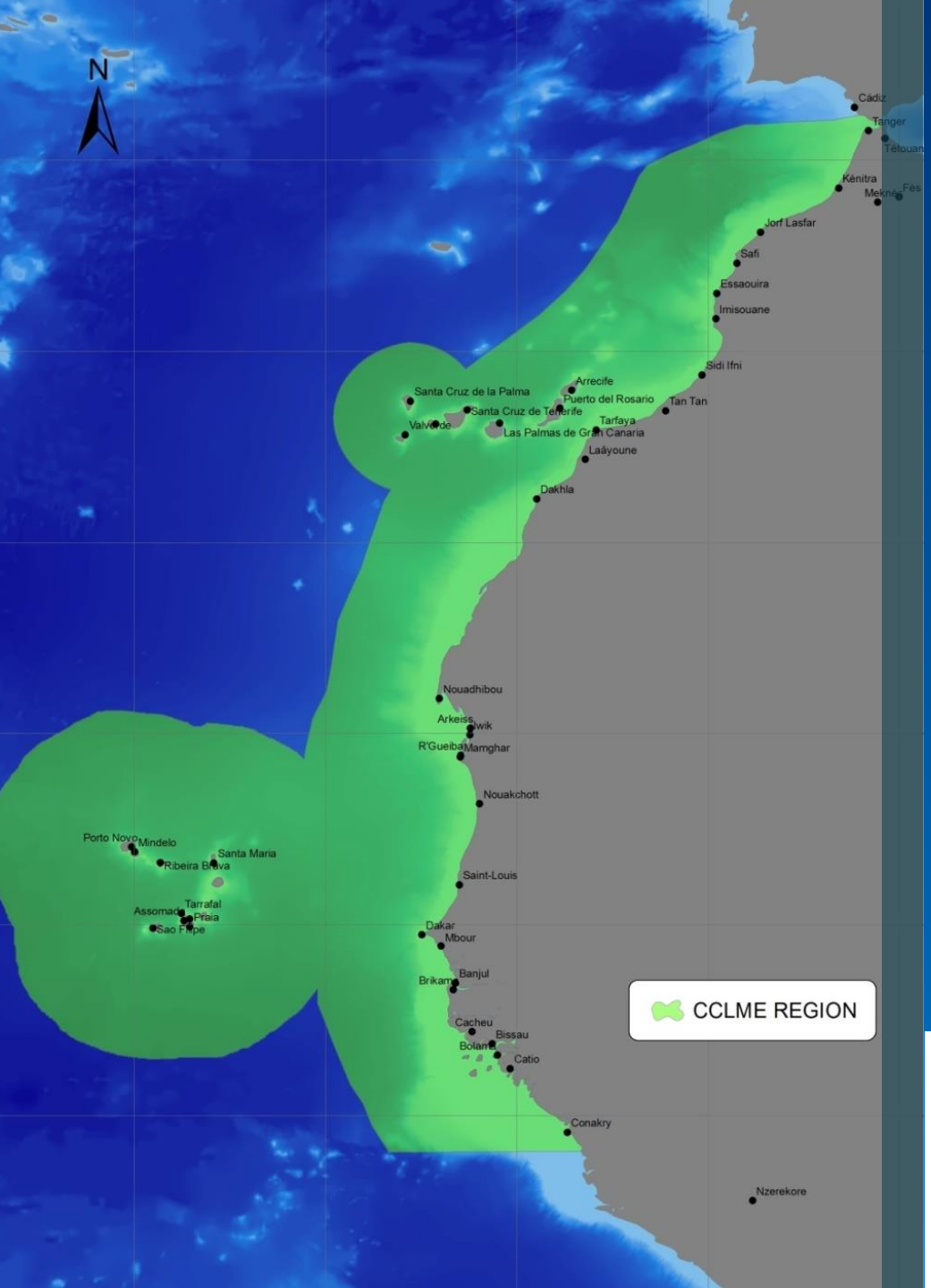


United Nations Educational, Scientific and Cultural Organization

Intergovernmental Oceanographic Commission

GOBIERNO DE ESPAÑA

cooperación española

Project "Enhancing oceanography capacities on CCLME Western Africa countries" Phases I & II

Hands-on Workshop on "The use of the CCLME Eco-GIS Viewer"

11-13 July 2017

THE PROJECT: PHASE I

Project:
ENHANCING OCEANOGRAPHY CAPACITIES ON WESTERN AFRICA COUNTRIES

Implementing Body:
IOC-UNESCO

United Nations Educational, Scientific and Cultural Organization · Intergovernmental Oceanographic Commission

Partner:
Instituto Español de Oceanografía -IEO-

Funding:
100% Spanish Agency for International Development Cooperation -AECID-

GOBIERNO DE ESPAÑA cooperación española

Period:
March 2013 – April 2015

United Nations Educational, Scientific and Cultural Organization · Intergovernmental Oceanographic Commission

GOBIERNO DE ESPAÑA cooperación española

PHASE I: Overall goal

*To **improve our understanding** of the oceanographic features and processes in the **Canary Current LME region** and increase the delivery of services to end users by (i) **making existing data accessible**, (ii) by **developing data and information products** required for integrated ecosystem based management of the ocean and coastal areas of West Africa, and (iii) by **enhancing oceanographic capacities in the region***

