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Intergovernmental Oceanographic Commission

IOC efforts in the North-West Africa Region

Itahisa Déniz González – Project coordinator – 24 February 2022

ENHANCING OCEANOGRAPHY CAPACITIES IN THE CCLME WESTERN AFRICA COUNTRIES

The Project: Phases I, II & III

Period:

Phase I: **March 2013 – April 2015**
Phase II: **May 2015 – September 2017**
Phase III: **January 2018 – April 2020**

Implementing Body:

IOC-UNESCO

Partner:

Instituto Español de Oceanografía -IEO-

Funding:

100% Spanish Agency for International Development Cooperation -AECID-

Phase I, II & III Overall goal

To **improve our understanding** of the oceanographic features and processes in the **Canary Current LME region**, to increase the delivery of services to end users, and to **develop science capacity**.

PHASE I
Product I: Inventory of metadata

Directory of Atmospheric, Hydrographic and Biological datasets for the Canary Current Large Marine Ecosystem, IOC Technical Series 110 (2014)

2nd Edition: Revised and Expanded (2016)
3rd Edition: Revised and Expanded (2017)

2 versions:
- Printed document
- On-line version

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

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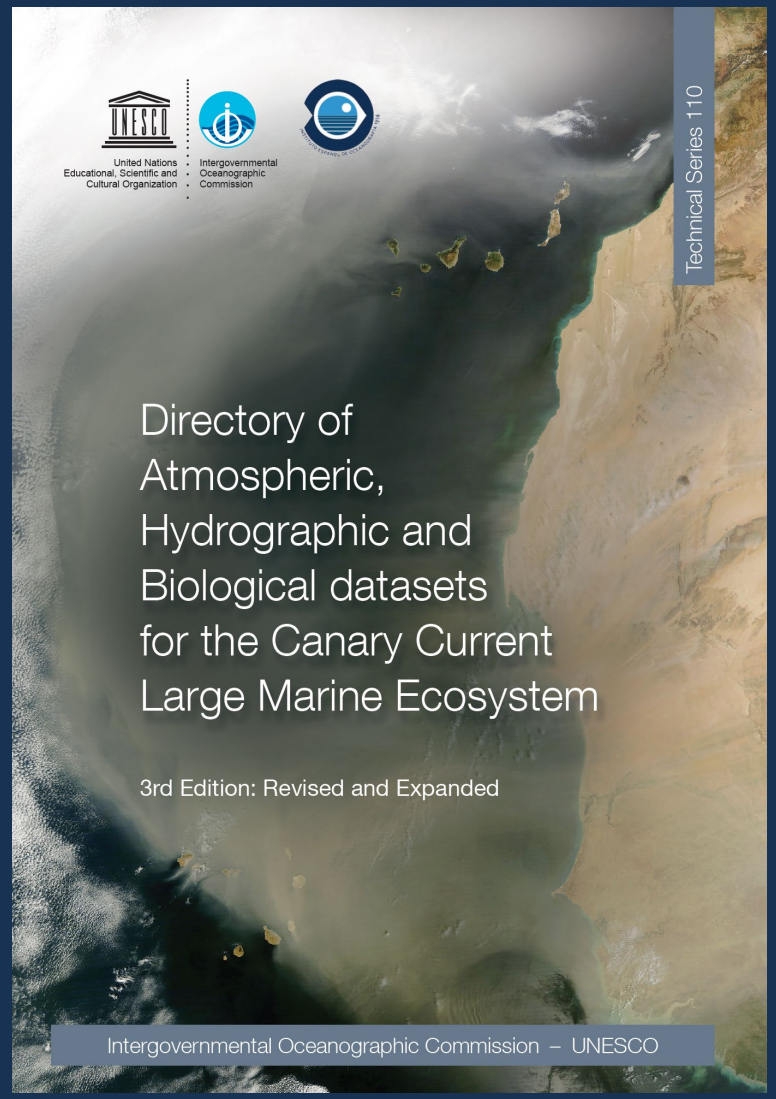
Intergovernmental Oceanographic Commission



3rd Edition Revised and Expanded

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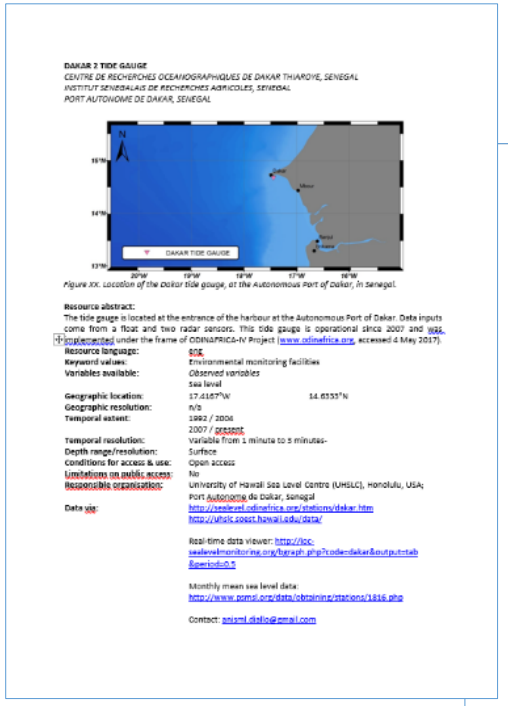
Commission

118 metadata sheets referring :

- **449 datasets**
- **34 databases**
- **26 time-series sites**

+ Discussion:
further data to be prospected
lessons learnt

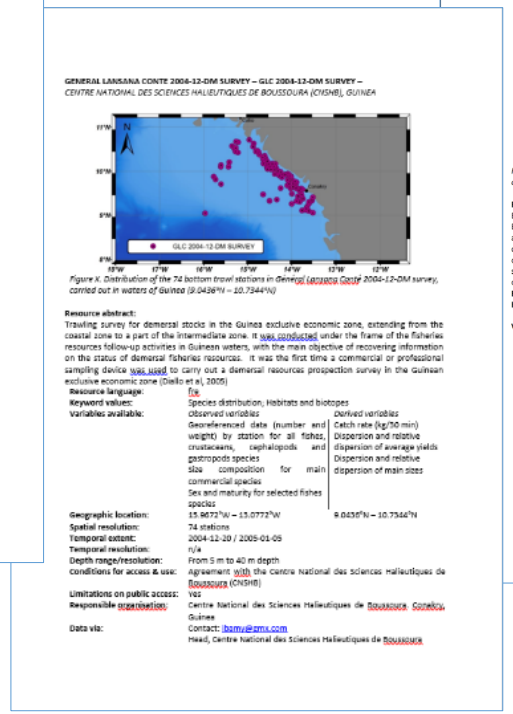


DAKAR 2 TIDE GAUGE
CENTRE DE RECHERCHES OCEANOGRAPHIQUES DE DAKAR THIAROYE, SENEGAL
INSTITUT SENEGALAIS DE RECHERCHES AGRICOLES, SENEGAL
PORT AUTONOME DE DAKAR, SENEGAL

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 5 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=0.7 Monthly mean sea level data: http://www.pomsl.org/data/obtaining/stations/1816.php Contact: psmsl.diallo@gmail.com

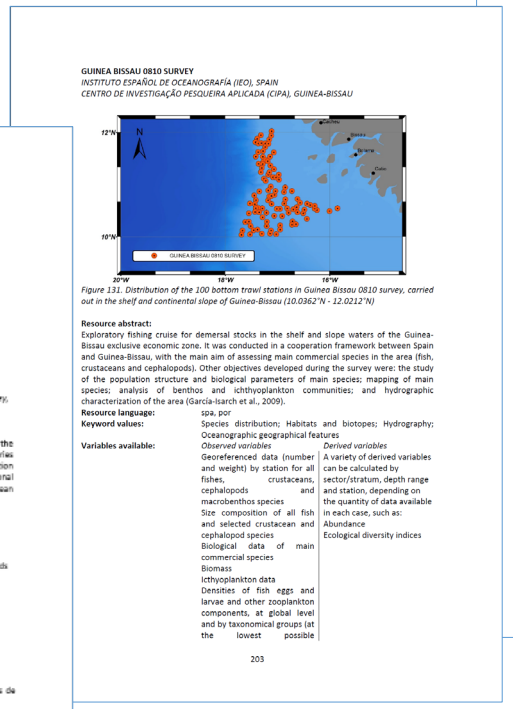


GENERAL LANSANA CONTE 2006-12-DM SURVEY – GLC 2004-12-DM SURVEY –
CENTRE NATIONAL DES SCIENCES HALIEUTIQUES DE BOUSSOURA (CNSHB), GUINEA

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 dispersion of average yields
	Size composition for main commercial species	Dispersion and relative dispersion of main sizes
	Sex and maturity for selected fishes species	
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	



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 Guinea-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 (Garcia-Isarch et al., 2009).

