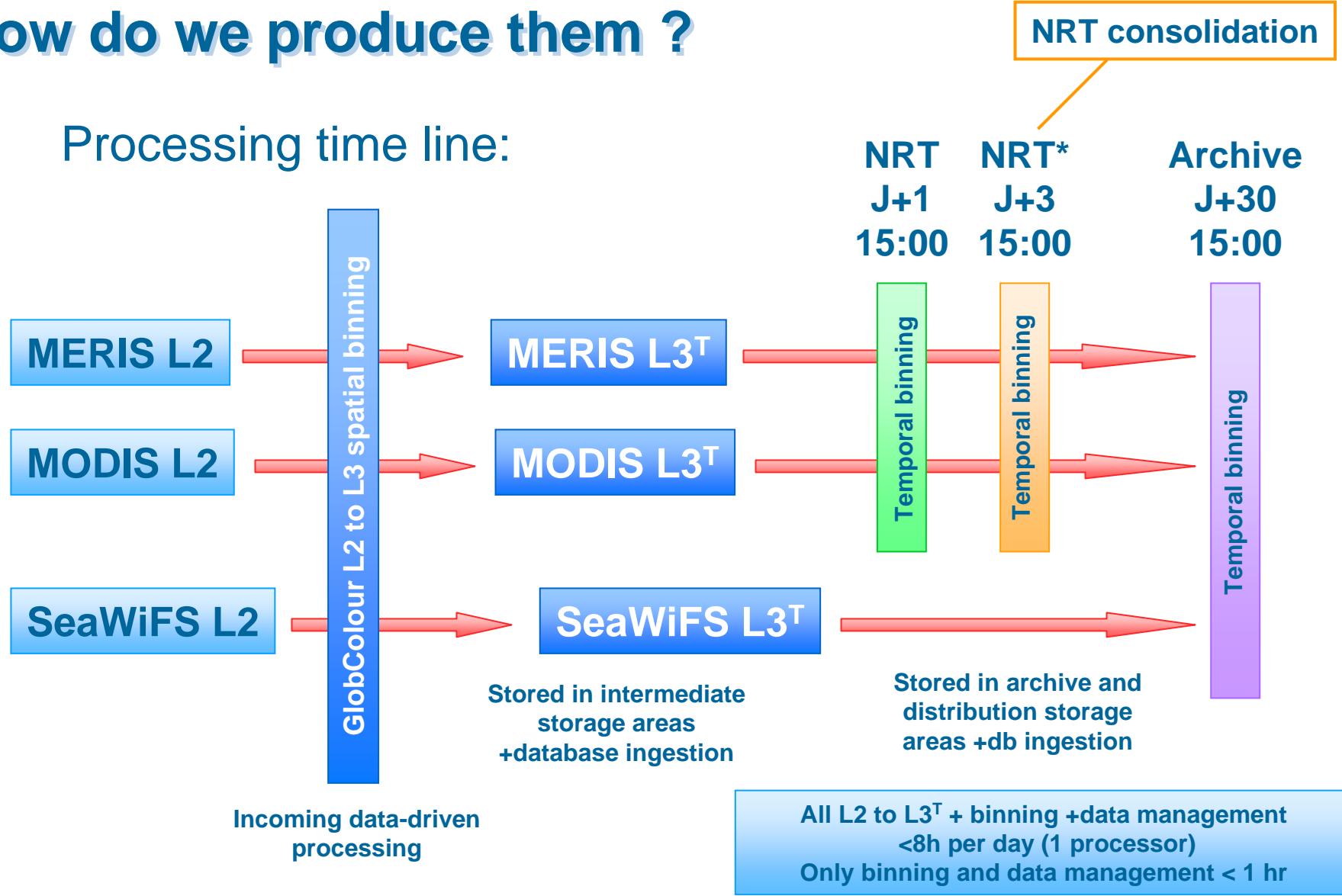
daily, 8-days, monthly products

daily composite

User-defined
configuration

How do we produce them ?

Processing time line:



How do we produce them ?

Processing HW environment:

- “NRT” processing

Two dual-Xeon 2.4 GHz, 2 Gb RAM

(redundancy with time shift)

- Global archive re-processing

Thirteen dual-Xeon 2.4 GHz, 2 Gb RAM

(one computer per month, one spare)

- Local NRT processing on subscription

Two dual-Xeon 2.4 GHz, 2 Gb RAM

(redundancy with load balancing)

MERIS L2 to L3^T <2h per day
MODIS L2 to L3^T < 4h per day
SeaWiFS L2 to L3^T < 20' per day