United Nations Educational, Scientific and Cultural Organization

Intergovernmental Oceanographic Commission

GOBIERNO DE ESPAÑA

cooperación española

WP1: Making existing data accessible

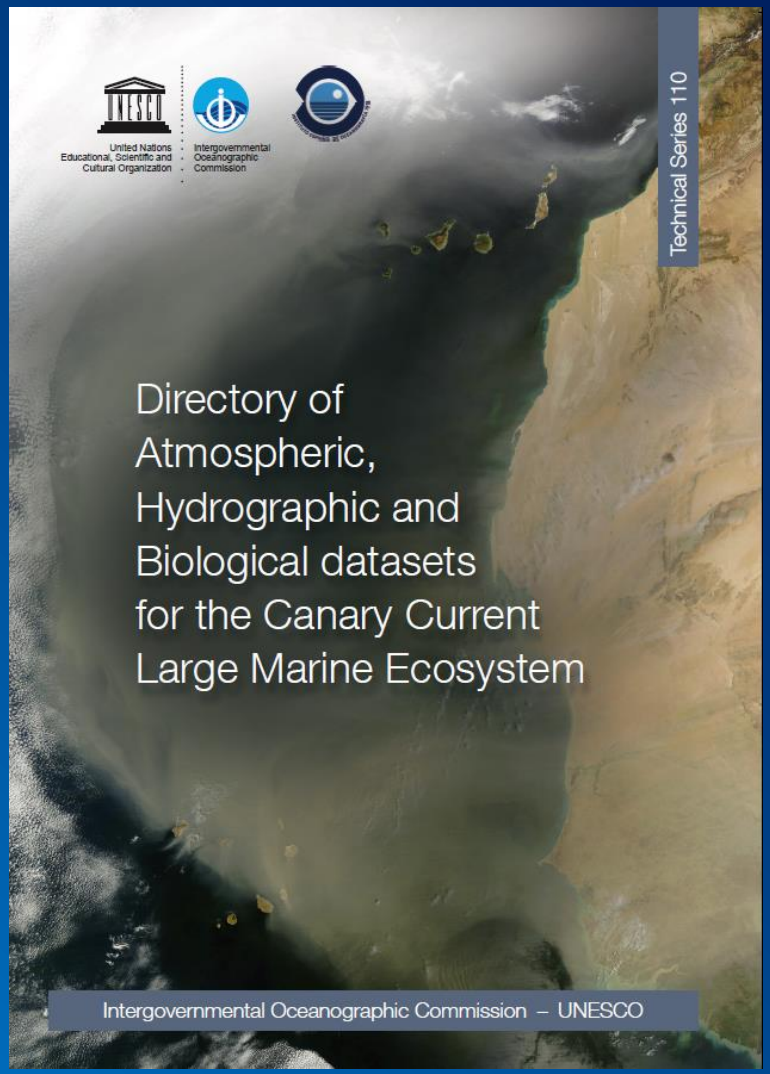
Deliverable

- *Directory of Atmospheric, Hydrographic and Biological datasets for the Canary Current Large Marine Ecosystem*, IOC Technical Series 110

2 versions:

- Printed document
- On-line version

http://www.unesco.org/new/ioc_ts110



United Nations
Educational, Scientific and
Cultural Organization

Intergovernmental
Oceanographic
Commission

GOBIERNO
DE ESPAÑA

cooperación
española

The Directory: outline

Metadata sheets were organised as follows:

1) **Remote sensing;**
2) **Atmospheric data;**
3) **Tide-gauges, moorings and Argo float network;**
4) **Ocean observatories and ship based repeat hydrography;**
5) **Biological surveys;**
6) **Databases**

Compilation of **85 metadata sheets** referring :

- **425 datasets**
- **27 databases**
- **21 time-series sites**

The Directory **needs of a continuous maintenance** to ensure that **new data from research cruises but also recovered by the countries in the region** are identified and updated.

United Nations Educational, Scientific and Cultural Organization

Intergovernmental Oceanographic Commission

GOBIERNO DE ESPAÑA

cooperación española

WP2: Analysing data and delivering information products

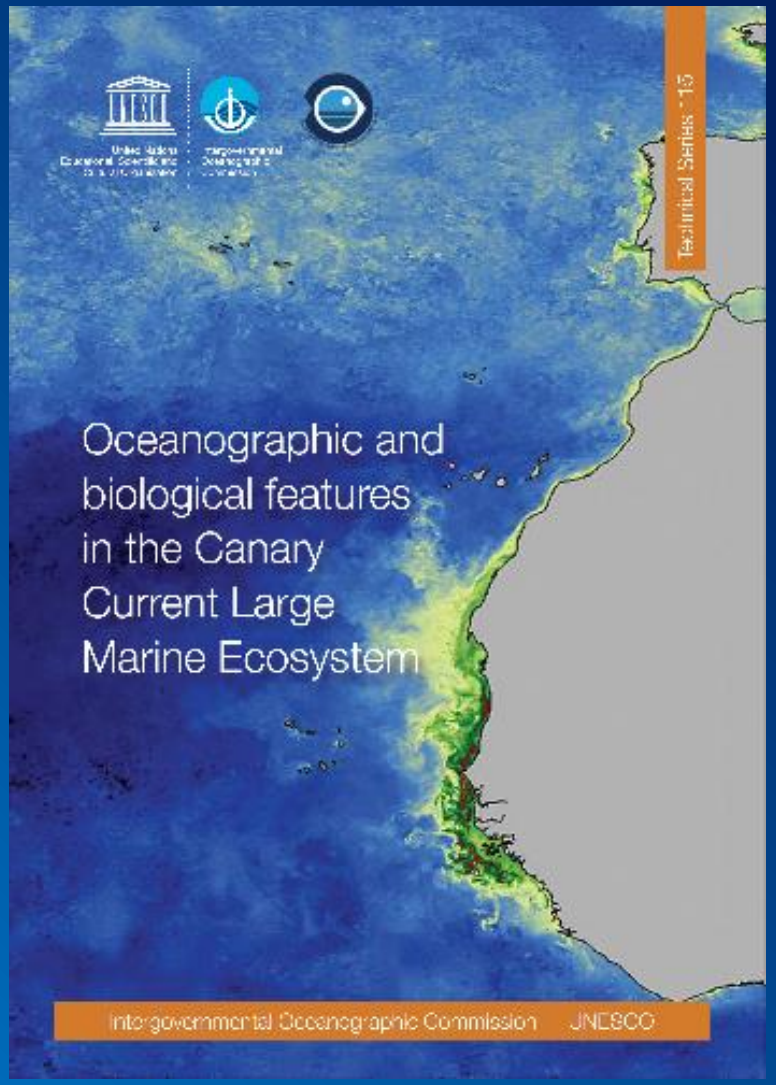
Products:

- *Oceanographic and biological features in the Canary Current Large Marine Ecosystem*, IOC Technical Series 115

2 versions:

- Printed document
- On-line version:

http://www.unesco.org/new/en/ioc/ts115



United Nations Educational, Scientific and Cultural Organization

Intergovernmental Oceanographic Commission

GOBIERNO DE ESPAÑA

cooperación española

The IOC Technical Series 115: Outline

- 54 scientists from 25 institutions

- 28 articles structured as follows:

(i) the ocean geomorphology and geological materials
(ii) the hydrographic structure and the ocean circulation
(iii) the biogeochemical characteristics of the marine environment
(iv) the life in the sea
(v) the interannual, interdecadal and long-term variability

The separate part of each article will be available soon at:
http://www.unesco.org/new/en/ioc/ts115

United Nations Educational, Scientific and Cultural Organization
Intergovernmental Oceanographic Commission
GOBIERNO DE ESPAÑA
cooperación española

The IOC Technical Series 115

2. OCEAN GEOMORPHOLOGY AND GEOLOGICAL MATERIALS

2.1. MAIN GEOMORPHOLOGIC FEATURES IN THE CANARY CURRENT LARGE MARINE ECOSYSTEM

Luis M. AGUDO-BRAVO[1] and José MANGAS[2]

[1] Instituto Español de Oceanografía. Spain

[2] Instituto de Oceanografía y Cambio Global (IOCAG), Universidad de Las Palmas de Gran Canaria. Spain

2.2. OCEANIC INTRAPLATE VOLCANIC ISLANDS AND SEAMOUNTS IN THE CANARY CURRENT LARGE MARINE ECOSYSTEM

José MANGAS[1], Luis Á. QUEVEDO-GONZÁLEZ[1] and Itahisa DÉNIZ-GONZÁLEZ[2]

[1] Instituto de Oceanografía y Cambio Global (IOCAG), Universidad de Las Palmas de Gran Canaria. Spain

[2] Intergovernmental Oceanographic Commission of UNESCO. France

3.2. WATER MASSES IN THE CANARY CURRENT LARGE MARINE ECOSYSTEM

María V. PASTOR[1], Pedro VÉLEZ-BELCHÍ[2] and Alonso HERNÁNDEZ-GUERRA[3]

[1] John Abbott College. Canada

[2] Centro Oceanográfico de Canarias, Instituto Español de Oceanografía. Spain

[3] Instituto de Oceanografía y Cambio Global (IOCAG), Universidad de Las Palmas de Gran Canaria. Spain

4.6. ZOOPLANKTON IN THE CANARY CURRENT LARGE MARINE ECOSYSTEM

Amina BERRAHO[1], Laila SOMOUE[1], Santiago HERNÁNDEZ-LEÓN[2] and Luis VALDÉS[3]

[1] Institut National de Recherche Halieutique. Morocco

[2] Instituto de Oceanografía y Cambio Global (IOCAG), Universidad de Las Palmas de Gran Canaria. Spain

[3] Intergovernmental Oceanographic Commission of UNESCO. France

5. LIFE IN THE SEA

5.1. PELAGIC FISH STOCKS AND THEIR RESPONSE TO FISHERIES AND ENVIRONMENTAL VARIATION IN THE CANARY CURRENT LARGE MARINE ECOSYSTEM

Cheikh-Baye BRAHAM[1] and Ad CORTEN[2]

[1] Institut Mauritanien de Recherches Océanographiques et des Pêches. Mauritania

[2] Ministry of Economic Affairs. The Netherlands

5.5. BIODIVERSITY AND BIOGEOGRAPHY OF DECAPOD CRUSTACEANS IN THE CANARY CURRENT LARGE MARINE ECOSYSTEM

Eva GARCÍA-ISARCH[1] and Isabel MUÑOZ[2]

[1] Centro Oceanográfico de Cádiz, Instituto Español de Oceanografía. Spain

[2] Centro Oceanográfico de Santander, Instituto Español de Oceanografía. Spain

6. INTERANNUAL, INTERDECADAL AND LONG-TERM VARIABILITY

6.1. OPEN OCEAN TEMPERATURE AND SALINITY TRENDS IN THE CANARY CURRENT LARGE MARINE ECOSYSTEM

Pedro VÉLEZ-BELCHÍ[1], Marta GONZÁLEZ-CARBALLO[2], María Dolores PÉREZ-HERNÁNDEZ[3] and Alonso HERNÁNDEZ-GUERRA[3]