Resource language:	spa, por	
Keyword values:	Species distribution; Habitats and biotopes; Hydrography; Oceanographic geographical features	
Variables available:	*Observed variables*	*Derived variables*
	Georeferenced data (number and weight) by station for all fishes, crustaceans, cephalopods and macrobenthos species	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
	Size composition of all fish and selected crustacean and cephalopod species	
	Biological data of main commercial species	
	Biomass	
	Ichthyoplankton data	
	Densities of fish eggs and larvae and other zooplankton components, at global level and by taxonomical groups (at the lowest possible	

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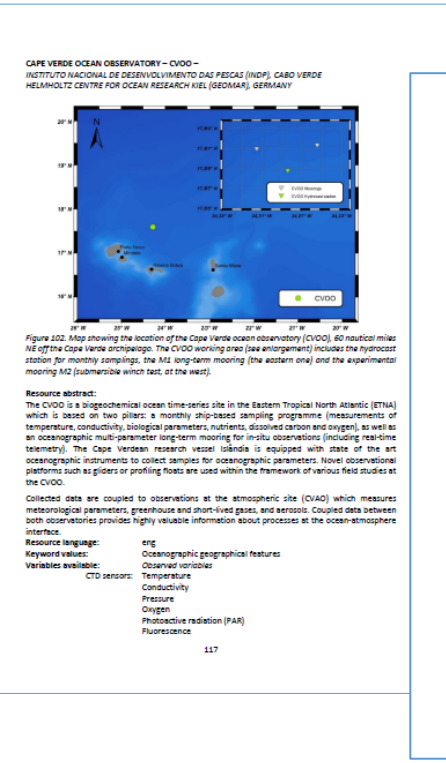

CAPE VERDE OCEAN OBSERVATORY – CVOO –
INSTITUTO NACIONAL DE DESENVOLVIMENTO DAS PESCAS (INDP), CABO VERDE
HELMHOLTZ CENTRE FOR OCEAN RESEARCH KIEL (GEOMAR), GERMANY

Figure 102. Map showing the location of the Cape Verde ocean observatory (CVOO), 60 nautical miles NE off the Cape Verde archipelago. The CVOO working area (see enlargement) includes the hydrocast station for monthly samplings, the M1 long-term mooring (the eastern one) and the experimental mooring M2 (submersible winch test, at the west).

Resource abstract:
The CVOO is a biogeochemical ocean time-series site in the Eastern Tropical North Atlantic (ETNA) which is based on two pillars: a monthly ship-based sampling programme (measurements of temperature, conductivity, biological parameters, nutrients, dissolved carbon and oxygen), as well as an oceanographic multi-parameter long-term mooring for in-situ observations (including real-time telemetry). The Cape Verdean research vessel Islândia is equipped with state of the art oceanographic instruments to collect samples for oceanographic parameters. Novel observational platforms such as gliders or profiling floats are used within the framework of various field studies at the CVOO.

Collected data are coupled to observations at the atmospheric site (CVAO) which measures meteorological parameters, greenhouse and short-lived gases, and aerosols. Coupled data between both observatories provides highly valuable information about processes at the ocean-atmosphere interface.

Resource language:	eng
Keyword values:	Oceanographic geographical features
Variables available:	*Observed variables*
CTD sensors:	Temperature Conductivity Pressure Oxygen Photoactive radiation (PAR) Fluorescence

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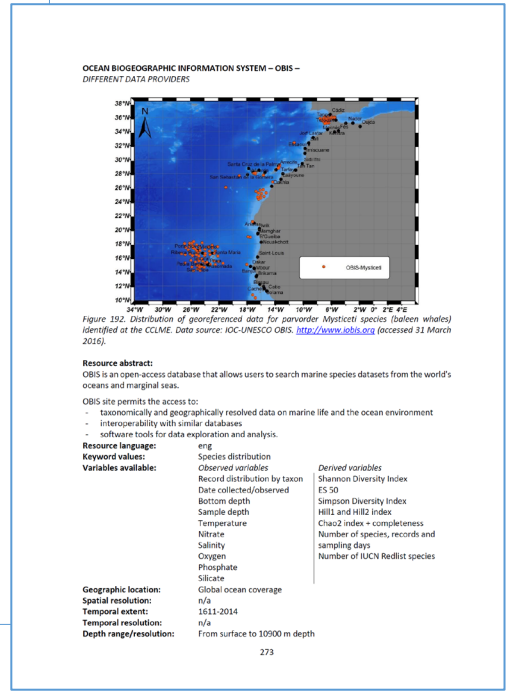

OCEAN BIOGEOGRAPHIC INFORMATION SYSTEM – OBIS –
DIFFERENT DATA PROVIDERS

Figure 192. Distribution of georeferenced data for parvorder Mysticeti species (baleen whales) identified at the CCLME. Data source: IOC-UNESCO OBIS. http://www.iobis.org (accessed 31 March 2016).

Resource abstract:
OBIS is an open-access database that allows users to search marine species datasets from the world's oceans and marginal seas.

OBIS site permits the access to:
- taxonomically and geographically resolved data on marine life and the ocean environment
- interoperability with similar databases
- software tools for data exploration and analysis.

Resource language:	eng	
Keyword values:	Species distribution	
Variables available:	*Observed variables*	*Derived variables*
	Record distribution by taxon	Shannon Diversity Index
	Date collected/observed	ES 50
	Bottom depth	Simpson Diversity Index
	Sample depth	Hill1 and Hill2 Index
	Temperature	Chao2 index + completeness
	Nitrate	Number of species, records and sampling days
	Salinity	Number of IUCN Redlist species
	Oxygen	
	Phosphate	
	Silicate	
Geographic location:	Global ocean coverage	
Spatial resolution:	n/a	
Temporal extent:	1611-2014	
Temporal resolution:	n/a	
Depth range/resolution:	From surface to 10900 m depth	

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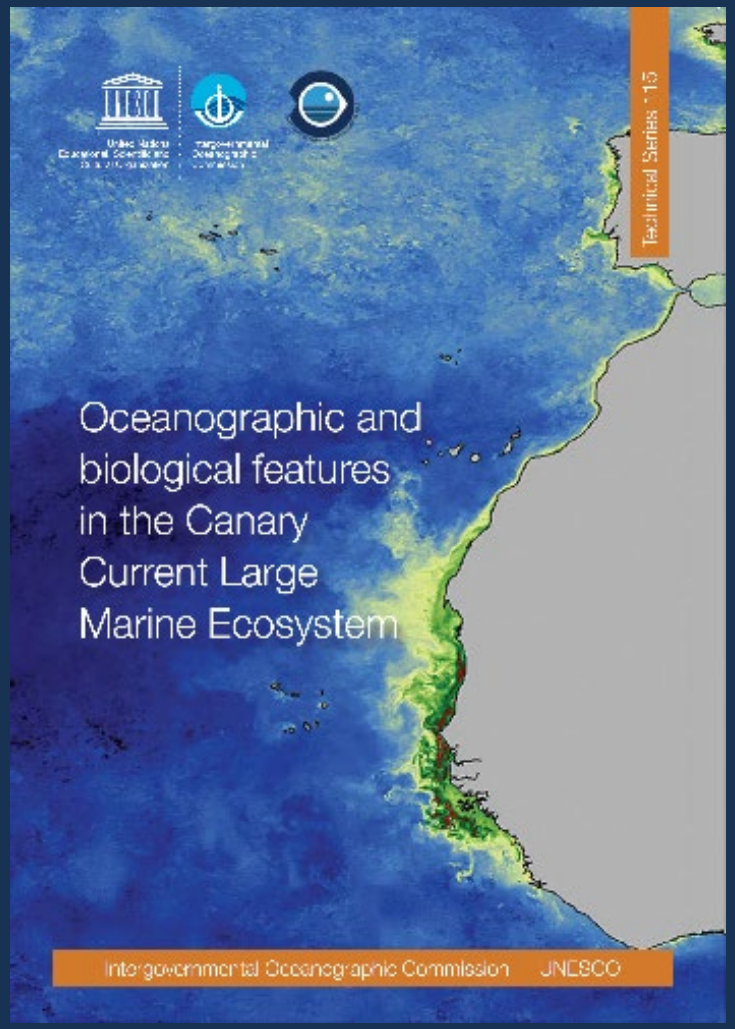
Product II: Data analysis

Oceanographic and biological features in the Canary Current Large Marine Ecosystem,
IOC Technical Series 115 (2015)



2 versions:

- Printed document
- On-line version
- Offprints also available!

