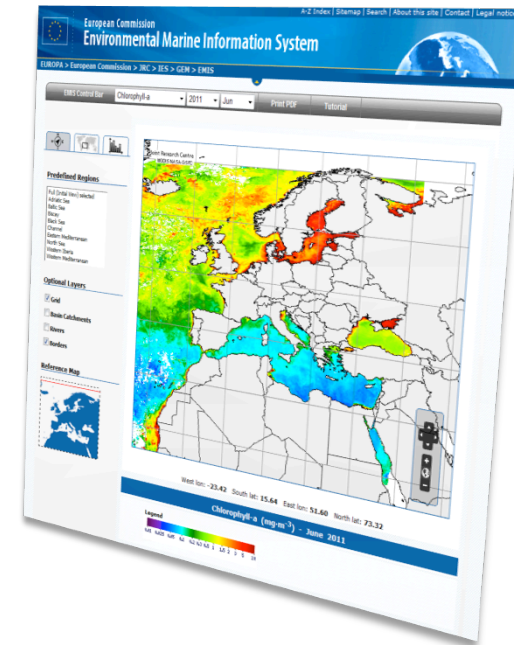


# Marine and Coastal Information Systems for Europe and Africa

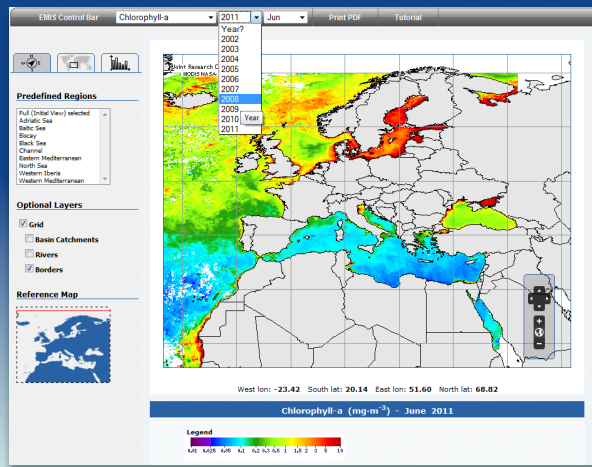
*Coordinator: Nicolas Hoepffner*  
*Webmaster: Pascal Derycke*

*European Commission*  
*Joint Research Centre*  
*Institute for Environment & Sustainability*  
*Ispira, Italy*