[1] Centro Oceanográfico de Canarias, Instituto Español de Oceanografía. Spain

[2] Observatorio Ambiental de Granadilla. Spain

[3] Instituto de Oceanografía y Cambio Global (IOCAG), Universidad de Las Palmas de Gran Canaria Spain

United Nations Educational, Scientific and Cultural Organization

Intergovernmental Oceanographic Commission

GOBIERNO DE ESPAÑA

cooperación española

WP3: training workshops

- **Workshop on "Upwelling and environmental indicators"**, held in Casablanca (Morocco) from 8th to 10th April 2014

- **Workshop on "Oceanographic and biological features and trends in the Canary Current Large Marine Ecosystem"**, held in Las Palmas de Gran Canaria (Spain) from 27th to 29th January 2015

United Nations Educational, Scientific and Cultural Organization

Intergovernmental Oceanographic Commission

GOBIERNO DE ESPAÑA

cooperación española

THE PROJECT: PHASE II

Project:
ENHANCING OCEANOGRAPHY CAPACITIES ON CCLME WESTERN AFRICA COUNTRIES PHASE II

Implementing Body:
IOC-UNESCO

United Nations Educational, Scientific and Cultural Organization

Intergovernmental Oceanographic Commission

Partner:
Instituto Español de Oceanografía -IEO-

Funding:
100% Spanish Agency for International Development Cooperation -AECID-

GOBIERNO DE ESPAÑA

cooperación española

Period:
May 2015 – May 2017

United Nations Educational, Scientific and Cultural Organization

Intergovernmental Oceanographic Commission

GOBIERNO DE ESPAÑA

cooperación española

PHASE II: Overall goal

*To **improve our understanding** of the oceanographic features and processes in the **Canary Current LME region** and increase the delivery of services to end users by (i) **making existing data accessible**, (ii) **by developing a GIS dynamic analytic** tool aimed to create meaningful data products at regional scale, adding value to raw data and producing new scientific knowledge on the ocean and coastal areas of the CCLME countries and (iii) by **enhancing oceanographic capacities in the region.***

United Nations Educational, Scientific and Cultural Organization

Intergovernmental Oceanographic Commission

GOBIERNO DE ESPAÑA

cooperación española

THE PROJECT: Expected Results

WP1: Data recovery

Enhance the access to science based information and made it more accessible to scientist, policy makers, industry and civil society

WP2: Development of a CCLME Data Analytic Viewer

Develop a CCLME Data Analytic Viewer for integrated ecosystem based management of the ocean and coastal areas of West Africa

WP3: Training workshops

Effectively contribute to enhance the expertise and capacities of the scientific community in the region in the use of the CCLME Data Analytic Viewer

United Nations Educational, Scientific and Cultural Organization

Intergovernmental Oceanographic Commission

GOBIERNO DE ESPAÑA

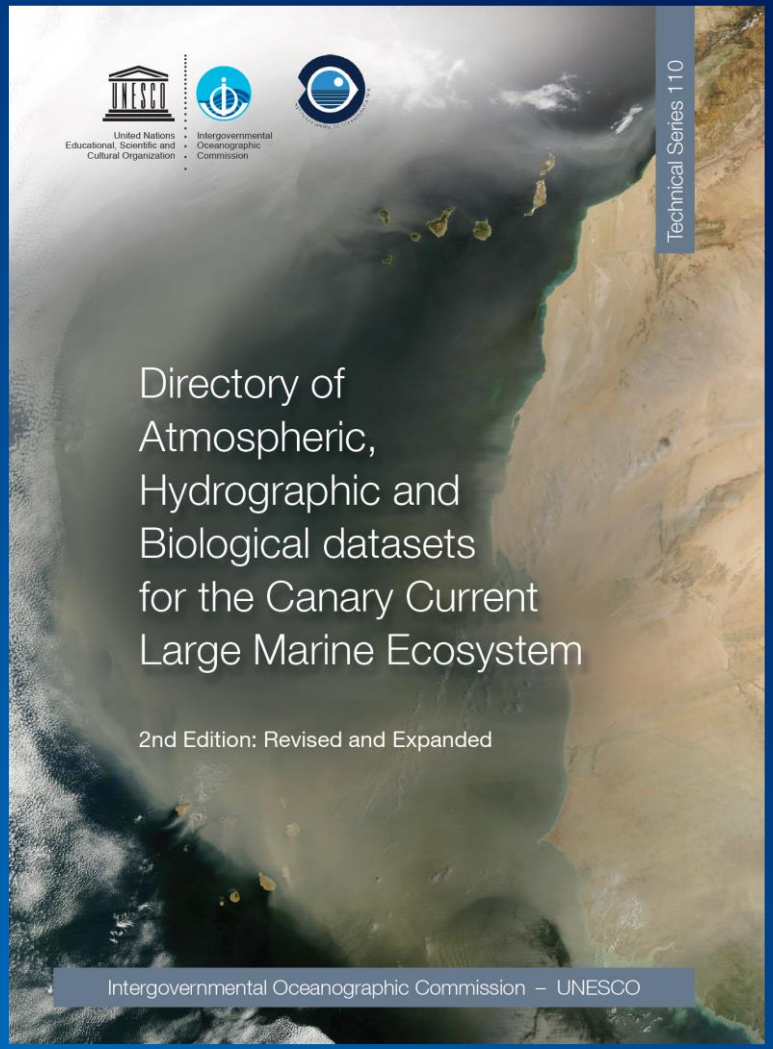
cooperación española

WP1: Data recovery

Expected result:
Enhance the access to science based information and made it more accessible to scientist, policy makers, industry and civil society