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

The IOC Technical Series 115 Outline

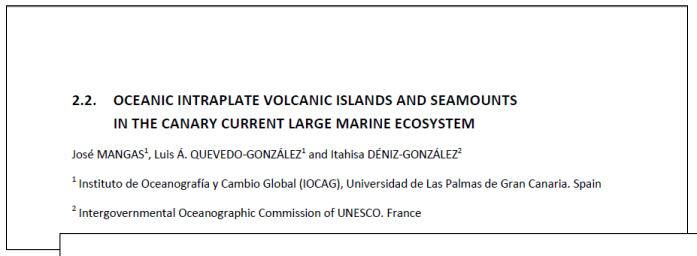
- **54 scientists** from **25 institutions**

- Executive Summary: main conclusions presented, followed by the **challenges for scientific research and management goals in the CCLME**, which can be used to guide new scientific projects in the region.

- 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 IOC Technical Series 115

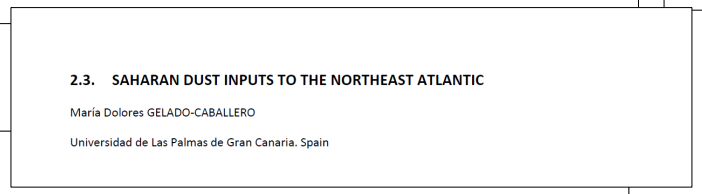


2.2. OCEANIC INTRAPLATE VOLCANIC ISLANDS AND SEAMOUNTS IN THE CANARY CURRENT LARGE MARINE ECOSYSTEM

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

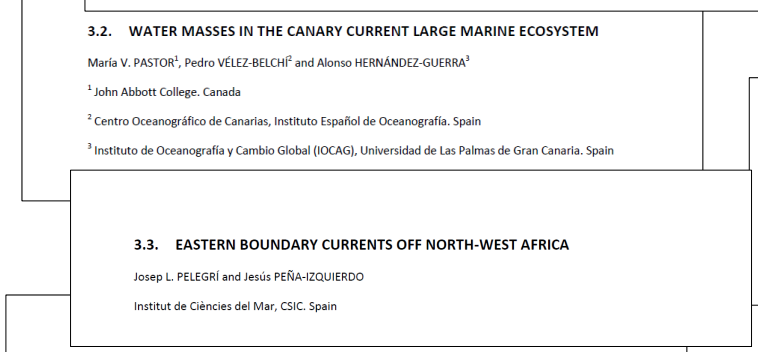
[2] Intergovernmental Oceanographic Commission of UNESCO. France



2.3. SAHARAN DUST INPUTS TO THE NORTHEAST ATLANTIC

María Dolores GELADO-CABALLERO

Universidad de Las Palmas de Gran Canaria. Spain



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

3.3. EASTERN BOUNDARY CURRENTS OFF NORTH-WEST AFRICA

Josep L. PELEGRÍ and Jesús PEÑA-IZQUIERDO

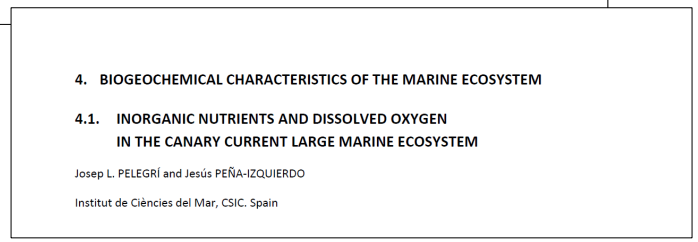
Institut de Ciències del Mar, CSIC. Spain

3.4. COASTAL UPWELLING OFF NORTH-WEST AFRICA

Josep L. PELEGRÍ[1] and Aïssa BENAZZOUZ[2]

[1] Institut de Ciències del Mar, CSIC. Spain

[2] Institut National de Recherche Halieutique. Morocco



4. BIOGEOCHEMICAL CHARACTERISTICS OF THE MARINE ECOSYSTEM

4.1. INORGANIC NUTRIENTS AND DISSOLVED OXYGEN IN THE CANARY CURRENT LARGE MARINE ECOSYSTEM

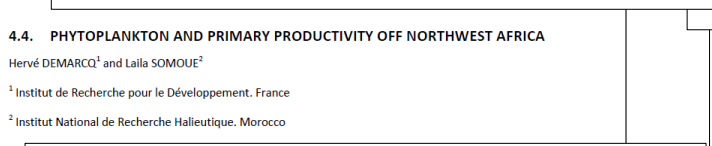
Josep L. PELEGRÍ and Jesús PEÑA-IZQUIERDO

Institut de Ciències del Mar, CSIC. Spain

4.2. INORGANIC CARBON, PH AND ALKALINITY IN THE CANARY CURRENT LARGE MARINE ECOSYSTEM

Melchor GONZÁLEZ-DÁVILA and J. Magdalena SANTANA-CASIANO

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

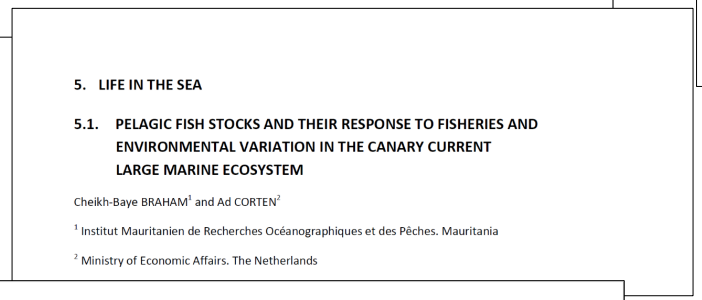


4.4. PHYTOPLANKTON AND PRIMARY PRODUCTIVITY OFF NORTHWEST AFRICA

Hervé DEMARCQ[1] and Laila SOMOUE[2]

[1] Institut de Recherche pour le Développement. France

[2] Institut National de Recherche Halieutique. Morocco



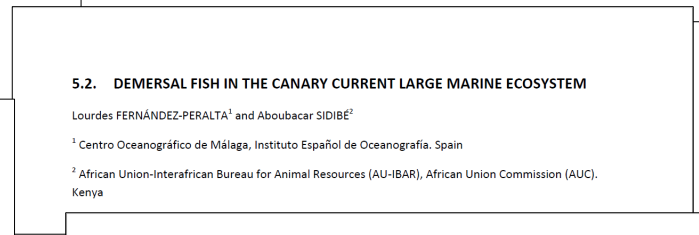
5. LIFE IN THE SEA

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

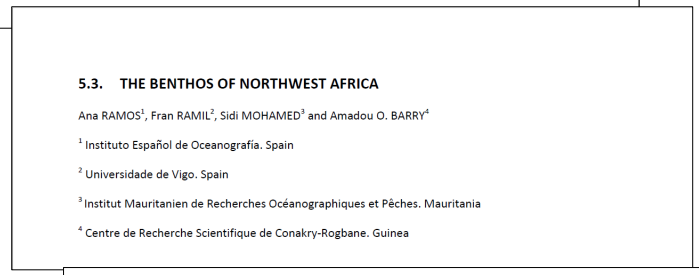


5.2. DEMERSAL FISH IN THE CANARY CURRENT LARGE MARINE ECOSYSTEM

Lourdes FERNÁNDEZ-PERALTA[1] and Aboubacar SIDIBÉ[2]

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

[2] African Union-Interafrican Bureau for Animal Resources (AU-IBAR), African Union Commission (AUC). Kenya



5.3. THE BENTHOS OF NORTHWEST AFRICA

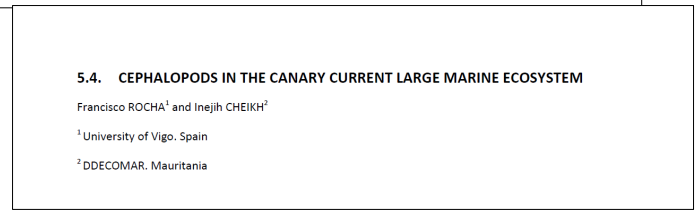
Ana RAMOS[1], Fran RAMIL[2], Sidi MOHAMED[3] and Amadou O. BARRY[4]