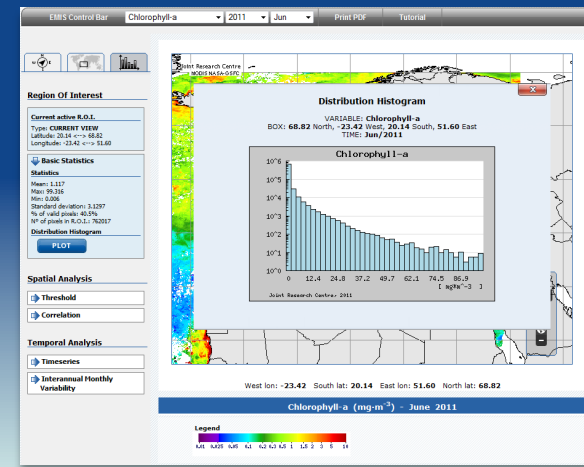


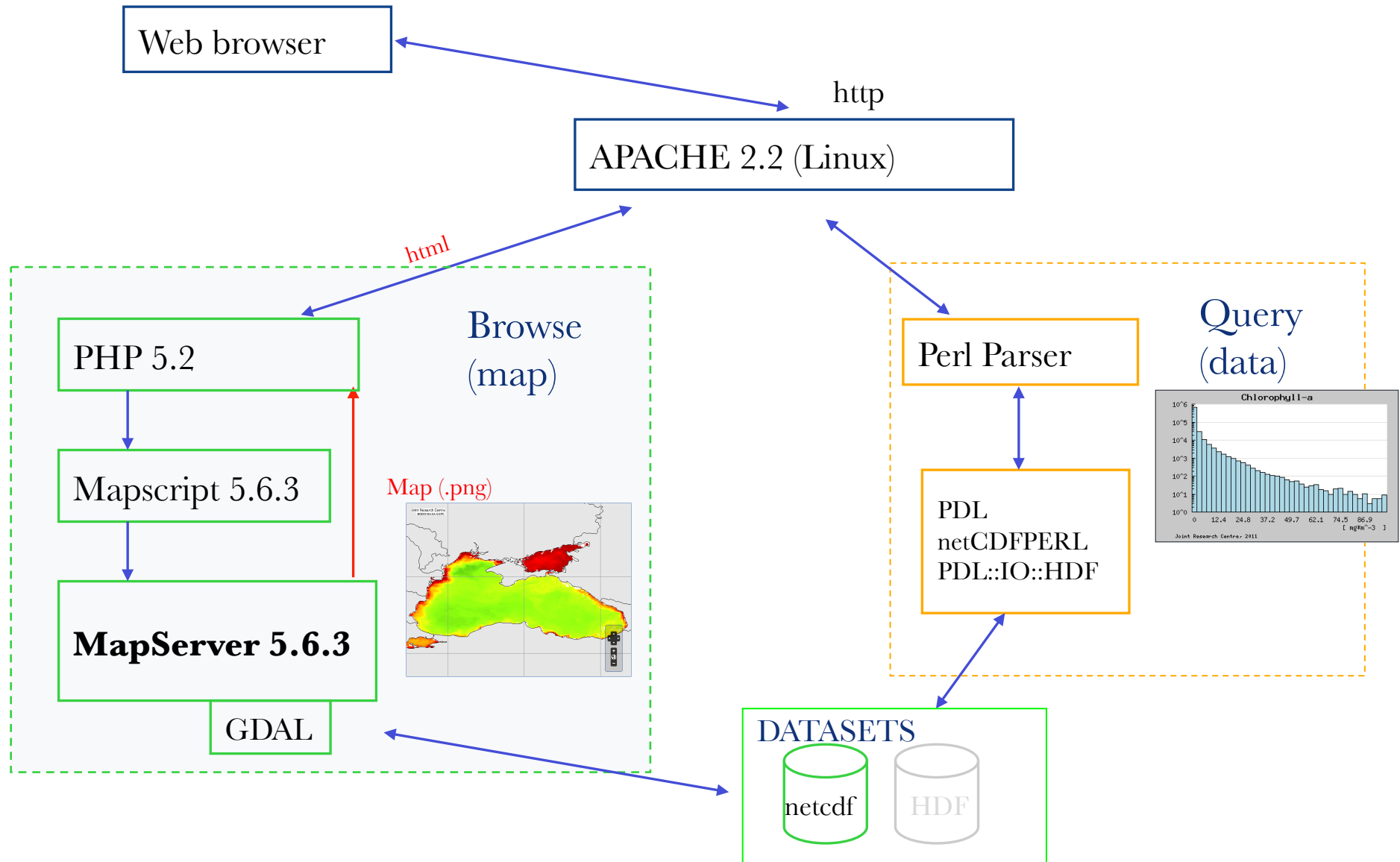
Open source web-based applications that allows the provision of scientific information, by way of geo-referenced maps (created in real-time), and supplies the users with:

## a web browser/navigation mode to create maps



## a query mode for basic analysis on the datasets





EMIS Control Bar
Chlorophyll-a
2011
Jun
Print PDF
Tutorial

**Predefined Regions**

- Full (Initial View) selected
- Adriatic Sea
- Baltic Sea
- Biscay
- Black Sea**
- Channel
- Eastern Mediterranean
- North Sea
- Western Iberia
- Western Mediterranean

