

## Environmental condition: access of satellite data

Jean-Marc Fromentin Ifremer

There is considerable quantity of environmental information that is currently available on Internet and free of access for scientific purposes for most of them.

However, these datasets are not always easy to handle and it could be of interest to facilitate their access through, e.g., the building of a homogeneous data set with similar space and time resolution for all products. Such a database could be accessible through the web for data extraction and visualization. To do such task, a given institute displaying strong competences in environmental/satellite data handling could be contracted.

To define habitats there are, a few other interesting “sub”products that could be derived from the basic databases, such as the surface velocity fields derived from altimetry; the 3-D dimensional temperature fields (temperature estimates at different reference depths inferred from SST and sea level anomalies) and the primary production (inferred from chl-a concentration and PAR). However, the selection and extraction of the basic data sets (SST, colour, altimetry) would also require a minimum effort/contracting of specialists (outside of the fisheries science).

Here is a list of the main environmental databases of interest for fisheries ecology:

### 1 IN-SITU DATA COLLECTIONS

- British Oceanographic Data Center, **BODC** (<http://www.bodc.ac.uk/>). Include: **NERC** Metadata files, oceanographic data collections (e.g., CTD profiles), sea level data (from the WOCE programme), tide data and indices (e.g., waves index). This site also holds the European Directory of Marine Environmental Data (**EDMED**, <http://www.bodc.ac.uk/services/edmed/>) which describes more than 2300 Datasets from over 500 Data Holding Centres across Europe. Binary format and HTML files.
- Climate Analysis Section, **CAS** (<http://www.cgd.ucar.edu/cas/catalog/>). This site, that is held by the National Center for Atmospheric Research (**NCAR**, US), provides links to the ECMWF and NCEP (see below) and a list of surface data (monthly data over 2°x2° or 5°x5° boxes of sea surface temperature and sea ice concentration), satellite data (see below) and climate indices, among which: the North Atlantic Oscillation index from Hurrell (1995), the North Pacific index from Trenberth and Hurrell (1994), the Southern Oscillation Index from Trenberth (1984) and several other El Niño indices from (Trenberth 1997). ASCII and HTML Files.
- Climate Diagnostics Center, **CDC NOAA-CIRES** (<http://www.cdc.noaa.gov/>). A key platform to access to the extensive NOAA data bases and get links to various other key sites, such as COADS, ECMWF (see below) and the **NCEP/NCAR reanalysis** data web site (<http://www.cdc.noaa.gov/cdc/data.ncep.reanalysis.html>) that provides gridded daily and monthly data sets of a large variety of variables (temperature, pressure, winds, etc.) from 1948 to present. ASCII and HTML Files.
- Climate Prediction Center, **CPC** ([http://www.cpc.ncep.noaa.gov/products/monitoring\\_and\\_data/](http://www.cpc.ncep.noaa.gov/products/monitoring_and_data/)). Hold by the National Center for Environmental Prediction (**NCEP**, US). This web site collects and produces daily and monthly data, time series, and maps for various climate parameters, such as precipitation, temperature, snow cover, and degree days for the United States, Pacific Islands, and other parts of the world. The CPC also compiles data on historic and current atmospheric and oceanic conditions, El Niño Southern Oscillations (ENSO) and other climate patterns such as the North Atlantic and Pacific Decadal Oscillations, and stratospheric ozone and temperature. ASCII and HTML Files.
- Comprehensive Ocean-Atmosphere data set, **COADS** (<http://www.cdc.noaa.gov/coads/>). One the largest and most visited environmental data provider. Includes various statistics (such as the mean and median) for each of 22 observed and derived variables (e.g., sea surface temperature, air temperature, sea level, wind, cloudiness, relative humidity) over 2° latitude x 2° longitude boxes back to 1800 and 1°x1° boxes since 1960. Binary files.

- International Research Institute for Climate Prediction, **IRI** (<http://ingrid.ldeo.columbia.edu/docfind/databrief/cat-ocean.html>). IRI proposes an oceanographic data library which includes oceanic station data from the arctic region, geochemical, isotopic, and radiochemical tracers data, monthly data sets from land-ocean models including snow cover and depth, sea ice, and sea surface temperature data and **LEVITUS**, a regularly updated world ocean atlas (1°x1°) of objectively analyzed fields of major ocean parameters at the annual, seasonal, and monthly time scales. Binary files.