[1] Instituto Español de Oceanografía. Spain

[2] Universidade de Vigo. Spain

[3] Institut Mauritanien de Recherches Océanographiques et Pêches. Mauritania

[4] Centre de Recherche Scientifique de Conakry-Rogbane. Guinea



5.4. CEPHALOPODS IN THE CANARY CURRENT LARGE MARINE ECOSYSTEM

Francisco ROCHA[1] and Inejih CHEIKH[2]

[1] University of Vigo. Spain

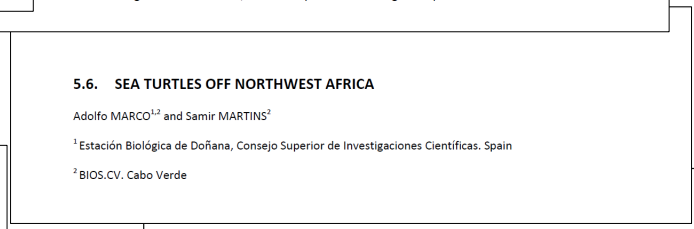
[2] DDECOMAR. Mauritania

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



5.6. SEA TURTLES OFF NORTHWEST AFRICA

Adolfo MARCO[1,2] and Samir MARTINS[2]

[1] Estación Biológica de Doñana, Consejo Superior de Investigaciones Científicas. Spain

[2] BIOS.CV. Cabo Verde

6. INTERANNUAL, INTERDECADAL AND LONG-TERM VARIABILITY

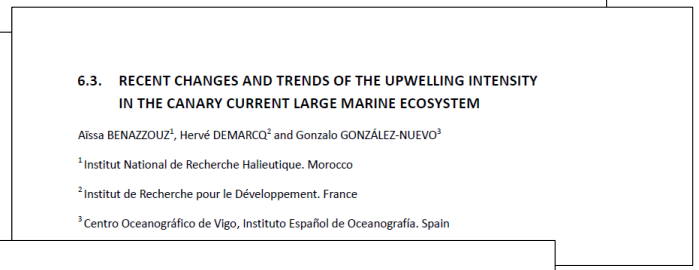
6.1. OPEN OCEAN TEMPERATURE AND SALINITY TRENDS IN THE CANARY CURRENT LARGE MARINE ECOSYSTEM

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



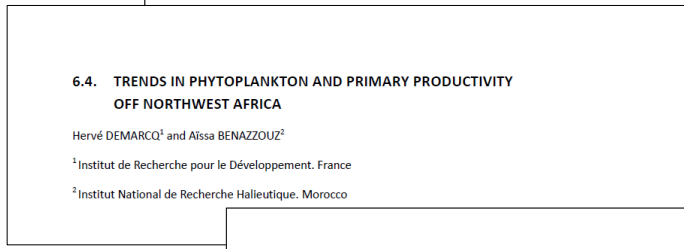
6.3. RECENT CHANGES AND TRENDS OF THE UPWELLING INTENSITY IN THE CANARY CURRENT LARGE MARINE ECOSYSTEM

Aïssa BENAZZOUZ[1], Hervé DEMARCQ[2] and Gonzalo GONZÁLEZ-NUEVO[3]

[1] Institut National de Recherche Halieutique. Morocco

[2] Institut de Recherche pour le Développement. France

[3] Centro Oceanográfico de Vigo, Instituto Español de Oceanografía. Spain

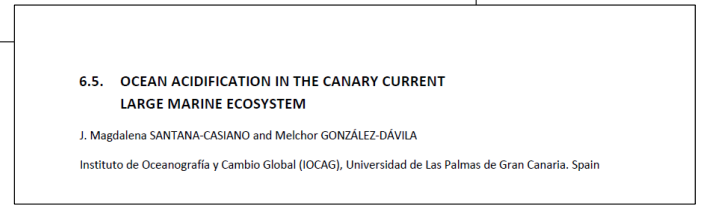


6.4. TRENDS IN PHYTOPLANKTON AND PRIMARY PRODUCTIVITY OFF NORTHWEST AFRICA

Hervé DEMARCQ[1] and Aïssa BENAZZOUZ[2]

[1] Institut de Recherche pour le Développement. France

[2] Institut National de Recherche Halieutique. Morocco



6.5. OCEAN ACIDIFICATION IN THE CANARY CURRENT LARGE MARINE ECOSYSTEM

J. Magdalena SANTANA-CASIANO and Melchor GONZÁLEZ-DÁVILA

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

Workshops (I)

Workshop on “Upwelling and environmental indicators”, held in Casablanca, Morocco (8-10 April 2014)

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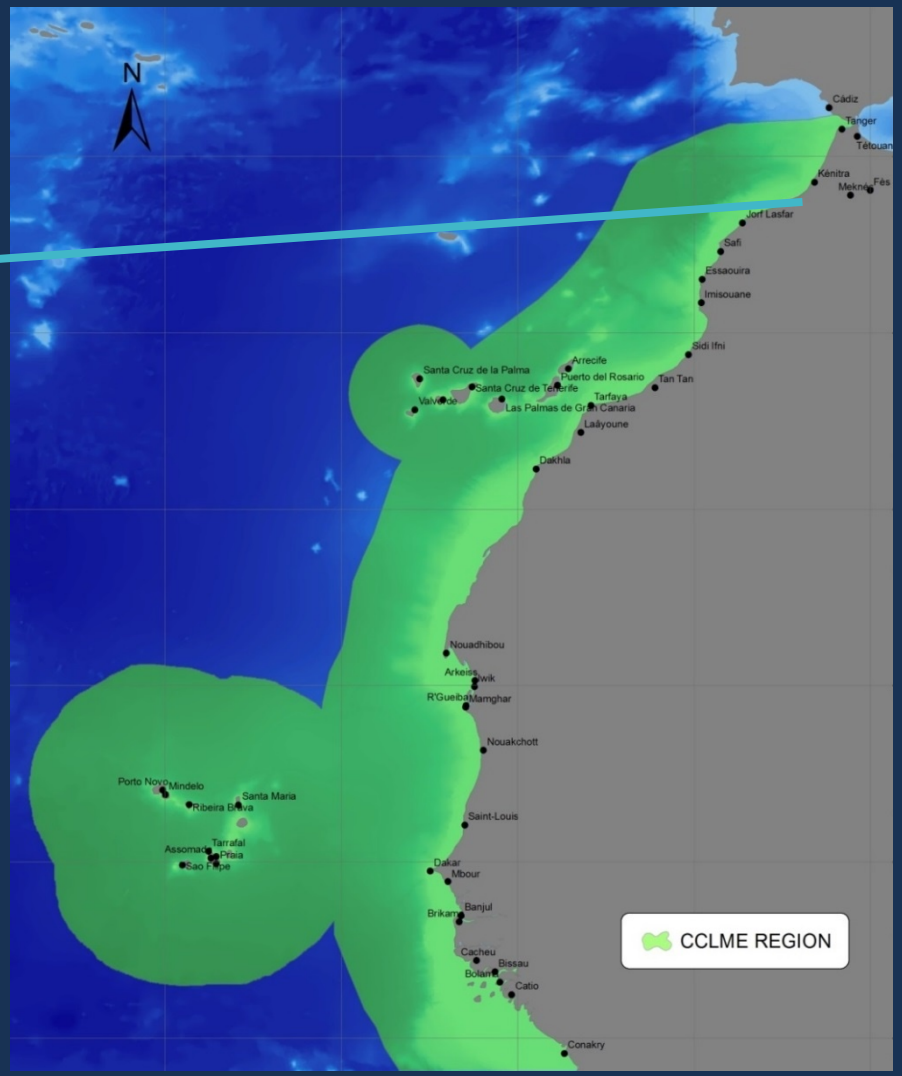

Workshops (II)