**Optional Layers**


Grid

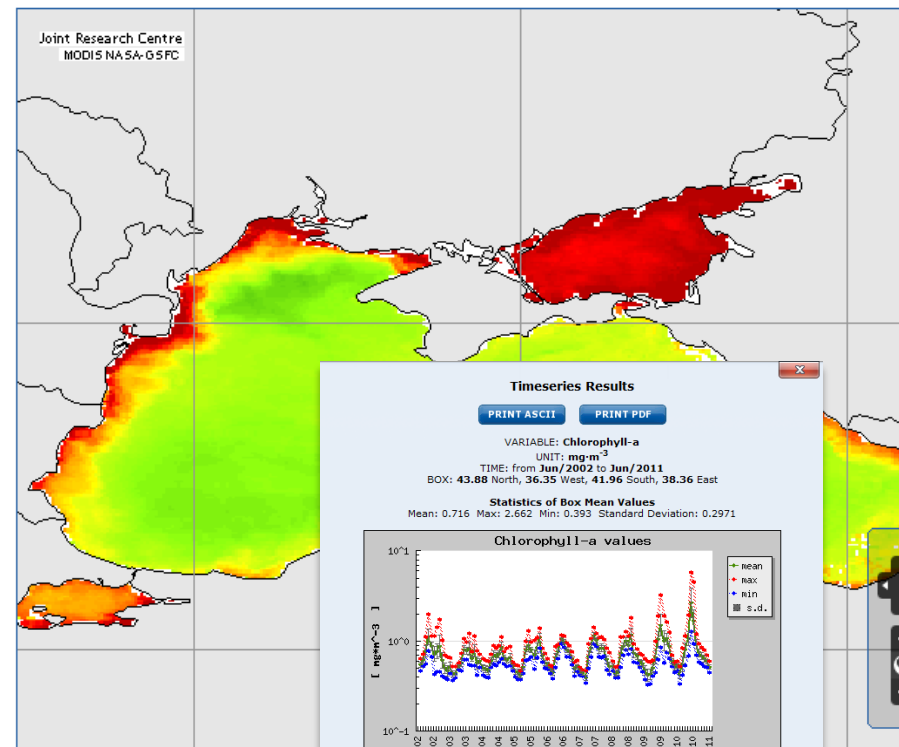
Basin Catchments

Rivers

Borders

**Reference Map**





Joint Research Centre  
MODIS NASA-GSFC

West lon: 27.3

**Cursor Position**

Latitude: - °  
Longitude: - °

**Region Of Interest**

Point

Box

Box Coordinates

North Lat: 43.88 °  
West Lon: 36.35 ° East Lon: 38.36 °  
South Lat: 41.96 °

**DRAW BOX**

**Box Statistics**

Mean: 0.524  
Max: 0.710  
Min: 0.453  
Standard deviation: 0.0399  
% of valid pixels: 100 %  
N° of valid pixels: 2322

Dynamic Mask

Current View

**Region Of Interest**

Current active R.O.I.

Type: BOX  
Latitude: 41.96 <-> 43.88  
Longitude: 36.35 <-> 38.36

Basic Statistics

**Spatial Analysis**

Threshold

Correlation

**Temporal Analysis**

Timeseries

Start  
Month / Year  
Jun / 2002

End  
Month / Year  
Jun / 2011

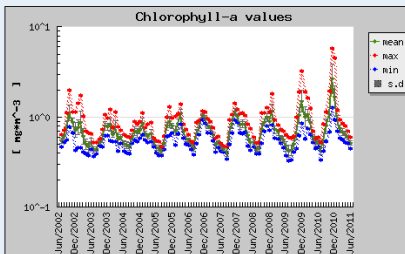
**CALCULATE**

Interannual Monthly Variability

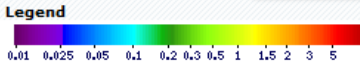
**Timeseries Results**

VARIABLE: Chlorophyll-a  
UNIT: mg·m<sup>-3</sup>  
TIME: from Jun/2002 to Jun/2011  
BOX: 43.88 North, 36.35 West, 41.96 South, 38.36 East

**Statistics of Box Mean Values**  
Mean: 0.716 Max: 2.662 Min: 0.393 Standard Deviation: 0.2971

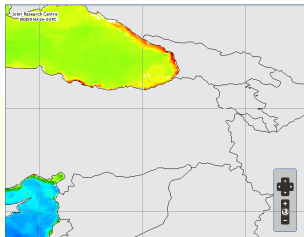


**Legend**

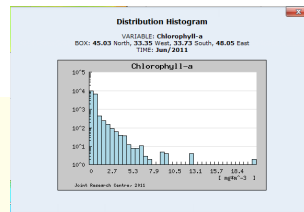


Copyright © European Union, 2006-2011

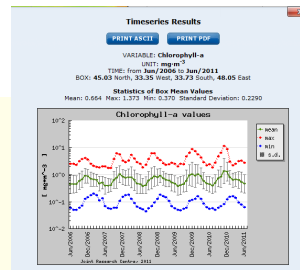
## Maps navigation



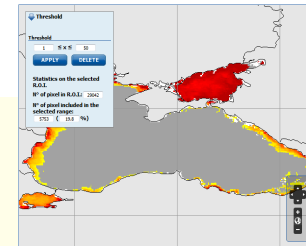
## Basic statistics



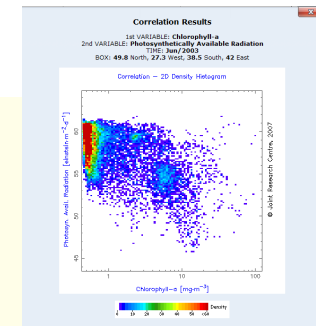
## Time-series



## Threshold analysis

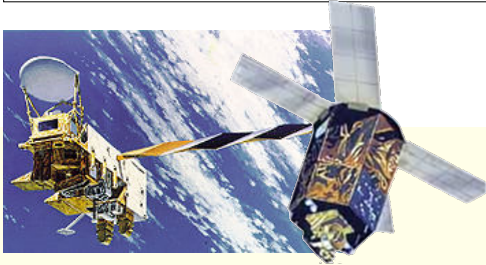


## Multivariate analysis



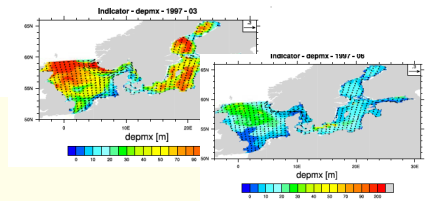
The bulk of environmental analysis in EMIS/AMIS relies on models data outputs and satellite-derived products, from optical and infrared satellite sensors

## Satellite derived products



Monthly devired products from SeaWIFS, MODIS-A, AVHRR Pathfinder  
(Surface chlorophyll, Diffuse attenuation coefficient, Depth integrated primary production, Sea surface, temperature, ...)