Temporal binning and data management:
1 h per day

Input data (L2) are kept on
line: 17 Tb

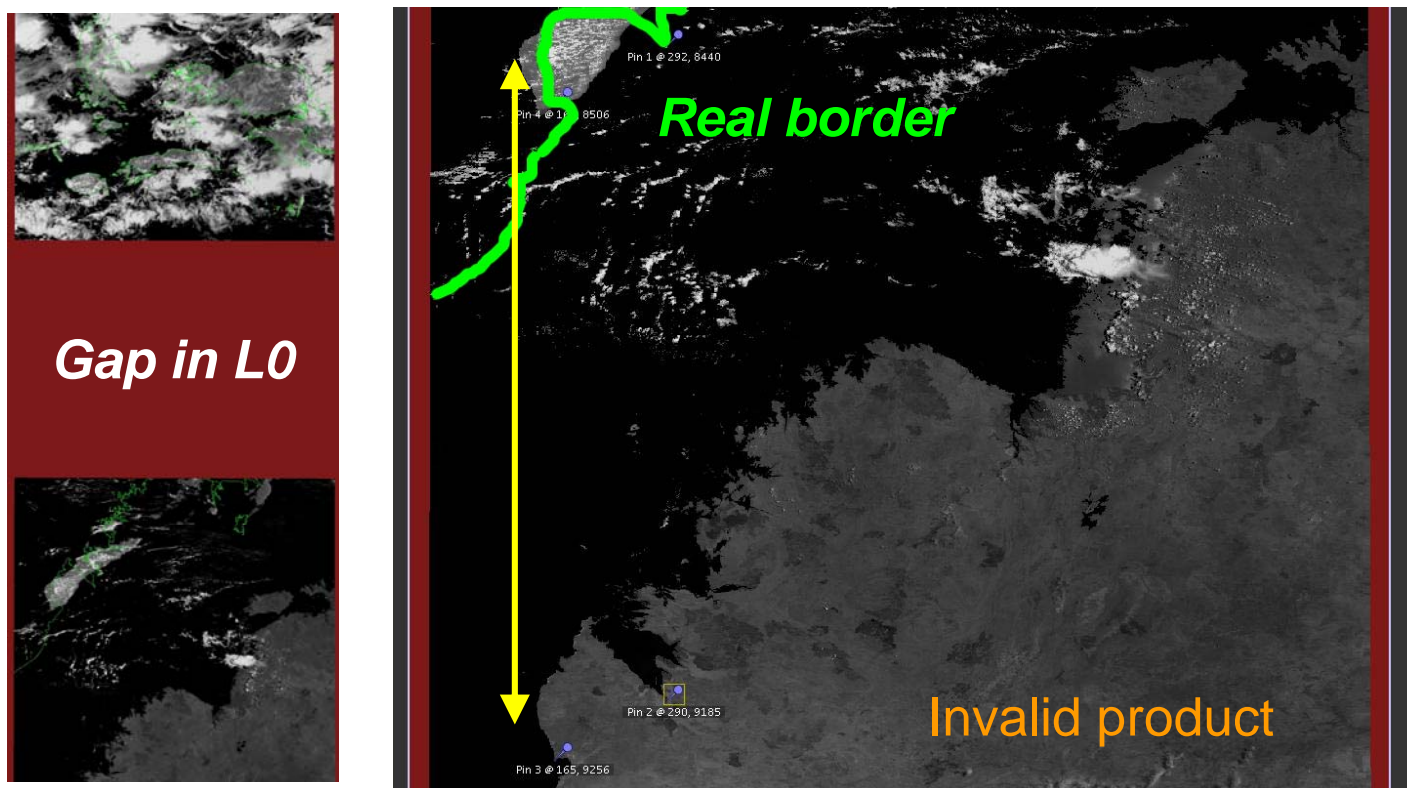
Output data (L3): twelve x 2 Tb disks
+2.8 Tb disk for data dissemination
(ftp, web)

LTO2 drives for archive

How do we check them ?

Product Quality Control:

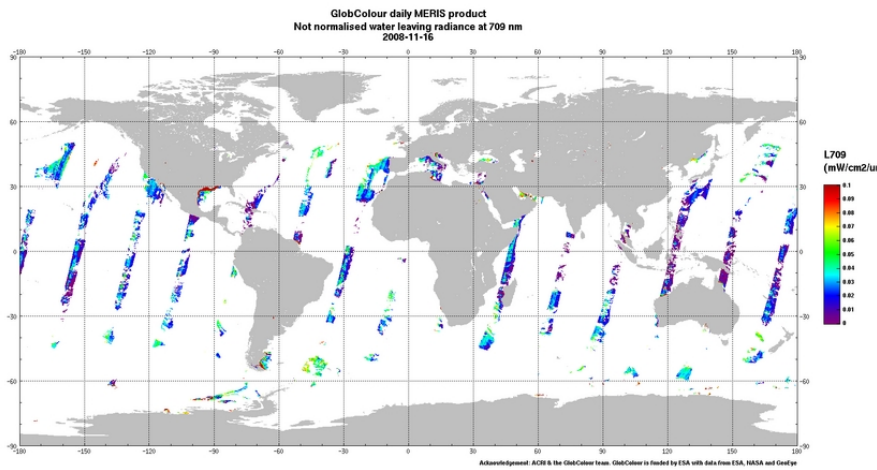
- Automatic filtering of invalid/corrupted input products
(e.g. geolocation problem in MERIS L2 due to large gaps in L0 products)



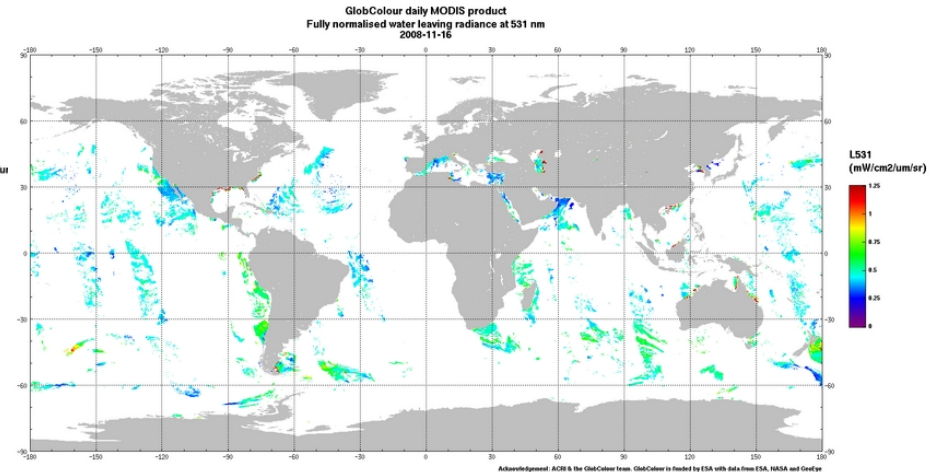
How do we check them ?