Deliverable

- **Updated** versions of the *Directory of Atmospheric, Hydrographic and Biological datasets for the Canary Current Large Marine Ecosystem* **available online** (pdf format) on an **annual basis** in 2016 and 2017 at: **http://www.unesco.org/new/ioc_ts110**



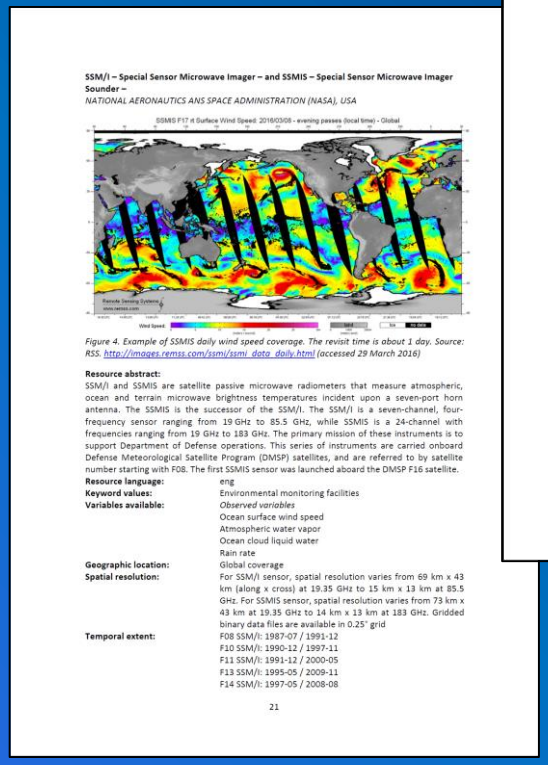
United Nations Educational, Scientific and Cultural Organization
Intergovernmental Oceanographic Commission

GOBIERNO DE ESPAÑA
cooperación española

The Directory: 2nd Edition Revised and Expanded

Compilation of **107 metadata sheets** referring :

- **429 datasets**
- **30 databases**
- **21 time-series sites**



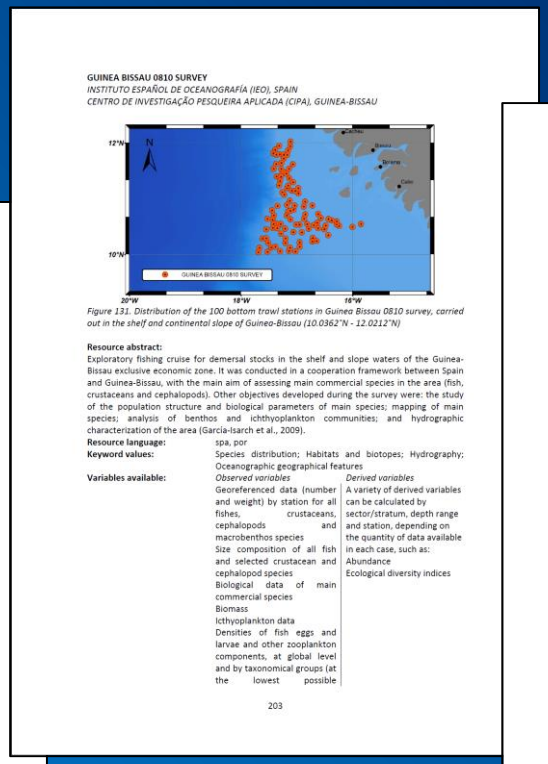
SSM/I – Special Sensor Microwave Imager – and SSMIS – Special Sensor Microwave Imager Sounder –
NATIONAL AERONAUTICS ANS SPACE ADMINISTRATION (NASA), USA

Figure 4. Example of SSMIS daily wind speed coverage. The revisit time is about 1 day. Source: RSS. http://images.remss.com/ssmi/ssmi_data_daily.html (accessed 29 March 2016)

Resource abstract:
SSM/I and SSMIS are satellite passive microwave radiometers that measure atmospheric, ocean and terrain microwave brightness temperatures incident upon a seven-port horn antenna. The SSMIS is the successor of the SSM/I. The SSM/I is a seven-channel, four-frequency sensor ranging from 19 GHz to 85.5 GHz, while SSMIS is a 24-channel with frequencies ranging from 19 GHz to 183 GHz. The primary mission of these instruments is to support Department of Defense operations. This series of instruments are carried onboard Defense Meteorological Satellite Program (DMSP) satellites, and are referred to by satellite number starting with F08. The first SSMIS sensor was launched aboard the DMSP F16 satellite.

Resource language:	eng
Keyword values:	Environmental monitoring facilities
Variables available:	*Observed variables* Ocean surface wind speed Atmospheric water vapor Ocean cloud liquid water Rain rate
Geographic location:	Global coverage
Spatial resolution:	For SSM/I sensor, spatial resolution varies from 69 km x 43 km (along x cross) at 19.35 GHz to 15 km x 13 km at 85.5 GHz. For SSMIS sensor, spatial resolution varies from 73 km x 43 km at 19.35 GHz to 14 km x 13 km at 183 GHz. Gridded binary data files are available in 0.25° grid
Temporal extent:	F08 SSM/I: 1987-07 / 1991-12 F10 SSM/I: 1990-12 / 1997-11 F11 SSM/I: 1991-12 / 2000-05 F13 SSM/I: 1995-05 / 2009-11 F14 SSM/I: 1997-05 / 2008-08