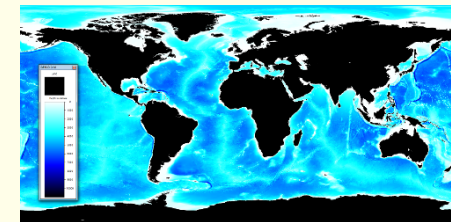
## Numerical models data



Modeled Data from hydrodynamic simulations (European seas)

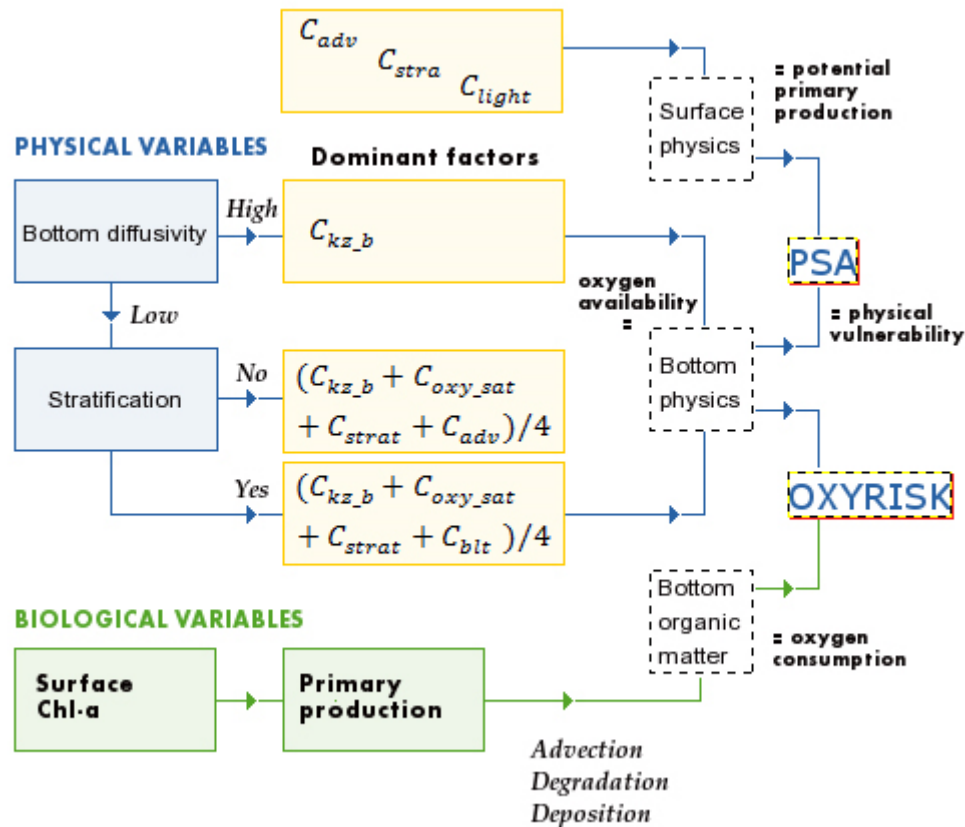
- Physical variables generated by 3D models (mixed layer depth, mixed layer temperature and salinity, ...)
- Ecological, water quality indicators

## Other marine variables from atlases and databases



Other variables and layers (Bathymetry (GEBCO Digital Atlas), catchment basins, rivers, ...)

Conceptual model for  
Eutrophication Risk Assessment (Druon & Al. 2004)

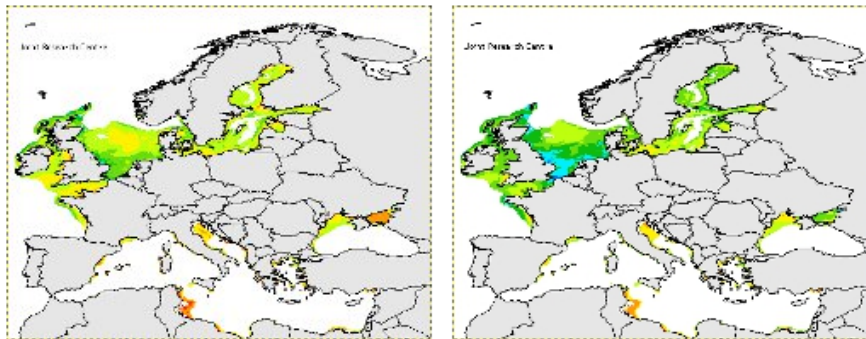


Combining Satellite data (and/or in situ data) with modeling to derive **Ecological and Water Quality Indicators** applicable to all European Seas (large scale) and comparable for different region