Product Quality Control:

- Daily visual verification of MERIS-only and MODIS-only products (verification of the daily coverage, quicklooks send by email)



Daily MERIS-only L709

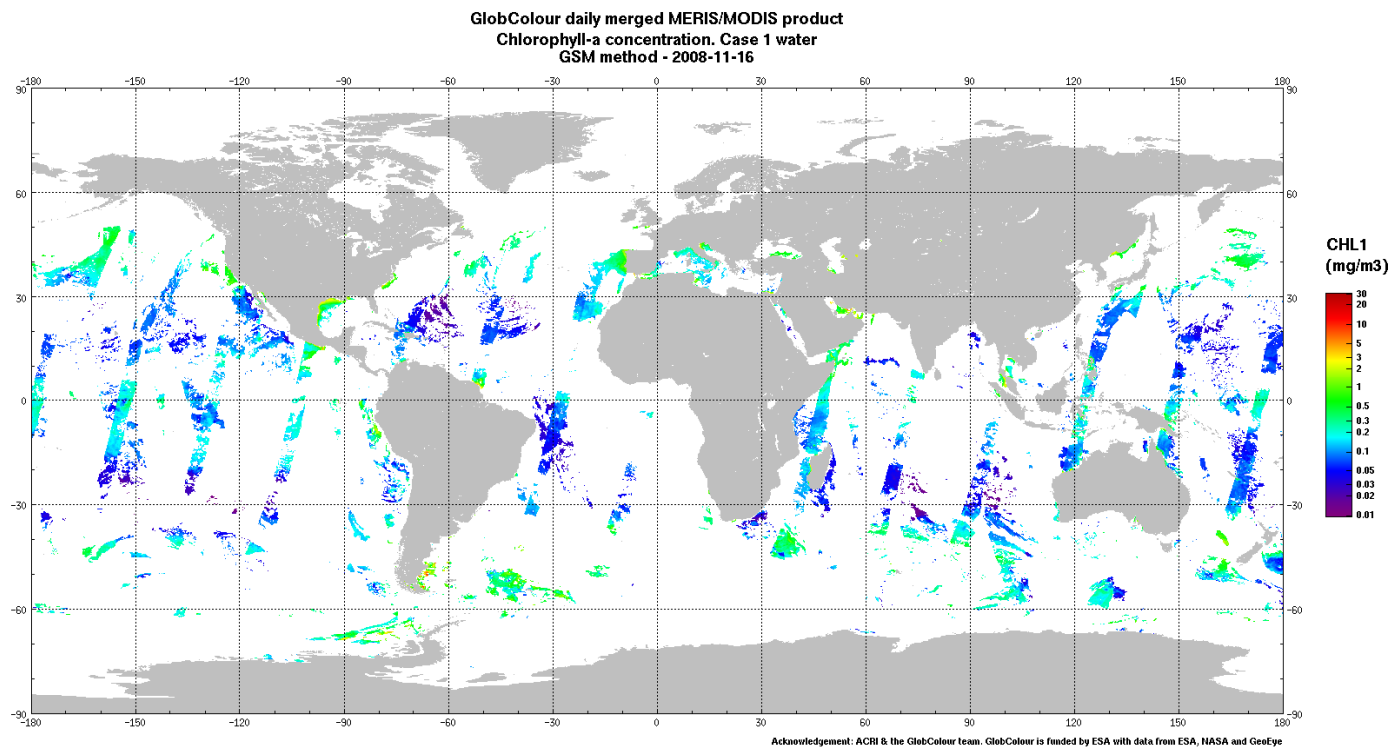


Daily MODIS-only L531

How do we check them ?

Product Quality Control:

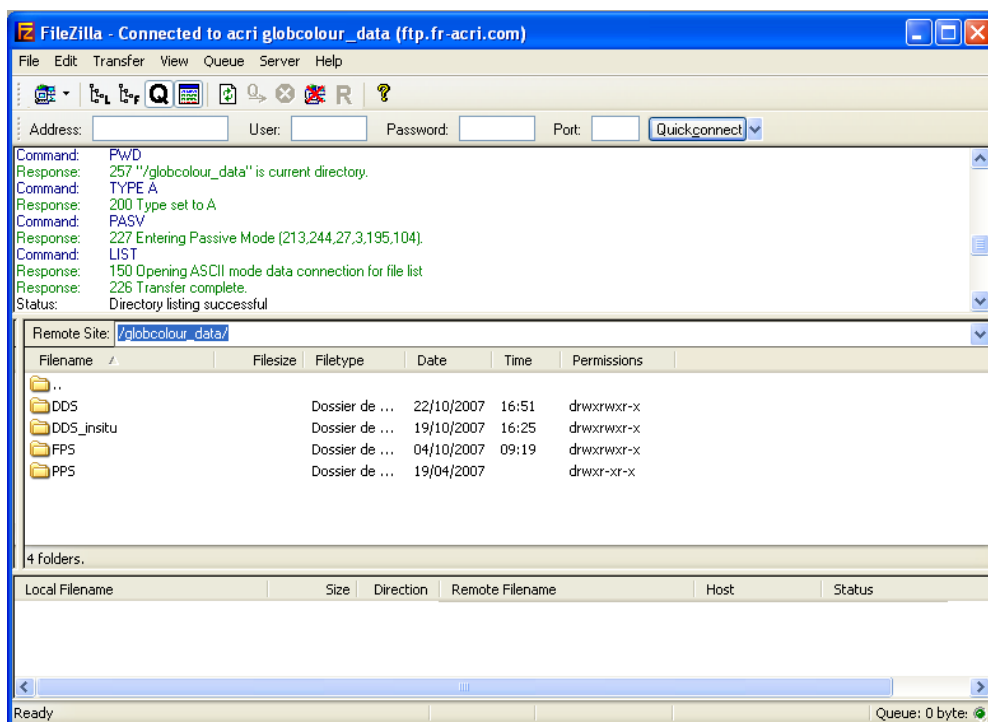
- Daily visual verification of CHL1 merged product
(automatic distribution of daily CHL1 quicklook by email)



How do we distribute them ?

Two distribution tools:

- ftp server
- HERMES data portal



Any ftp client
All products are available
Tree structure
Automatisation (wget)
No spatial extraction
Allows access to NRT products (FPS/NRT directory)

<ftp://ftp.fr-acri.com/>

How do we distribute them ?

Two distribution tools:

- ftp server
- **HERMES data portal**

New since UCM #2

<http://hermes.acri.fr/>

How do we distribute them ?

- Archive
- Near real time
- Subscriptions
- NRT rolling archive
- Demonstration

CHL1 merged product of the day

5 distribution functions...