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

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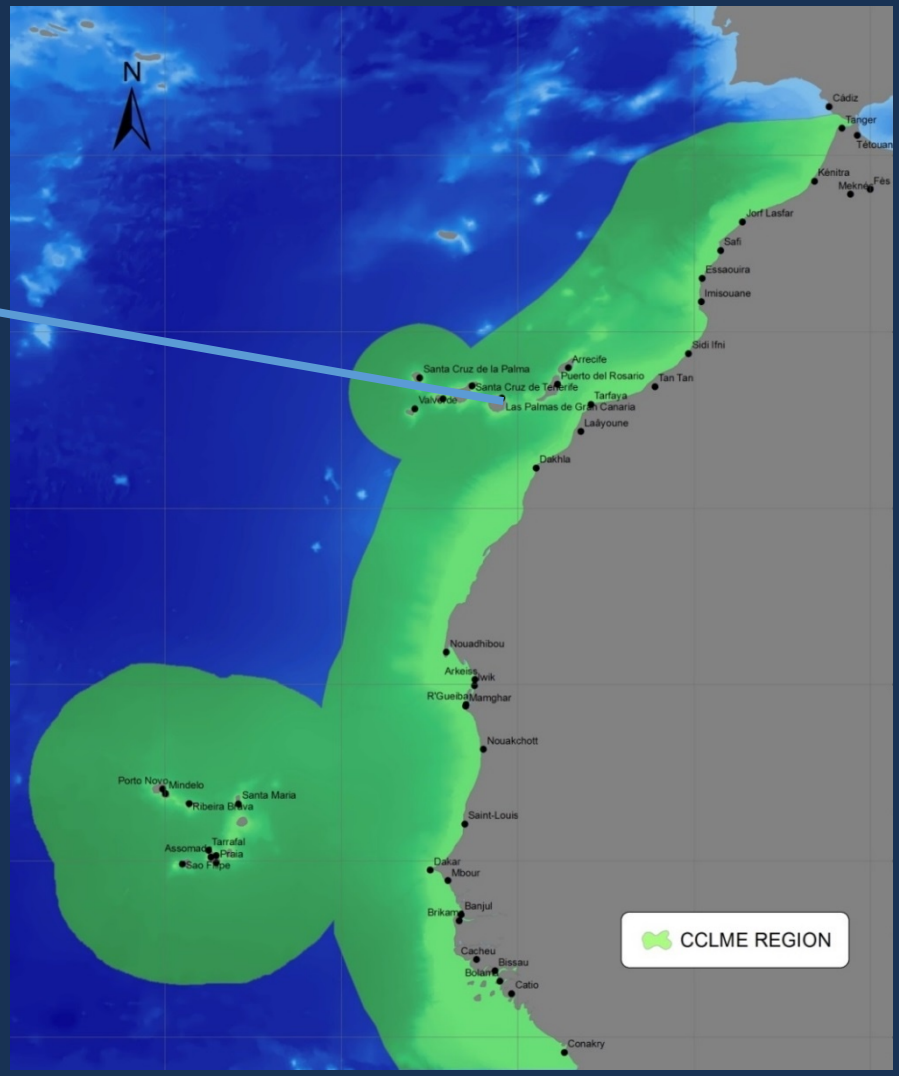
Intergovernmental Oceanographic Commission



PHASE II
Product III Data analytic viewer

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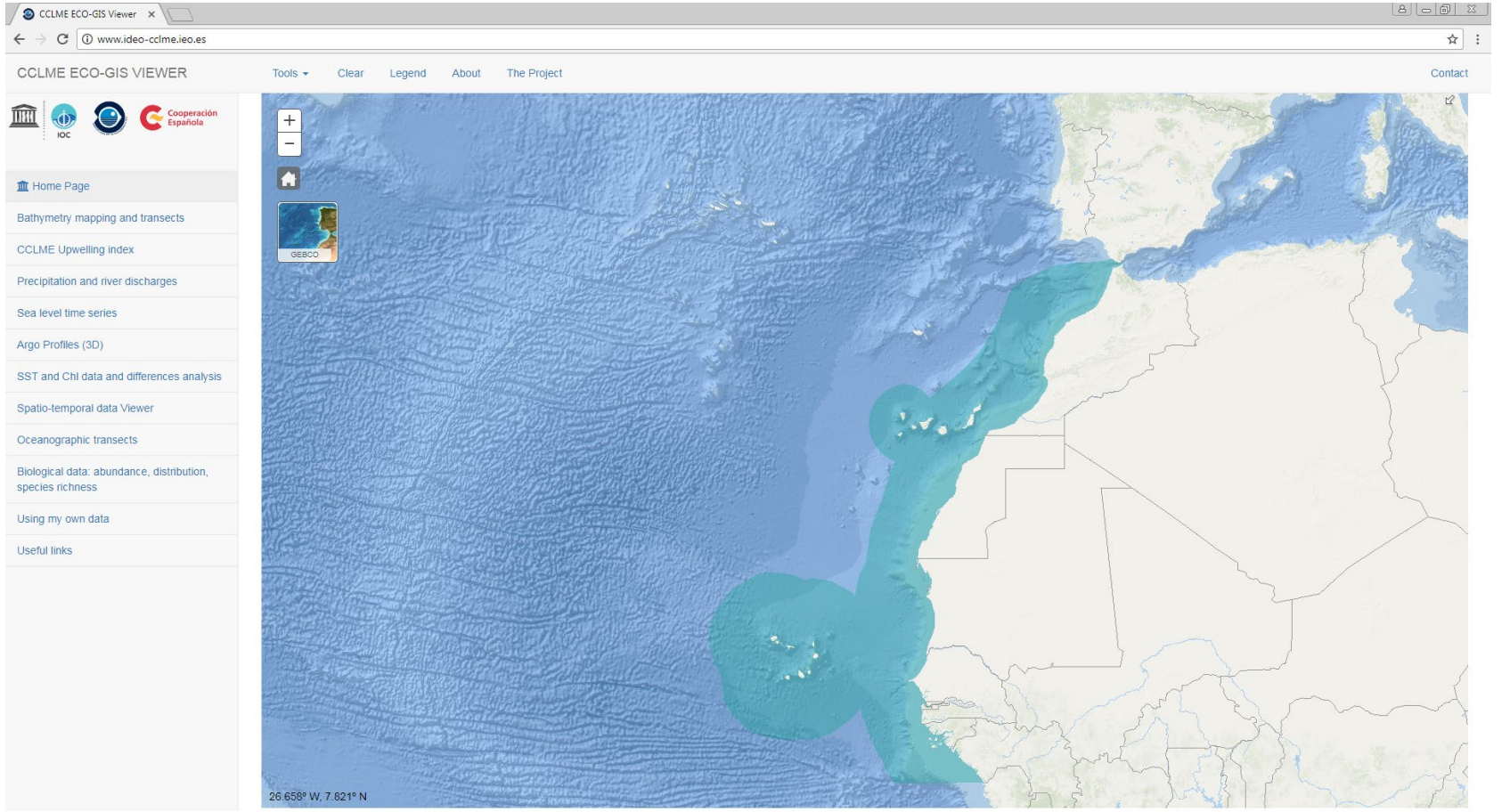
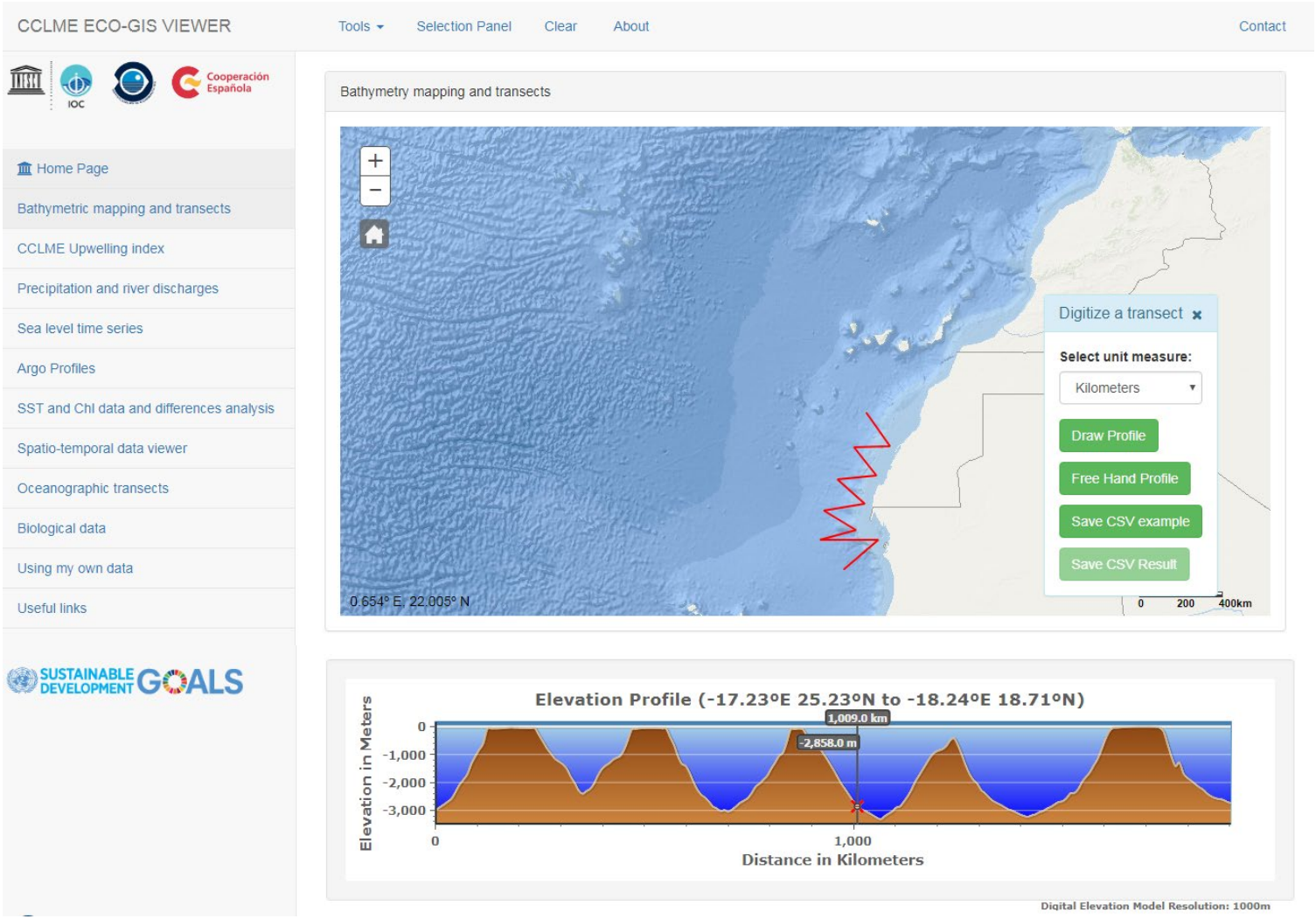
Oceanographic
Commission