21



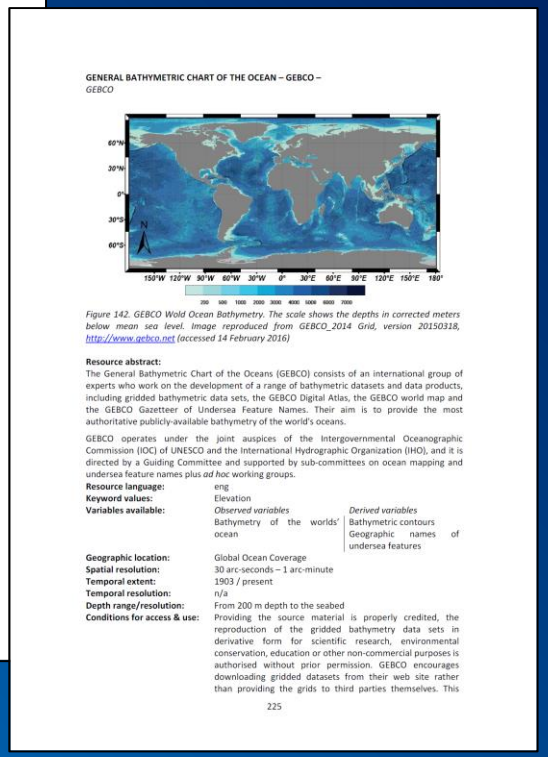
GUINEA BISSAU 0810 SURVEY
INSTITUTO ESPAÑOL DE OCEANOGRAFÍA (IEO), SPAIN
CENTRO DE INVESTIGAÇÃO PESQUEIRA APLICADA (CIPA), GUINEA-BISSAU

Figure 131. Distribution of the 100 bottom trawl stations in Guinea Bissau 0810 survey, carried out in the shelf and continental slope of Guineo-Bissau (10.0362°N - 12.0212°N)

Resource abstract:
Exploratory fishing cruise for demersal stocks in the shelf and slope waters of the Guinea-Bissau exclusive economic zone. It was conducted in a cooperation framework between Spain and Guinea-Bissau, with the main aim of assessing main commercial species in the area (fish, crustaceans and cephalopods). Other objectives developed during the survey were: the study of the population structure and biological parameters of main species; mapping of main species; analysis of benthos and ichthyoplankton communities; and hydrographic characterization of the area (García-Isarch et al., 2009).

Resource language:	spa, por
Keyword values:	Species distribution; Habitats and biotopes; Hydrography; Oceanographic geographical features
Variables available:	*Observed variables* Georeferenced data (number and weight) by station for all fishes, crustaceans, cephalopods and macrobenthos species Size composition of all fish and selected crustacean and cephalopod species Biological data of main commercial species Biomass Icthyoplankton data Densities of fish eggs and larvae and other zooplankton components, at global level and by taxonomical groups (at the lowest possible *Derived variables* A variety of derived variables can be calculated by sector/stratum, depth range and station, depending on the quantity of data available in each case, such as: Abundance Ecological diversity indices

203



GENERAL BATHYMETRIC CHART OF THE OCEAN – GEBCO –
GEBCO

Figure 142. GEBCO Wold Ocean Bathymetry. The scale shows the depths in corrected meters below mean sea level. Image reproduced from GEBCO_2014 Grid, version 20150318, http://www.gebco.net (accessed 14 February 2016)

Resource abstract:
The General Bathymetric Chart of the Oceans (GEBCO) consists of an international group of experts who work on the development of a range of bathymetric datasets and data products, including gridded bathymetric data sets, the GEBCO Digital Atlas, the GEBCO world map and the GEBCO Gazetteer of Undersea Feature Names. Their aim is to provide the most authoritative publicly-available bathymetry of the world's oceans.

GEBCO operates under the joint auspices of the Intergovernmental Oceanographic Commission (IOC) of UNESCO and the International Hydrographic Organization (IHO), and it is directed by a Guiding Committee and supported by sub-committees on ocean mapping and undersea feature names plus *ad hoc* working groups.

Resource language:	eng
Keyword values:	Elevation
Variables available:	*Observed variables* Bathymetry of the worlds' ocean *Derived variables* Bathymetric contours Geographic names of undersea features
Geographic location:	Global Ocean Coverage
Spatial resolution:	30 arc-seconds – 1 arc-minute
Temporal extent:	1903 / present
Temporal resolution:	n/a
Depth range/resolution:	From 200 m depth to the seabed
Conditions for access & use:	Providing the source material is properly credited, the reproduction of the gridded bathymetry data sets in derivative form for scientific research, environmental conservation, education or other non-commercial purposes is authorised without prior permission. GEBCO encourages downloading gridded datasets from their web site rather than providing the grids to third parties themselves. This

225

United Nations Educational, Scientific and Cultural Organization

Intergovernmental Oceanographic Commission

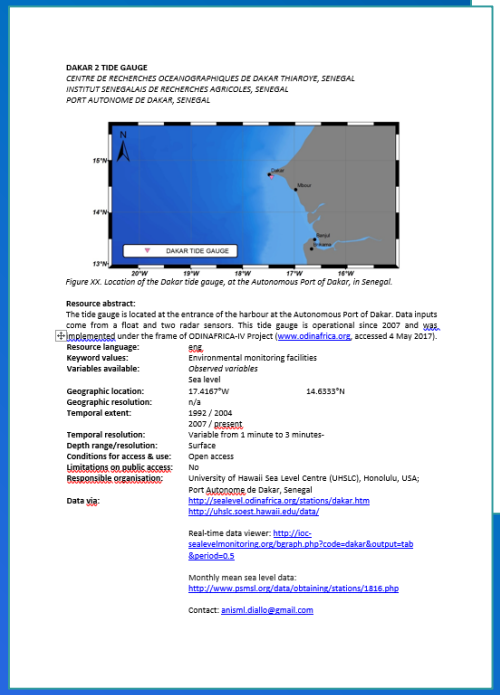
GOBIERNO DE ESPAÑA

cooperación española

The 3rd Edition of the Directory so far…

Compilation of **128 metadata sheets** referring :