Hermes

Home page Archive

Third GlobColour User consulta

Archive The GlobCo called Full F whole globe

Near Real Time The GlobCo The NRT se FPS produc

Subscriptions The Subscri local area. F Should you service@glo

NRT rolling archive Near Real T wget theml

Demonstration New demon Secchi Disk

Archive: products selection

HERMES for GlobColour product selection - Mozilla Firefox

HERMES for GlobColour product s...

esa GLOBECOLOUR Hermes Product User Guide ACRI

Home page Archive Near Real Time Demonstration products Subscriptions Rolling archive

Product type
 FPS DDS

Select an area on map or enter coordinates

North
 16°N
 West 44°E 113°E East
 50°S
 Reset

Select product parameters
 Check/Uncheck All

CHL1 L490
 CHL2 L510 L709
 BBP L531 KD490
 CDM L555 EL555
 TSM L620 T865
 L412 L670 CF
 L443 L681

Select a date or period
 From 01/09/1997 to 15/11/2008
 (Use date format: dd/mm/yyyy)

Binning period
 track (DDS only)
 daily
 8-days
 monthly

Resolution
 1 km (DDS only)
 4 km
 25 km
 100 km

Selected products list Check/Uncheck All

- L3b_19970901-19970930_GLOB_4_GSM-SWF_CHL1_MO_00.nc.gz #
- L3b_19971001-19971031_GLOB_4_AV-SWF_CHL1_MO_00.nc.gz #4
- L3b_19971001-19971031_GLOB_4_AV-SWF_T865_MO_00.nc.gz #5
- L3b_19971001-19971031_GLOB_4_GSM-SWF_CHL1_MO_00.nc.gz #
- L3b_19971101-19971130_GLOB_4_AV-SWF_CHL1_MO_00.nc.gz #7
- L3b_19971101-19971130_GLOB_4_AV-SWF_T865_MO_00.nc.gz #8
- L3b_19971101-19971130_GLOB_4_GSM-SWF_CHL1_MO_00.nc.gz #
- L3b_19971201-19971231_GLOB_4_AV-SWF_CHL1_MO_00.nc.gz #10
- L3b_19971201-19971231_GLOB_4_AV-SWF_T865_MO_00.nc.gz #11
- L3b_19971201-19971231_GLOB_4_GSM-SWF_CHL1_MO_00.nc.gz #4

Order Products New search Visualize Download list Upload a list

Interface User Manual
 Contact: service@globcolour.info

All images and data available on this GlobColour site are for research and educational use only
 Data sources : SeaWiFS (NASA), MODIS (NASA), MERIS (ESA)

Any web browser
 Mail+ftp based delivery system
 All products are available (fps+dds)
Spatial extraction is possible (fps)
 Allows huge requests (delivery by blocks)
 Product **visualisation** before download



Home page Archive

Third GlobColour User consulta

- Archive** - The GlobCo called Full F whole globe
- Near Real Time** - The GlobCo The NRT se FPS produc
- Subscriptions** - The Subscri local area. F Should you service@glo
- NRT rolling archive** - Near Real T wget them!
- Demonstration** - New demon Secchi Disk

Archive: product visualisation

HERMES QUICKLOOK

esa GLOBECOLOUR ACRI

L3m_20070901-20070930_GLOB_25_AV-MERMODSWF_CF_MO_00

- > PNG
- > 4 km netcdf file
- > 25 km netcdf file
- > 100 km netcdf file

L3m_20070901-20070930_GLOB_25_AVW-MERMODSWF_CHL1_MO_00

- > PNG
- > 4 km netcdf file
- > 25 km netcdf file
- > 100 km netcdf file

L3m_20070901-20070930_GLOB_25_AVW-MERMODSWF_L412_MO_00

- > PNG
- > 4 km netcdf file
- > 25 km netcdf file
- > 100 km netcdf file

Each product can be individually downloaded from the visualisation window



Home page Archive

Third GlobColour User consulta

Archive The GlobCo called Full F whole globe

Near Real Time The GlobCo The NRT se FPS produc

Subscriptions The Subscri local area. F Should you service@glo

NRT rolling archive Near Real T wget theml

Demonstration New demon Secchi Disk

Archive: products selection

HERMES for GlobColour product selection - Mozilla Firefox

HERMES for GlobColour product s...

esa GLOBECOLOUR Hermes Product User Guide ACRI

Home page Archive Near Real Time Demonstration products Subscriptions Rolling archive

Product type
 FPS DDS

Select an area on map or enter coordinates

North
 16°N
 West 44°E 113°E East
 South
 50°S
 Reset

Select product parameters
 Check/Uncheck All

<input checked="" type="checkbox"/> CHL1	<input type="checkbox"/> L490	<input type="checkbox"/> L709
<input type="checkbox"/> CHL2	<input type="checkbox"/> L510	<input type="checkbox"/> KD490
<input type="checkbox"/> BBP	<input checked="" type="checkbox"/> L531	<input type="checkbox"/> EL555
<input type="checkbox"/> CDM	<input type="checkbox"/> L555	<input type="checkbox"/> T865
<input type="checkbox"/> TSM	<input type="checkbox"/> L620	<input type="checkbox"/> CF
<input type="checkbox"/> L412	<input type="checkbox"/> L670	
<input type="checkbox"/> L443	<input type="checkbox"/> L681	

Select a date or period
 From 01/09/1997 to 15/11/2008
 (Use date format: dd/mm/yyyy)

Binning period
 track (DDS only)
 daily
 8-days
 monthly

Resolution
 1 km (DDS only)
 4 km
 25 km
 100 km

Selected products list Check/Uncheck All

- L3b_19970901-19970930_GLOB_4_GSM-SWF_CHL1_MO_00.nc.gz #
- L3b_19971001-19971031_GLOB_4_AV-SWF_CHL1_MO_00.nc.gz #4
- L3b_19971001-19971031_GLOB_4_AV-SWF_T865_MO_00.nc.gz #5
- L3b_19971001-19971031_GLOB_4_GSM-SWF_CHL1_MO_00.nc.gz #
- L3b_19971101-19971130_GLOB_4_AV-SWF_CHL1_MO_00.nc.gz #7
- L3b_19971101-19971130_GLOB_4_AV-SWF_T865_MO_00.nc.gz #8
- L3b_19971101-19971130_GLOB_4_GSM-SWF_CHL1_MO_00.nc.gz #
- L3b_19971201-19971231_GLOB_4_AV-SWF_CHL1_MO_00.nc.gz #10
- L3b_19971201-19971231_GLOB_4_AV-SWF_T865_MO_00.nc.gz #11