CCLME Eco-GIS Viewer: http://www.ideo-cclme.ieo.es



IOC-UNESCO

CCLME Eco-GIS Viewer



IOC-UNESCO

Workshops (III)

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)

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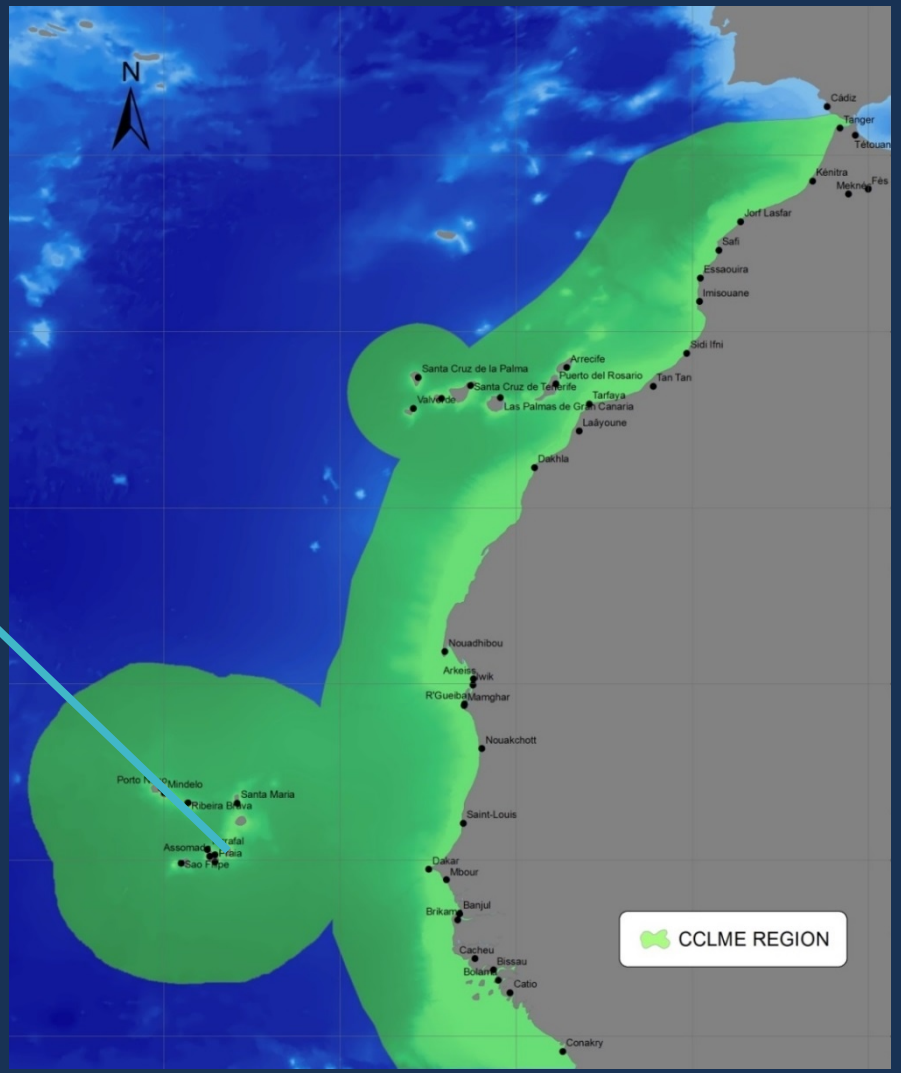

Workshops (IV)

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

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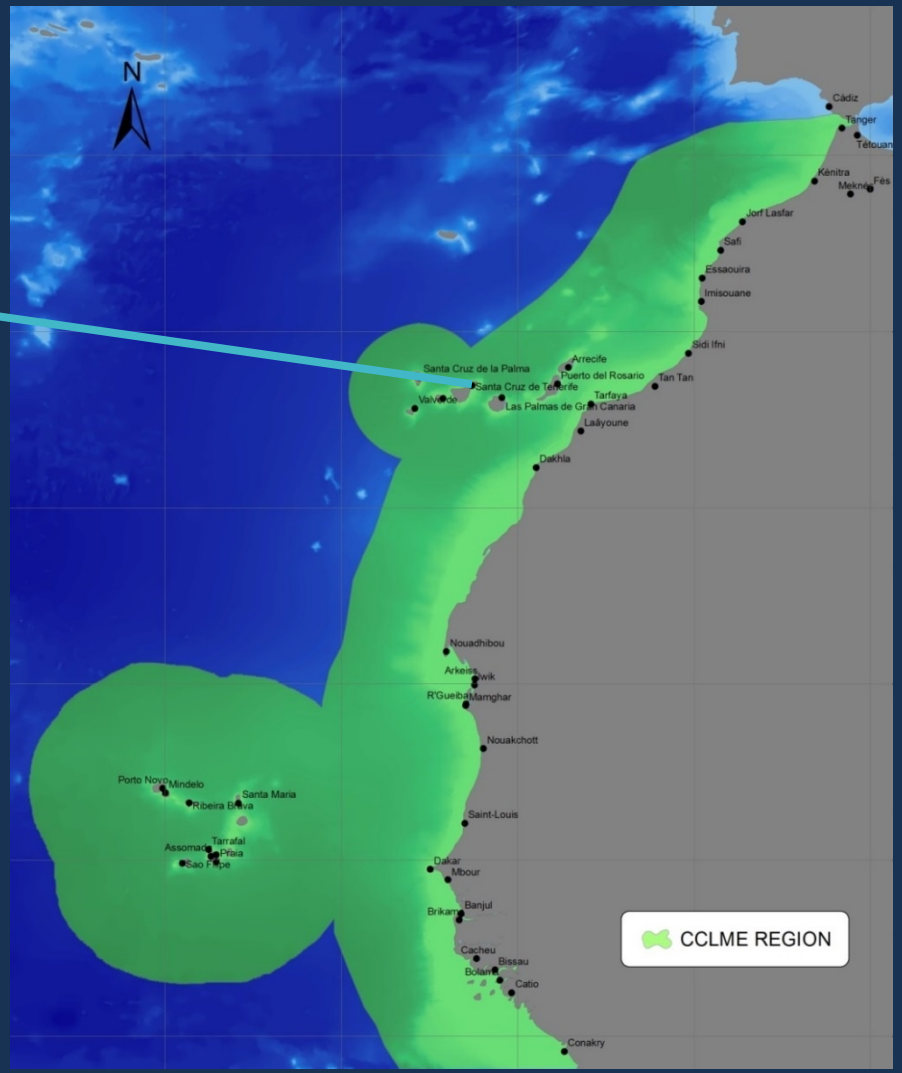

Workshop (V)

Workshop on “The effects of climate change on the productivity of the CCLME”
held in Santa Cruz de Tenerife, Spain (18-20 September 2018)