- **459 datasets**
- **34 databases**
- **32 time-series sites**



DAKAR 2 TIDE GAUGE

CENTRE DE RECHERCHES OCEANOGRAPHIQUES DE DAKAR THIAROYE, SENEGAL
INSTITUT SENEGALAIS DE RECHERCHES AGRICOLES, SENEGAL
PORT AUTONOME DE DAKAR, SENEGAL

Figure XX. Location of the Dakar tide gauge, at the Autonomous Port of Dakar, in Senegal.

Resource abstract:
The tide gauge is located at the entrance of the harbour at the Autonomous Port of Dakar. Data inputs come from a float and two radar sensors. This tide gauge is operational since 2007 and was implemented under the frame of ODINAFRICA-IV Project (www.odinafrica.org, accessed 4 May 2017).

Resource language:	eng
Keyword values:	Environmental monitoring facilities
Variables available:	*Observed variables* Sea level
Geographic location:	17.4167°W 14.6333°N
Geographic resolution:	n/a
Temporal extent:	1992 / 2004 2007 / present
Temporal resolution:	Variable from 1 minute to 3 minutes-
Depth range/resolution:	Surface
Conditions for access & use:	Open access
Limitations on public access:	No
Responsible organisation:	University of Hawaii Sea Level Centre (UHSLC), Honolulu, USA; Port Autonome de Dakar, Senegal
Data via:	http://sealevel.odinafrica.org/stations/dakar.htm http://uhslc.soest.hawaii.edu/data/ Real-time data viewer: http://ioc-sealevelmonitoring.org/bgraph.php?code=dakar&output=tab&period=0.5 Monthly mean sea level data: http://www.psmsl.org/data/obtaining/stations/1816.php Contact: anismi.diallo@gmail.com

GENERAL LANSANA CONTE 2004-12-DM SURVEY – GLC 2004-12-DM SURVEY –

CENTRE NATIONAL DES SCIENCES HALIEUTIQUES DE BOUSSOURA (CNSHB), GUINEA

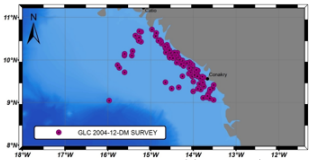


Figure X. Distribution of the 74 bottom trawl stations in General Lansana Conté 2004-12-DM survey, carried out in waters of Guinea (9.0436°N – 10.7344°N)

Resource abstract:
Trawling survey for demersal stocks in the Guinea exclusive economic zone, extending from the coastal zone to a part of the intermediate zone. It was conducted under the frame of the fisheries resources follow-up activities in Guinean waters, with the main objective of recovering information on the status of demersal fisheries resources. It was the first time a commercial or professional sampling device was used to carry out a demersal resources prospection survey in the Guinean exclusive economic zone (Diallo et al, 2005)

Resource language:	fre	
Keyword values:	Species distribution; Habitats and biotopes	
Variables available:	*Observed variables*	*Derived variables*
	Georeferenced data (number and weight) by station for all fishes, crustaceans, cephalopods and gastropods species	Catch rate (kg/30 min) Dispersion and relative
	Size composition for main commercial species	dispersion of average yields Dispersion and relative
	Sex and maturity for selected fishes species	dispersion of main sizes
Geographic location:	15.9672°W – 13.0772°W	9.0436°N – 10.7344°N
Spatial resolution:	74 stations	
Temporal extent:	2004-12-20 / 2005-01-05	
Temporal resolution:	n/a	
Depth range/resolution:	From 5 m to 40 m depth	
Conditions for access & use:	Agreement with the Centre National des Sciences Halieutiques de Boussoura (CNSHB)	
Limitations on public access:	Yes	
Responsible organisation:	Centre National des Sciences Halieutiques de Boussoura, Conakry, Guinea	
Data via:	Contact: ibamy@gmx.com Head, Centre National des Sciences Halieutiques de Boussoura	

REPOSITORIO DE DATOS MARINOS INTEGRADOS DE CANARIAS – REDMIC –

OBSERVATORIO AMBIENTAL GRANADILLA, SPAIN

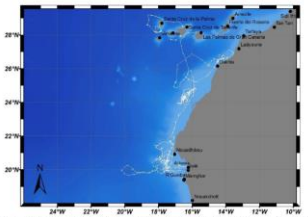


Figure 168. Registered positions and derived trajectory of the loggerhead seaturtle (Caretta Caretta) specimen named Catalina, obtained through a transmitter stocked on its carapace. The radiotracking started at the east Gran Canaria Island (Spain) on 02 July 2006 and last data was obtained off Arkeiss (Mauritania) on 17 July 2008. A distance of around 8960 km was covered during 746 days. Source: REDMIC. www.redmic.es (accessed 23 Mars 2017)

Resource abstract:
REDMIC (standing for Integrated Marine Data Repository for the Canary Islands) is a permanent system of systematic storage, custody, and service of marine data, which follows the OpenData and Open-Science philosophy. It has been designed for the Canary Islands (Spain), and by extension, Macaronesia. The novelty of REDMIC is that marine data, whatever their nature, are integrated in a single and coherent geographic information system. After the initial effort of feeding data in a common framework, thereafter they can be used and combined as often as desired with maximum agility. The aim of REDMIC is to maximize the potential use of marine data.