- **Physical Sensitive Area Index (PSA)**
- **Oxygen Depletion Risk Index (Oxyrisk)**

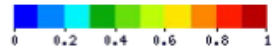
## PSA

The '**Physically Sensitive Area Index**' ('**PSA**') integrates the various supporting factors of eutrophication to locate sensitive areas to oxygen deficiencies assuming primary production and nutrients are evenly distributed.



(Climatology) July

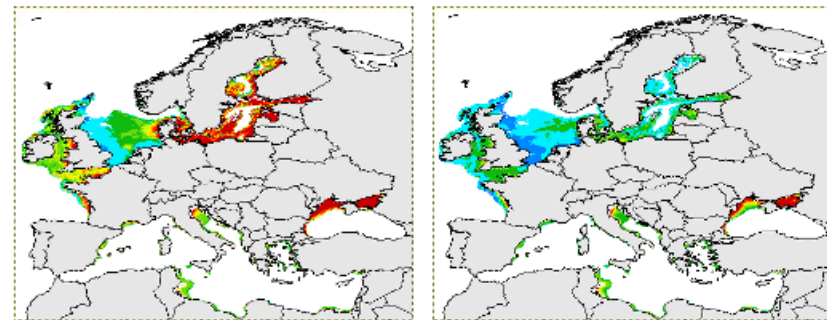
(Climatology) October



*Monthly maps of the modeled Physical Sensitive Area (PSA) index for European seas (< 100m water depth) from 10-years climatology (1998-2008). The index, ranging from 0 to 1, reflects the vulnerability of the coastal waters to eutrophication based on the dominant physical processes. Additional data layer on land illustrates the catchment basins.*

## OXYRISK

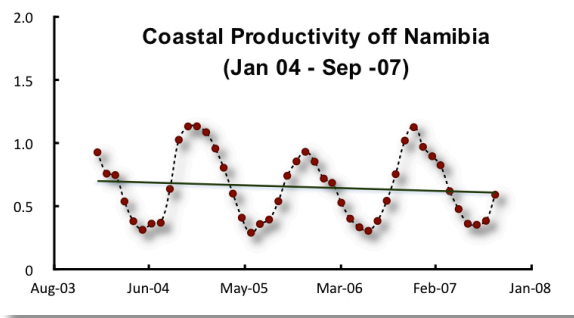
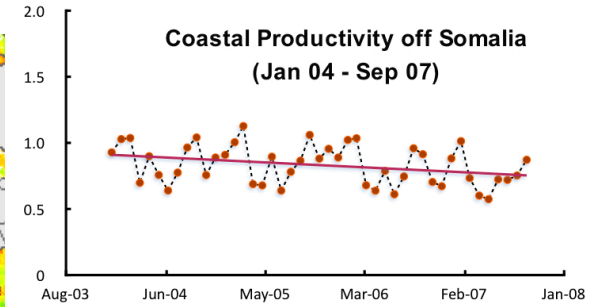
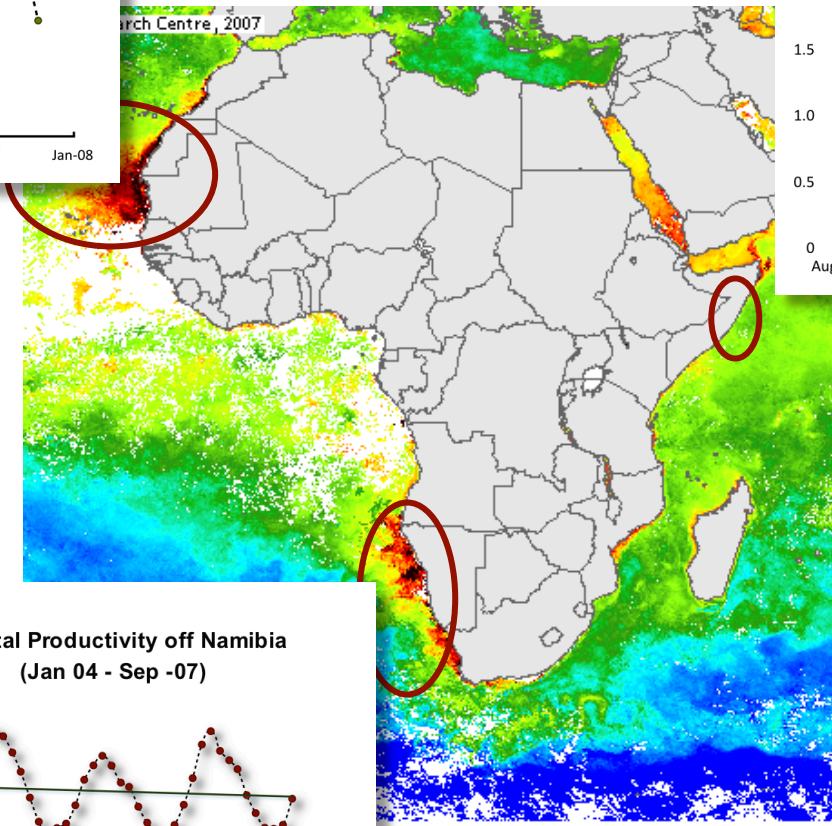
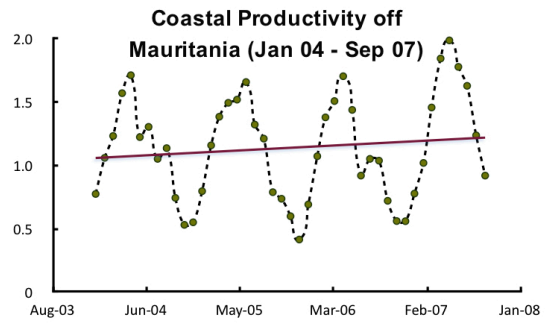
The '**OXYgen depletion RISK index**' ('**OXYRISK**') characterizes the spatial distribution of potential hypoxia for a given month performing an oxygen budget between the physical supporting factors (source term) and the flux of organic matter (sink term) estimated primarily from satellite derived 'Chlorophyll-a' or 'Primary Production' data.