Order Products New search Visualize **Download list** Upload a list

Interface User Manual Contact: service@globcolour.info

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 Data sources : SeaWiFS (NASA), MODIS (NASA), MERIS (ESA)

List mode orders:

- users can download the list
- users can edit/create the list
- users can send back the list to the server

Useful for sparsed temporal requests



Home page Archive

Third GlobColour User consultation

- Archive
- Near Real Time**
- Subscriptions
- NRT rolling archive
- Demonstration

NRT: products selection

Same interface as for the Archive browser
Daily products by default
Last available day by default

Hermes

Home page Archive

Third GlobColour User consultation

Archive The GlobColour called Full Frame of the whole globe

Near Real Time The GlobColour The NRT service FPS products

Subscriptions The Subscription local area. For Should you service@globcolour.org

NRT rolling archive Near Real Time get them!

Demonstration New demonstration Secchi Disk

Subscriptions

HERMES for GlobColour queries - Mozilla Firefox

HERMES for GlobColour queries

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Home page Archive Near Real Time Demonstration products Subscriptions Rolling archive

MERIS - MODIS

Select an area on map or enter coordinates

North
6°S
West 61°E 78°E East
18°S
South
Reset

Resolution (max. size area)
 1 km (~10x10 deg)
 4 km (~40x40 deg)

End of delivery
 30/11/2008
 period max: 55 days
 format: dd/mm/yyyy

Sensor
 MERIS
 MODIS
 MERIS+MODIS

Format
 netCDF-map
 netCDF-sin

Frequency
 daily composite 4days
 monthly
 Bdays
 daily
 custom

Weighted averaging method
 CHL1
 L412
 L443
 L490
 L555
 L670
 KD490
 EL565
 T865
 CF

GSM method
 CHL1-GSM
 CDM-GSM
 BBP-GSM

Submit query Consult query

For any other specific request, contact: service@globcolour.info

All images and data available on this GlobColour site are for research and educational use only
 Data sources : MODIS (NASA), MERIS (ESA)

- NRT merged MERIS+MODIS products
- MERIS-only & MODIS-only (only GSM) products
- User-defined** local products (<10° or <40°)
- 1.0 km or 4.6 km - ISIN or PC grid
- Daily or **composite** products
- Mail+ftp based delivery
- Allows user request **updates**

Hermes

Home page Archive

Third GlobColour User consultation

Archive The GlobColour called Full Frame of the whole globe

Near Real Time The GlobColour NRT service FPS products

Subscriptions The Subscription local area. For more information, please contact service@globcolour.org

NRT rolling archive Near Real Time rolling archive. Get them!

Demonstration New demonstration products. Secchi Disk

Subscriptions: custom parameters

HERMES for GlobColour queries - Mozilla Firefox

HERMES for GlobColour queries

esa GLOBECOLOUR Hermes Product User Guide ACRI

Home page Archive Near Real Time Demonstration products Subscriptions Rolling archive

MERIS - MODIS

Select an area on map or enter coordinates

North
6°S
West 61°E 78°E East
18°S
South
Reset

Resolution (max. size area)
 1 km (~10x10 deg)
 4 km (~40x40 deg)

End of delivery
 30/11/2008
 period max: 55 days
 format: dd/mm/yyyy

Sensor
 MERIS
 MODIS
 MERIS+MODIS

Format
 netCDF-map
 netCDF-sin

Frequency
 daily composite 4days
 monthly
 2days
 daily
 custom

Weighted averaging method
 CHL1
 L412
 L443
 L490
 L555
 L670
 KD490
 EL565
 T865
 CF

GSM method
 CHL-GSM
 MOD-GSM
 PRR-GSM

Options for custom process
 Deliveries on: Average on N days
 monday
 tuesday
 wednesday
 thursday
 friday
 saturday
 sunday
 1
2
3
4
5
6

Submit query Consult query

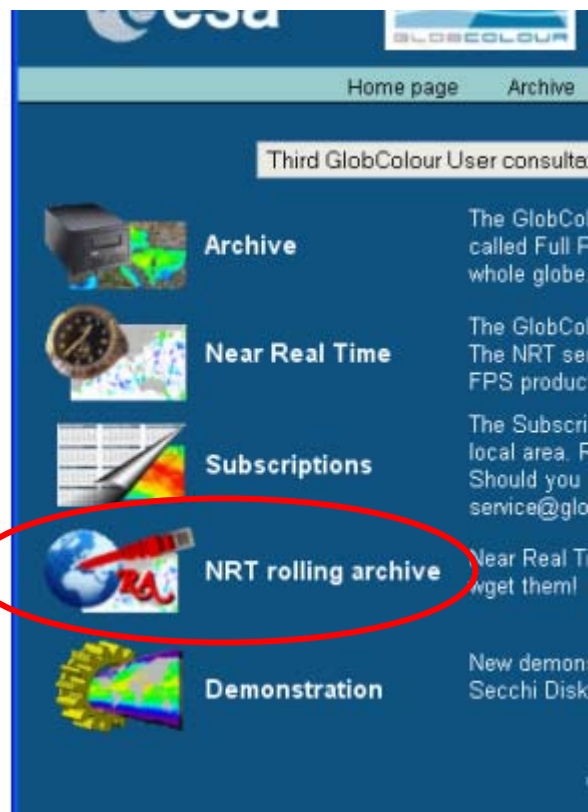
For any other specific request, contact: service@globcolour.info

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 Data sources : MODIS (NASA), MERIS (ESA)

Custom frequency:

- day delivery
- running average duration

User request
on NRT subscription



NRT rolling archive

Index of ftp://globcolour_data@ftp.fr-acri.com/FPS/NRT/

[Up to higher level directory](#)

Name	Size	Last Modified
2008_11_02		04/11/2008 10:52:00
2008_11_03		04/11/2008 14:31:00
2008_11_04		05/11/2008 14:19:00
2008_11_05		06/11/2008 14:37:00
2008_11_06		07/11/2008 14:35:00
2008_11_07		08/11/2008 14:21:00
2008_11_08		09/11/2008 14:26:00
2008_11_09		10/11/2008 14:28:00
2008_11_10		11/11/2008 14:44:00
2008_11_11		12/11/2008 15:26:00
2008_11_12		13/11/2008 15:50:00
2008_11_13		14/11/2008 17:16:00
2008_11_14		15/11/2008 18:04:00
2008_11_15		16/11/2008 17:01:00
2008_11_16		17/11/2008 19:50:00

*Link to an ftp server
One directory per day (84 products)
Last 15 days available*

Hermes

Home page Archive

Third GlobColour User consultation

Archive The GlobColour called Full Field of view whole globe

Near Real Time The GlobColour The NRT service FPS products

Subscriptions The Subscription local area. For Should you service@globcolour.info

NRT rolling archive Near Real Time wet them!