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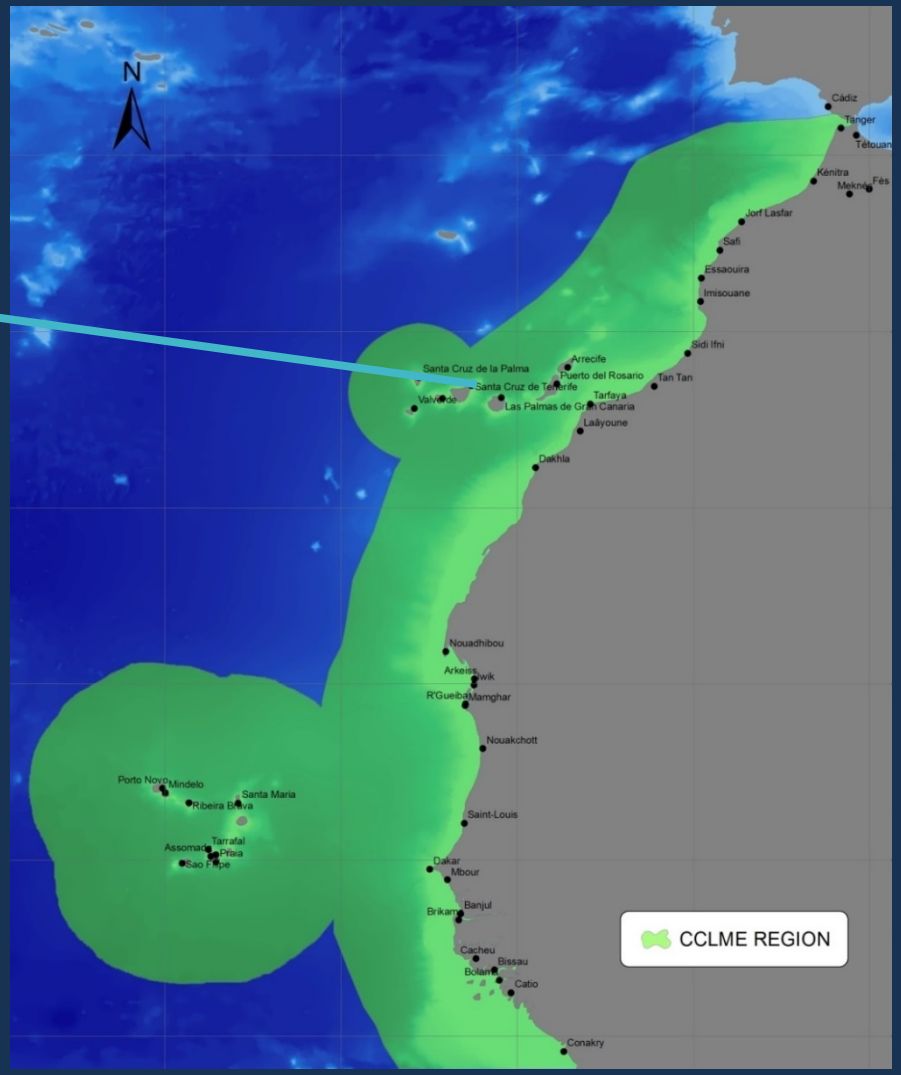


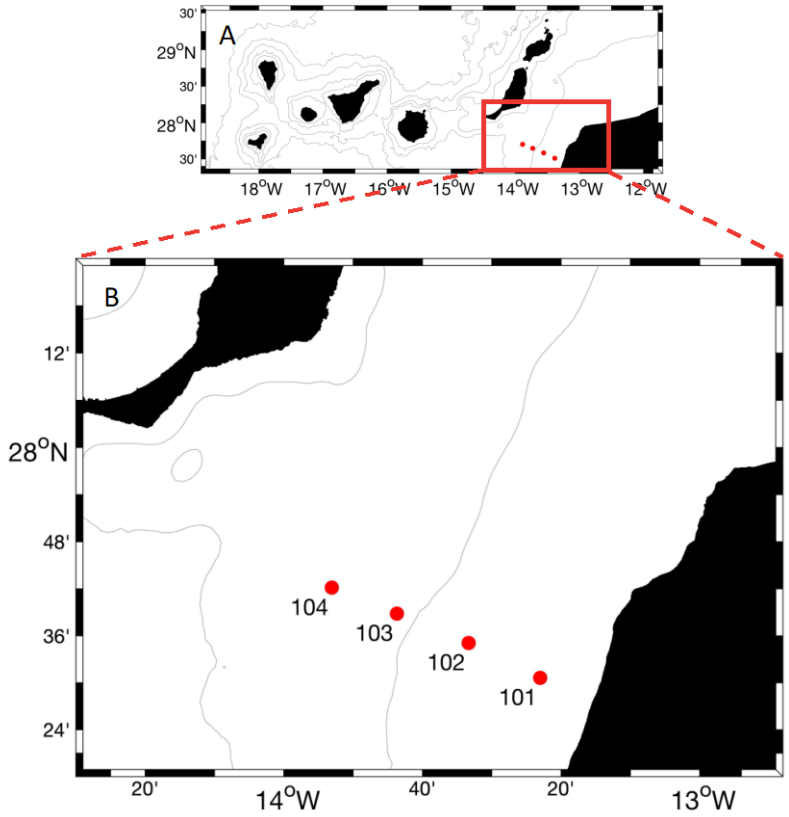
PHASE III
Results Primary production database

- EBUS **primary production database prepared**, compiling 327 primary production *in situ* data points from 20 studies.
  The archive contains: **164 measurements for the CCLME**

- Data was prepared in an additional data archive for integration in the CCLME Eco-GIS Viewer.

Results Phase III

Initial steps for validation of a PP model



Distribution of the four stations carried out the IEO survey RAPROCAN-1911, in which primary production and *in situ* chlorophyll data was sampled.

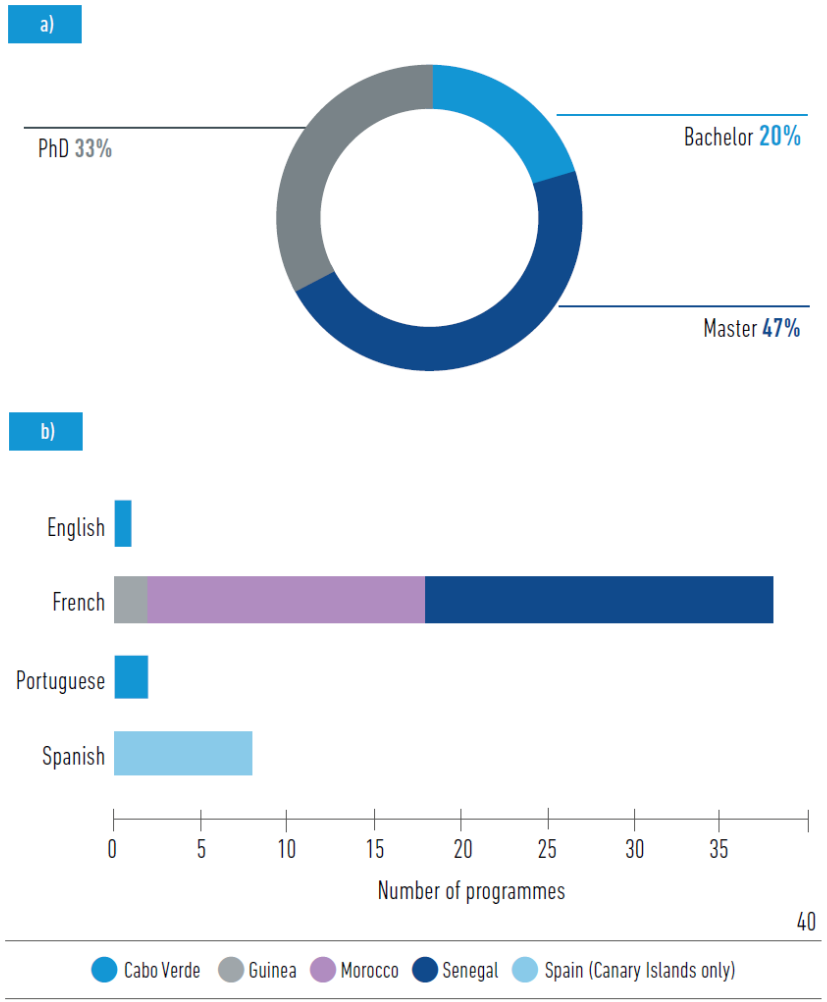
New primary production and *in situ* chlorophyll data was sampled during IEO survey RAPROCAN-1911 (November 2021) as an in-kind contribution to the project. Although the survey plan was designed to sample inside and outside the CCLME region to obtain a full gradient of variability, due to bad weather conditions only 4 samples could be taken in a small-scale transect off the coast of Morocco to the south-east of Fuerteventura Island, close to the African coast.