(Climatology) July

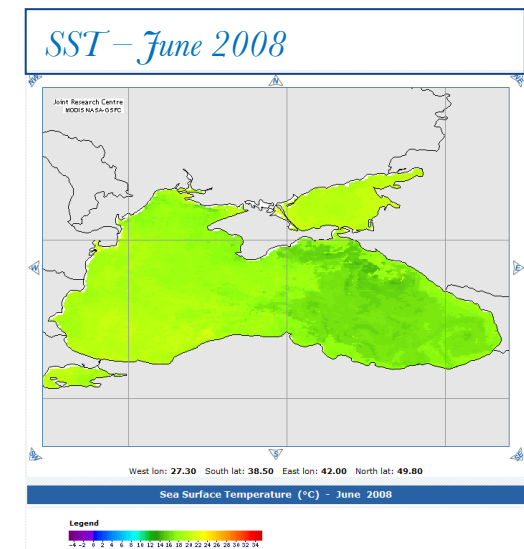
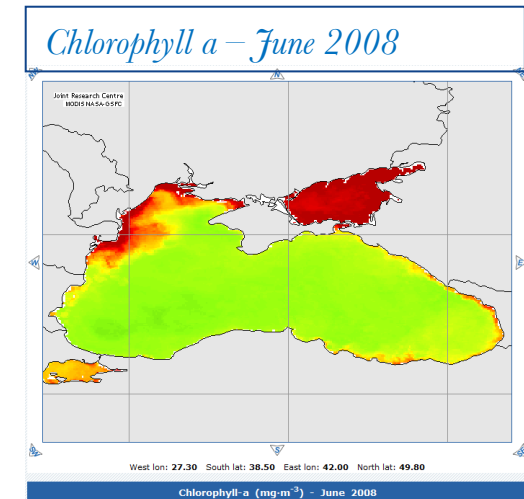
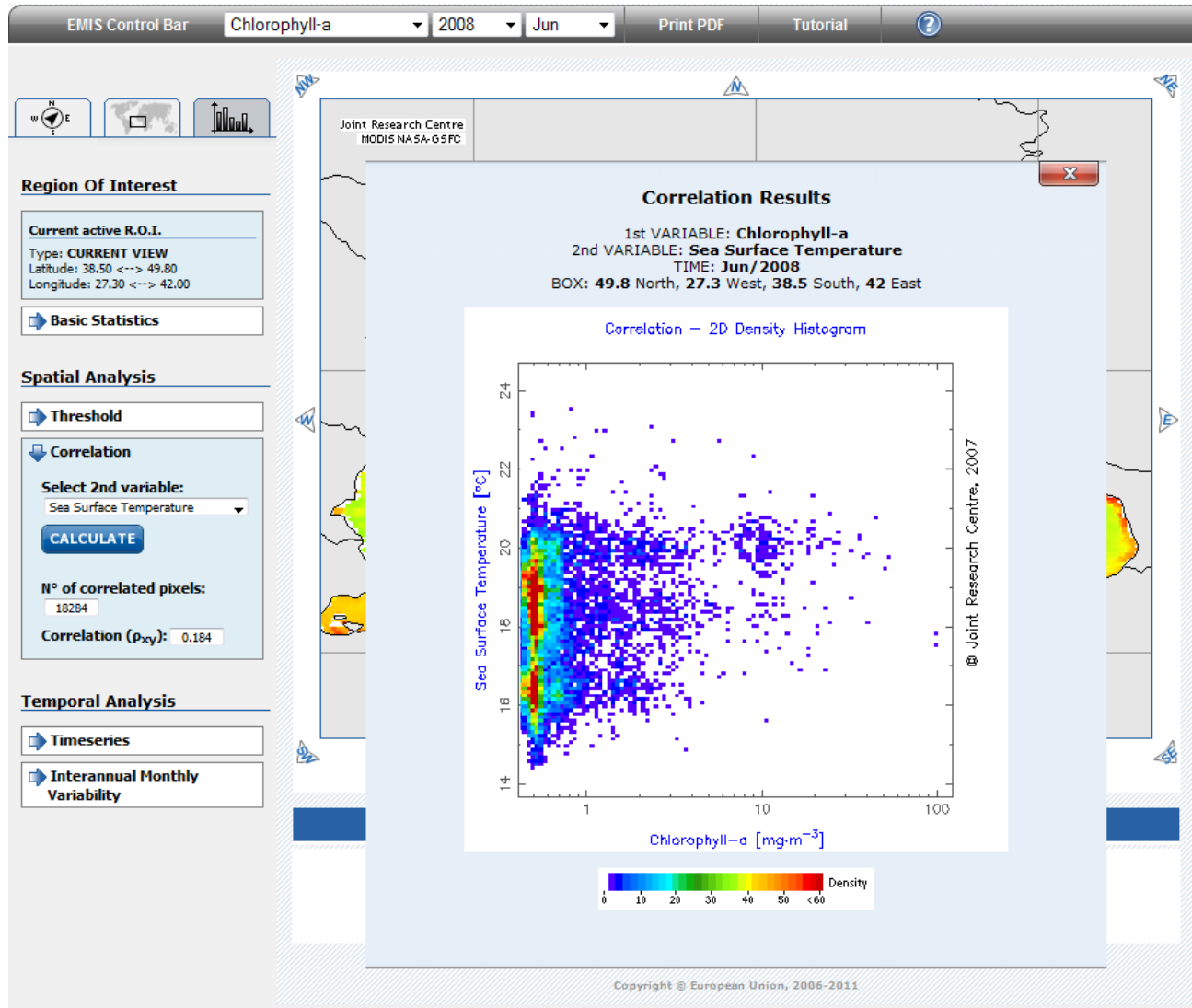
(Climatology) October





## Applications

- ✓ Ecosystem functioning and regime shift
- ✓ Fisheries management
- ✓ Climate change impacts
- ✓ Carbon cycle monitoring and carbon budget analysis



## Spatial Analysis

Threshold

Correlation

## Temporal Analysis

Timeseries

### Interannual Monthly Variability

#### Months

Jan  
 Feb  
 Mar  
 Apr  
 May  
 Jun  
 Jul  
 Aug  
 Sep  
 Oct  
 Nov  
 Dec

From 2002

To 2006

CALCULATE

## Interannual Monthly Variability Results

PRINT ASCII

PRINT PDF

VARIABLE: Chlorophyll-a Concentration

UNIT:  $\text{mg}\cdot\text{m}^{-3}$

TIME: from Dic/2002 to Dic/2006

BOX: 4.82 North, 44.13 West, -0.34 South, 53.52 East

### Statistics of Box Mean Values:

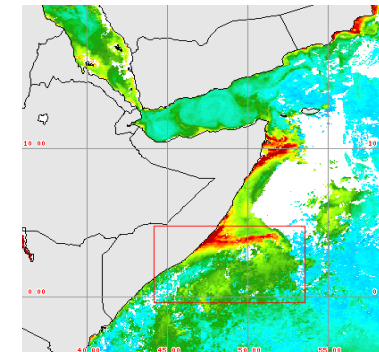
**Jan:** Mean: 0.345 Max: 0.529 Min: 0.000 Standard Deviation: 0.2015