Demonstration New demonstration Secchi Disk

Demonstration products

HERMES for GlobColour product selection - Mozilla Firefox

Home page Archive Near Real Time Demonstration products Subscriptions Rolling archive

Demonstration products

Select an area on map or enter coordinates

North
90°N
West 180°W 180°E East
90°S
Reset

Resolution
 4 km
 9 km
 25 km
 100 km

Select product parameters
 PAR
 ZHL
 ZSD
 Primary productivity (soon available)

Select a date or period
From 01/01/2003 to 31/12/2003
(Use date format: dd/mm/yyyy)

Binning period
 daily
 8-days
 monthly

Search Upload a list

Interface User Manual
Contact: service@globcolour.info

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Data sources : SeaWiFS (NASA), MODIS (NASA), MERIS (ESA)

Background and acknowledgement
The GlobColour project has been initiated and funded by the ESA Data User Element Programme to develop a satellite based ocean colour data service to support global carbon-cycle research. The GlobColour products have undergone an extensive validation based on a validation protocol derived from the SIMBROS protocol. The GlobColour products have been derived with the GSM model and algorithm, developed by ICES (Martorena S. and D.A. Siegel, 2005). The GlobColour project has largely benefited from NASA contributions, including the availability of the MODIS and SeaWiFS products, the *in situ* data base of radiometric and phytoplankton pigment data, and other oceanographic and atmospheric data, the SeaWiFS Bio-optical Archive and Storage System - SeaBASS (Verdell and Bailey, 2002).

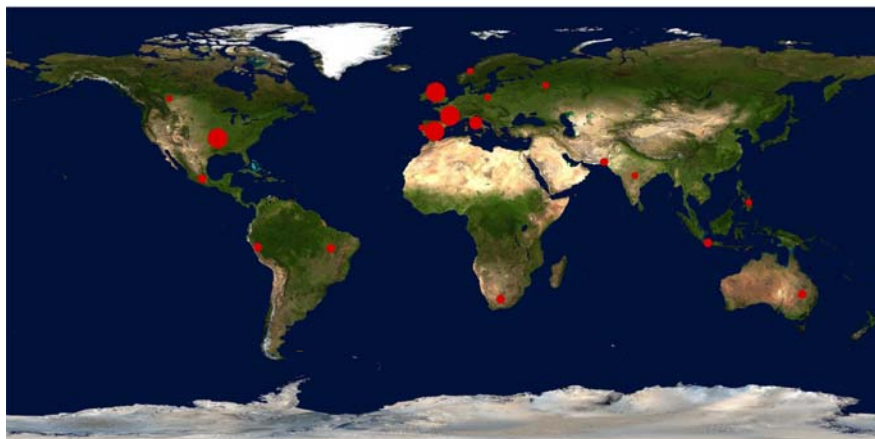
Same interface as for the Archive browser
Only year 2003 is available

Who are our users ?

Users:

- HERMES users are well identified (known by email address)
- ftp server users are known by their IP (ftp server retrieved logs)