## 2 Remote-sensing databases

- Advanced Very High Resolution Radiometers, **AVHRR**, (<http://podaac.jpl.nasa.gov/sst/>). The NOAA/ NASA AVHRR Oceans Pathfinder sea surface temperature data are derived from AVHRR on board six polar orbiting satellites. Databases provide daily, weekly and monthly averages for both the ascending pass (daytime) and descending pass (nighttime) on a 4 km, 9 km, 18 km, 54 km and 0.5 degree resolution since 1985. Data available in HDF (a self-describing, platform independent format).
- **AVISO** ([http://www.jason.oceanobs.com/html/presentation/welcome\\_uk.html](http://www.jason.oceanobs.com/html/presentation/welcome_uk.html)) distributes Topex-Poseidon and ERS altimetric data worldwide since 1992 and Jason-1 and Envisat since 2002. This site is dedicated to gridded or along track altimetry data (sea level anomalies), absolute dynamic topography, wind/wave data and geophysical data over a 1/3 degree resolution. Both delayed time and near-real time data can be available. NetCDF Format.
- French ERS Processing and Archiving Facility, **CERSAT** (<http://www.ifremer.fr/cersat/en/index.htm>). This site ensures the off-line processing of ERS-1 and ERS-2 altimeter, scatterometer and microwave sounder data from various satellites. Databases can provide swath (band of the satellite track), collocated and gridded data of daily, weekly and monthly averages over several spatial resolutions (up to 2 km) since 1991 or 1996. Includes also buoy networks data and surveys of regional seas, such as the Bay of Biscay sea. Available variables are: sea wind, sea ice, sea level and waves. HDF Format.
- National Geophysical Data Center, **NGDC** (<http://www.ngdc.noaa.gov/mgg/>). NGDC, which is one of three NOAA National Data Centers, compiles and distributes extensive databases in both coastal and open ocean areas. Key data types include bathymetry, 2 and 5 minutes gridded relief, trackline geophysics (gravity, magnetics, seismic reflection), sediment thickness, data from ocean drilling and seafloor sediment and rock samples, digital coastlines, and data from the Great Lakes. Format binary.
- Sea-viewing Wide Field-of-view Sensor, **SeaWiFS** (<http://daac.gsfc.nasa.gov/data/dataset/SEAWIFS/>). This site provides satellite measurements of global and regional **ocean color** data from the NASA's Mission To Planet Earth programme (MTPE). The concentration and predominant identity of substances and particles in the euphotic (lighted) zone of the upper ocean influences the apparent color of the ocean, which can range from deep blue to varying shades of green and ruddy brown. Living phytoplankton, inorganic sediments, particulate and dissolved organic matter all contribute to the color of the ocean. SeaWiFS was launched August 1, 1997 and scans approximately 90% of the ocean surface every two days. There are two main types of data: the Global Area Coverage (**GAC**), that consists of radiance data for all 8 SeaWiFS bands, subsampled at 4-km resolution and the Local Area Coverage (**LAC**) includes high resolution data of 1.1 kms for areas of special interest. Data available in HDF (a self-describing, platform independent format). HDF Format

## 3 Models outputs

- European Centre for Medium-Range Weather Forecasting **ECMWF** (<http://www.ecmwf.int/>). ECMWF provides real-time data from a large variety of ocean

models (partly from international programmes, such TOGA and DEMETER or ERA) and holds a data archives section, including full resolution, surface and pressure level data. format NetCDF.

- **MERCATOR** ([www.mercator-ocean.fr](http://www.mercator-ocean.fr)) is an operational oceanography project founded in 2002. This site provides images and outputs numerical files (retrospective, real time and forecasts) of global models assimilating both satellite and *in-situ* data over the North Atlantic and Mediterranean Sea. Two System Prototypes are already available : PSY1 (start 2001) implements a near-real-time model of the Northern and Tropical Atlantic regions with a  $1/3^\circ$  resolution and PSY2 (start 2003) near-real-time at a higher resolution ( $1/15^\circ$ ) for the North Atlantic and Mediterranean regions assimilating altimeter and *in situ* data. Several key variables are available in 2D and 3D, e.g., sea temperature, salinity, current speed, diffusion, depth and height of the upper mixing layer, wind stress, etc... Format NetCDF.