**Feb:** Mean: 0.305 Max: 0.394 Min: 0.000 Standard Deviation: 0.1709

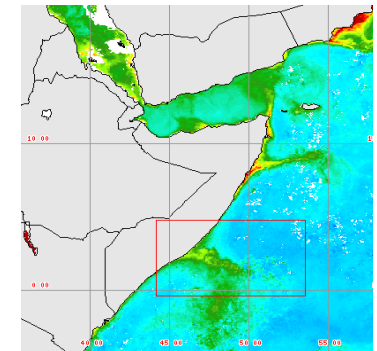
**Mar:** Mean: 0.183 Max: 0.266 Min: 0.000 Standard Deviation: 0.1055

**Apr:** Mean: 0.088 Max: 0.118 Min: 0.000 Standard Deviation: 0.0495

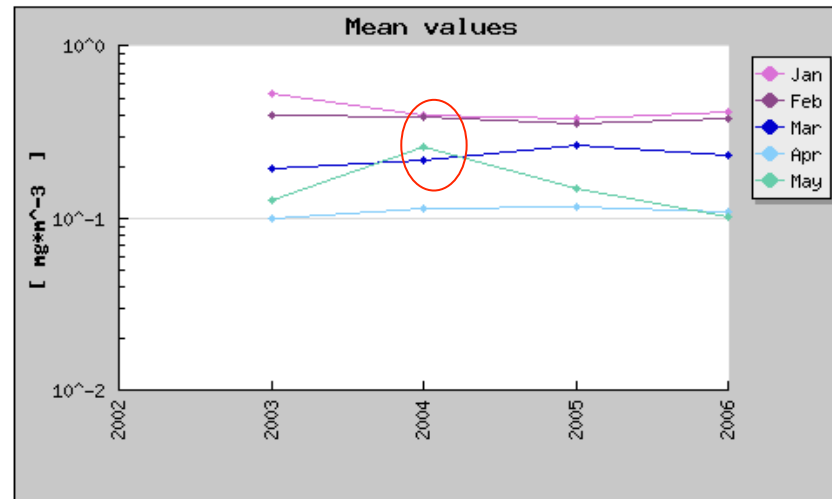
**May:** Mean: 0.128 Max: 0.259 Min: 0.000 Standard Deviation: 0.0931



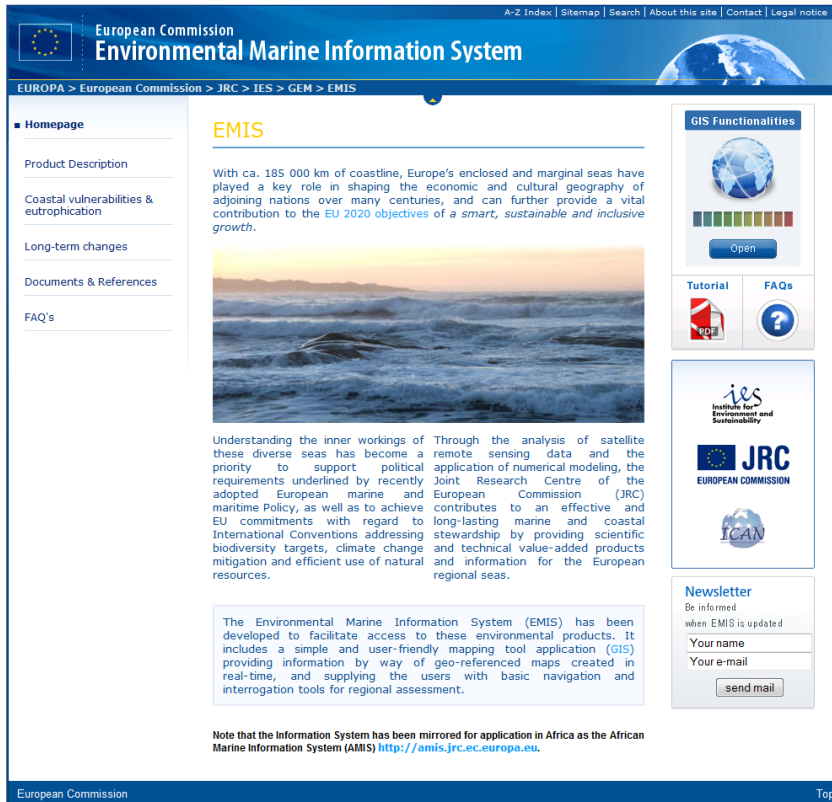
*Chlorophyll May 2004*



*May 2006*



**<http://emis.jrc.ec.europa.eu> <http://amis.jrc.ec.europa.eu>**



The screenshot shows the EMIS homepage with a navigation menu on the left, a main content area with a 'Product Description' and a 'GIS Functionalities' sidebar, and a footer with the European Commission logo.



The screenshot shows the AMIS homepage with a navigation menu on the left, a main content area with a 'Homepage' section and a 'chloroGIN' logo, and a footer with logos for IES, European Commission, and ICAN.