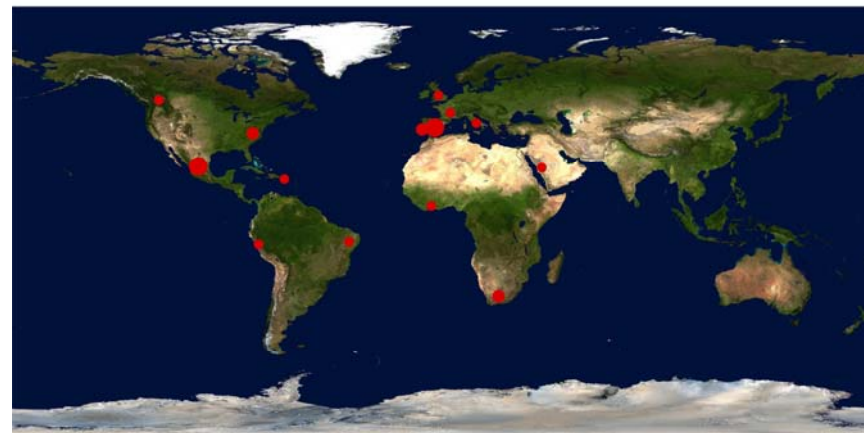
Hermes Archive - Nbr of users / country



Archive



Hermes NRT Subscription - Nbr of users / country



NRT subscriptions

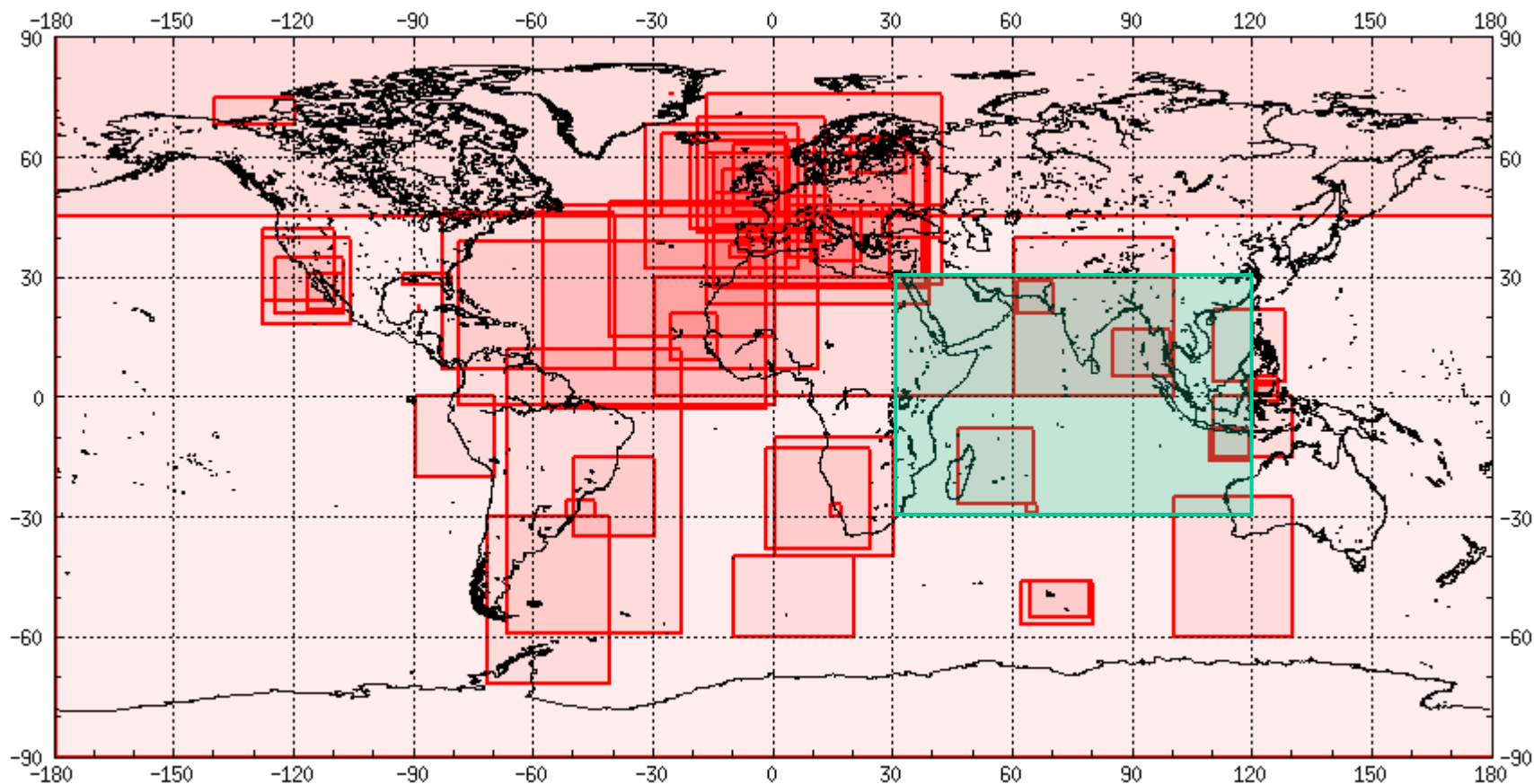


Maps of identified users

Who are our users ?

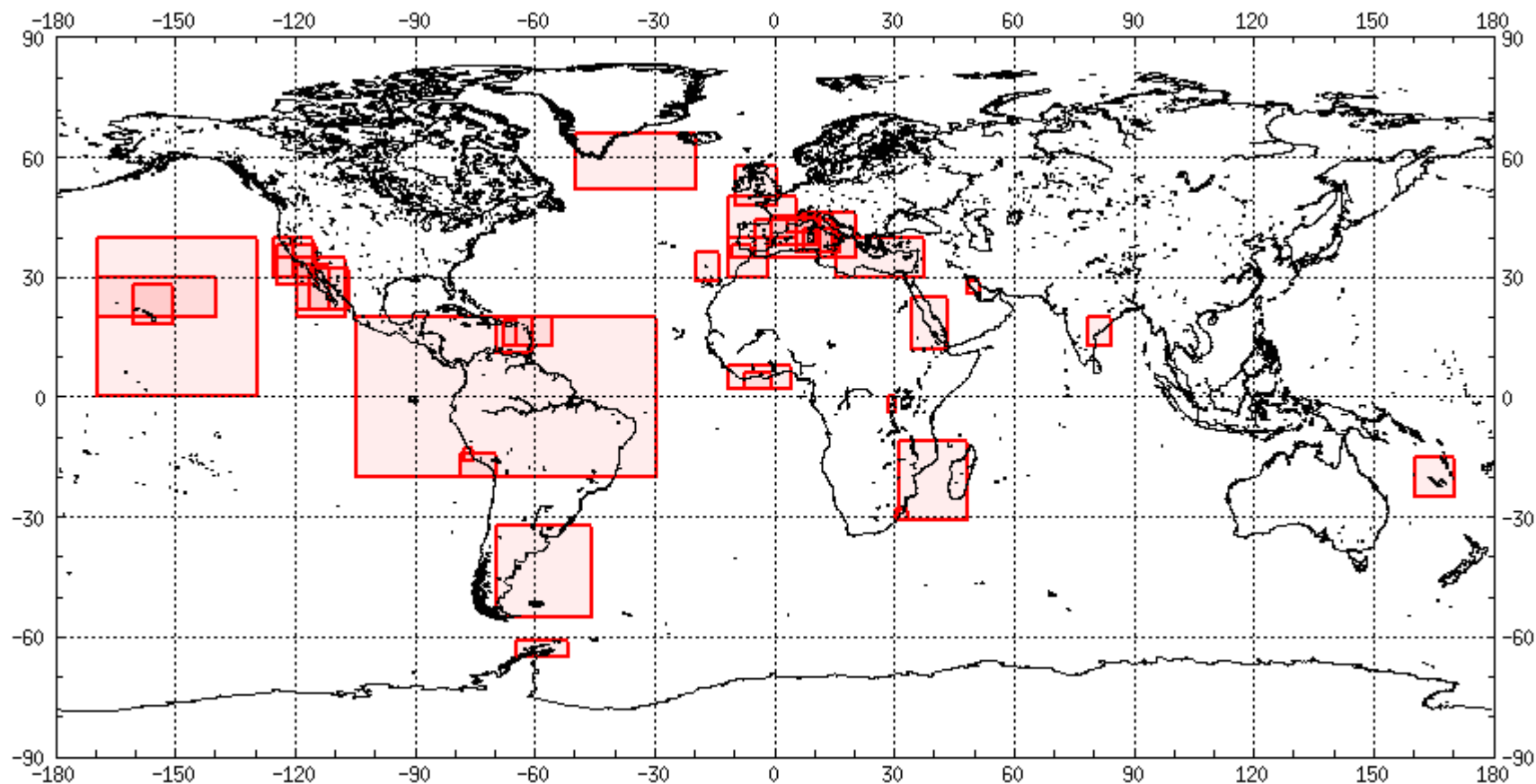
Users areas of interest: archive

Monthly climatologies
(manual process)



Who are our users ?