Resource language:	eng, spa	
Keyword values:	Environmental monitoring facilities; Elevation; Species distribution	
Variables available:	*Observed variables*	*Derived variables*
	Species distribution Bathymetry Radiotracking of loggerhead seaturtles	Tracklines of seaturtles trajectories
Geographic location:	28.3088°N – 27.1229°N	12.6328°W – 19.6471°W
Spatial resolution:	Variable: 100 m, 500 m, 1000 m and 5000 m grid	
Temporal extent:	1825-12-31 / present	
Temporal resolution:	Variable	
Depth range/resolution:	From surface to seabed	

242

United Nations Educational, Scientific and Cultural Organization

Intergovernmental Oceanographic Commission

GOBIERNO DE ESPAÑA

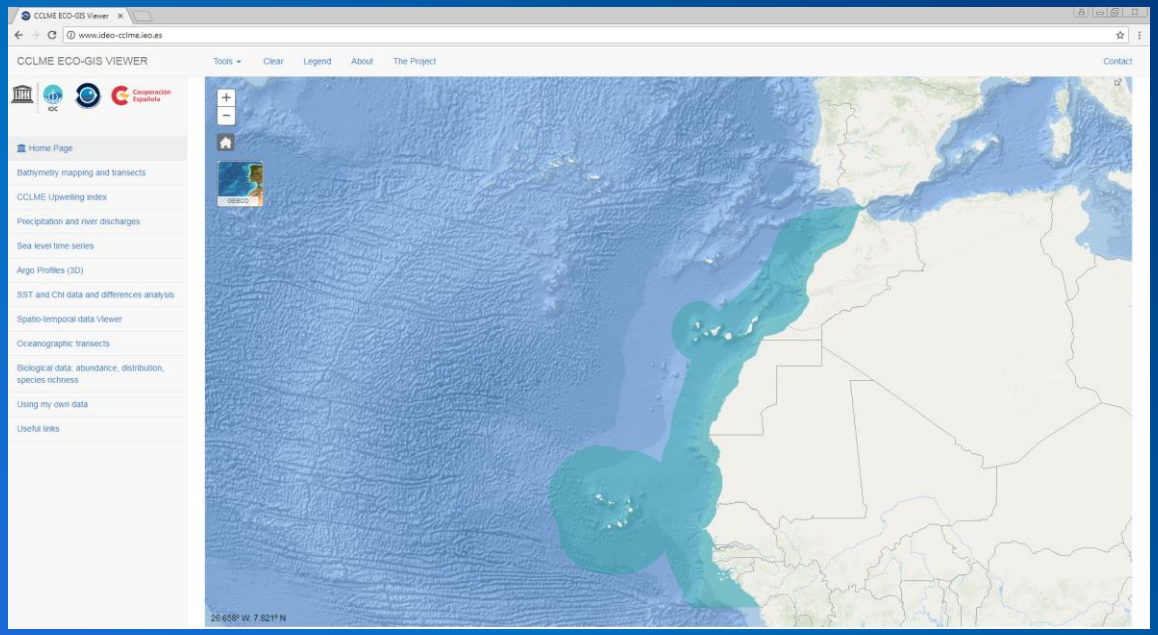
cooperación española

WP2: development of a CCLME Data Analytic Viewer

Expected result: Develop a CCLME Data Analytic Viewer for integrated ecosystem based management of the ocean and coastal areas of West Africa

Product:

- **CCLME Eco-GIS Viewer**: to be launched… **TODAY!**



IOC-UNESCO

United Nations Educational, Scientific and Cultural Organization

Intergovernmental Oceanographic Commission

GOBIERNO DE ESPAÑA

cooperación española

WP3: training workshops

Expected result:
Effectively contribute to enhance the expertise and capacities of the scientific community in the region in the use of the CCLME Data Analytic Viewer

- Workshop 1: **Workshop on the "Update of metadata, data availability and application needs for a CCLME Eco-GIS viewer"** held in Praia, Cabo Verde (3-5 November 2015)

- Workshop 2: **Hands-on Workshop on "The use of the CCLME Eco-GIS Viewer"** held in Santa Cruz de Tenerife, Spain (11-13 July 2017)

United Nations Educational, Scientific and Cultural Organization

Intergovernmental Oceanographic Commission

GOBIERNO DE ESPAÑA

cooperación española

KEY EXPECTED OUTPUT OF THE PROJECT:

Developing a GIS dynamic analytic tool aimed to create meaningful data products at regional scale, adding value to raw data and producing new scientific knowledge on the ocean and coastal areas of the CCLME countries

United Nations Educational, Scientific and Cultural Organization

Intergovernmental Oceanographic Commission

GOBIERNO DE ESPAÑA

cooperación española

Further information about the project at:
http://www.unesco.org/new/en/natural-sciences/ioc-oceans/sections-and-programmes/ocean-sciences/canary-current-large-marine-ecosystem-project-cclme/

United Nations Educational, Scientific and Cultural Organization

Intergovernmental Oceanographic Commission

GOBIERNO DE ESPAÑA

cooperación española

Thank you very much!

United Nations
Educational, Scientific and
Cultural Organization

Intergovernmental
Oceanographic
Commission

GOBIERNO
DE ESPAÑA

cooperación
española