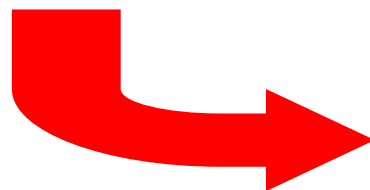
Users areas of interest: NRT subscriptions



Who are our users ?

Users feedbacks

- Get any product on Plate-Carré grid
- Get products in HDF format
- Get MERIS-only products
- Visualisation of RoI only
- Map zoom in-out
- Climatologies



Improvements

- On-the-fly resampling on PC
- MERIS-only products
- Full resolution PNG

All these improvements are currently in test mode

How much data ?

Data distribution: statistics

Number of users = 256
Number of products > 100,000
Total size > 1 Tb

GlobColour ftp server:

Number of different users: 164
Total number of products: 64763
Total size of distributed products: 321 Gb

Since 03/2007

HERMES archive server:

Number of different users: 66
Total number of products: 34000
Total size of distributed products: 710 Gb

Since 03/2007

NRT subscriptions:

Number of different users: 26
Total number of products: 1673
Total size of distributed products: ? Gb

Since 03/2007

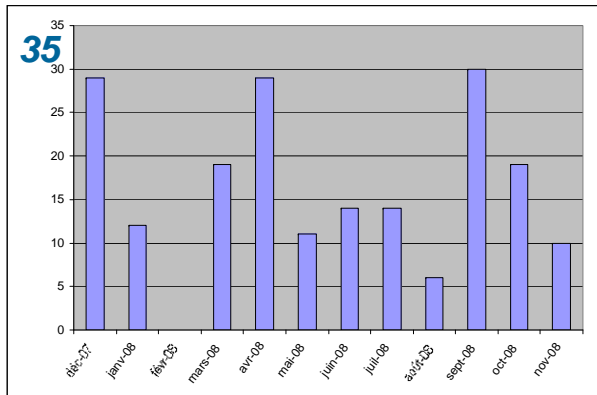
How much data ?

Data distribution: statistics

GlobColour ftp server:

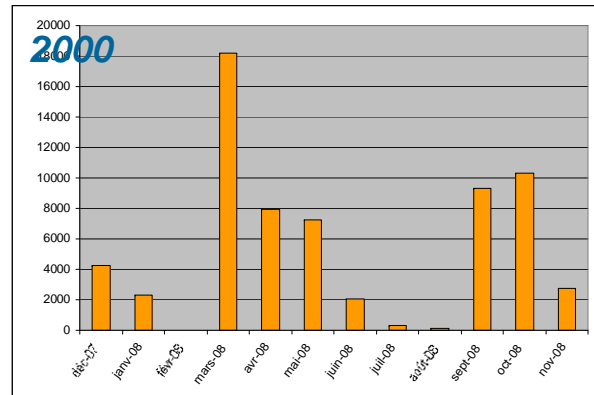
Number of different users: 164
 Total number of products: 64763
 Total size of distributed products: 321 Gb

Month	Nb users	Nb products	Size (Gb)
12/07	29	4236	60
01/08	12	2326	5
02/08	--	----	---
03/08	19	18158	111
04/08	29	7940	11
05/08	11	7249	16
06/08	14	2045	14
07/08	14	300	2
08/08	6	155	4
09/08	30	9312	53
10/08	19	10283	17
11/08	10	2759	28



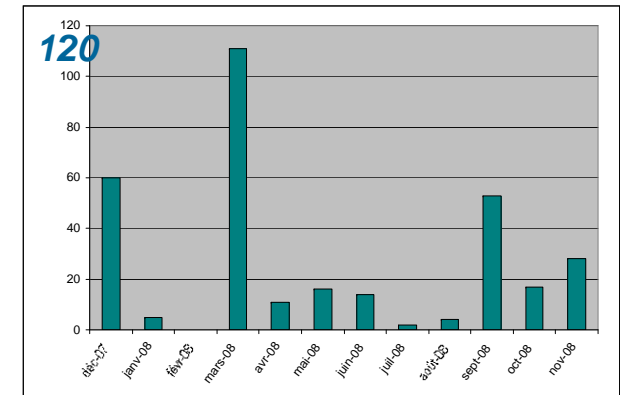
Number of users

15/month



Number of products

200/day



Total size (Gb)

1 Gb/day

What about the future ?

- **Continue the NRT and archive production**
- **Demonstration products -> operational products**
- **Perform a full reprocessing in 2009**
 - Upgraded L2 input products: SeaWiFS, MODIS, MERIS
 - Upgraded GSM : use the 6xx nm bands as additional inputs
- **Set-up of an automatic NRT inter-calibration between sensors**
 - Monitoring of the residuals
- **Set-up of an automatic NRT validation versus in-situ data**
 - Oceanographic Autonomous Observations (LOV)



Acknowledgement



➤ The team is grateful to ESA, and in particular to the Data User Element Programme, to have initiated and funded the GlobColour project.

➤ GlobColour has largely benefited from NASA contributions, including the availability of the MODIS and SeaWiFS products; as well as the *in situ* data base of radiometric and phytoplankton pigment data, and other oceanographic and atmospheric data: SeaBASS (Werdell and Bailey, 2002).



www.globcolour.info

hermes.acri.fr

Thank you !



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Image NASA

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Pointer lat 45.980947° lon -1.549784°

Streaming 100%

Eve alt 4992.74 km