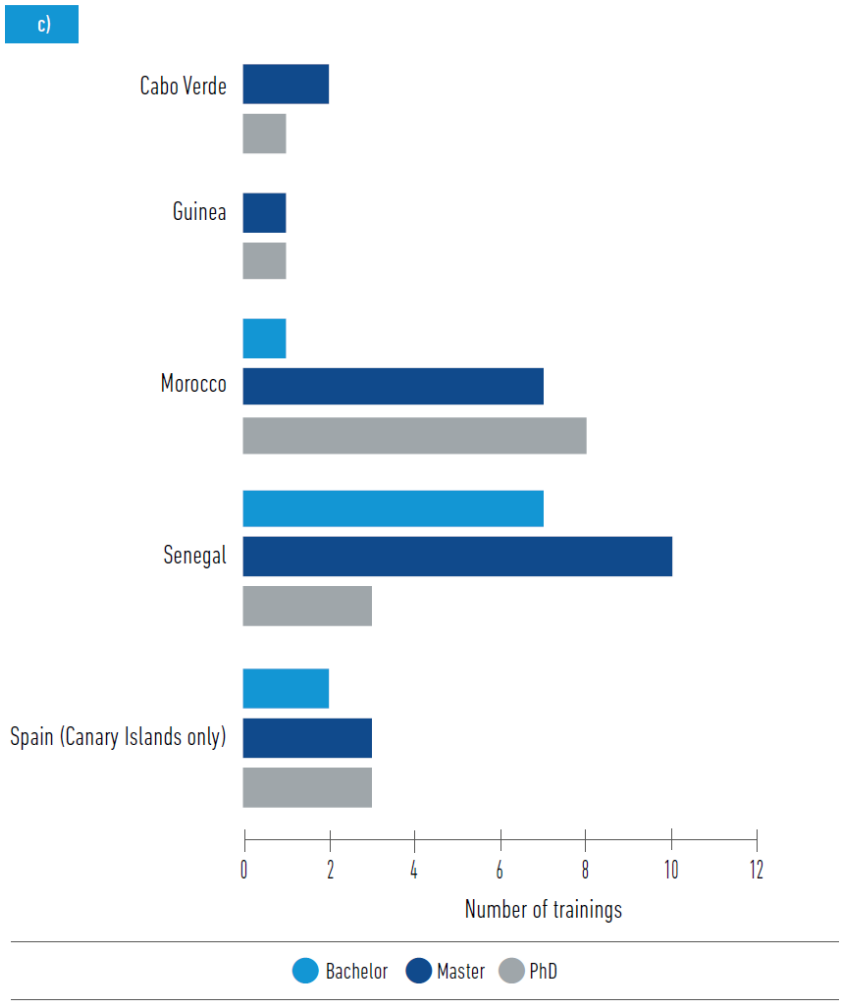
Concerning the validation of a regional primary production model for the Canary Current upwelling system, a case study was elaborated as a first attempt to calibrate available satellite-based primary production estimates with *in situ* measurements in the Canary region near the NW-African coastal upwelling. The purpose of this analysis was to assess which model adjusts better to *in situ* data collected during the RAPROCAN-1911 cruise.

Although the number of samples collected during the cruise was not sufficient for a robust evaluation of any model, the case study underlines the potential of the CAFE (Carbon, Absorption, and Fluorescence Euphotic-resolving) satellite-derived estimation (MODIS, temporal coverage: July 2002-July 2019) for further studies.

Results Phase III

Graduate and post-graduate training programmes





Academic year:
2019-2020

Total identified: 49

Figure 4.28. Number of training programmes identified in the CCLME Western Africa region: a) by type; b) by language;[39] c) by country.
Source: unpublished data IOC-UNESCO, 2020.

Graduate and post-graduate training programmes

Analysis

Case study included in the GOSR2020

Chapter 4 – Research capacity and infrastructure

MORE INFORMATION

http://en.unesco.org/gosr

https://ioc.unesco.org

GOSR PORTAL

https://gosr.ioc-unesco.org

Workshop (VI)

Training workshop on “The Canary Current Eastern Boundary Upwelling System” held in Mindelo, Cabo Verde (10-12 March 2020)

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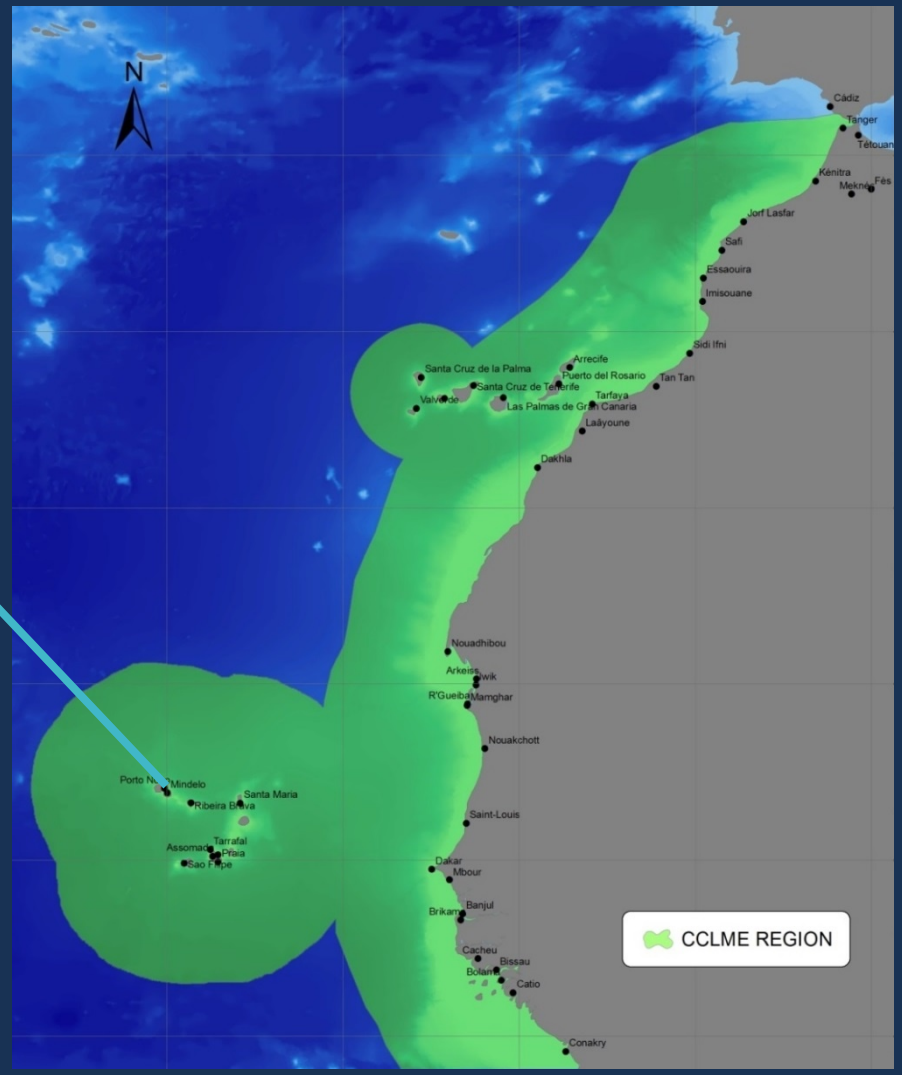


The Project: Phase IV

Invasive alien species and other ocean stressors: Furthering the scientific knowledge and capacity basis in the Canary Current Large Marine Ecosystem

Implementing Body:
IOC-UNESCO

Partner:
Instituto Español de Oceanografía -IEO-

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

Period:
July 2021 – June 2023

The Project: Implementation Strategy

Pillar 1: Enhancement of scientific knowledge on the Canary Current system through **scientific cooperation**. This pillar will focus on the effects of **multiple ocean stressors** and will include a collaborative approach to the question of **invasive alien species**.

Pillar 2: Engaging the scientific community for the **enhancement of the access to science-based data, information and knowledge produced or gathered under the frame of the project.** This pillar will focus on the transfer of marine technology and reinforced communication activities.

The Project: Pillar I

The intended output of this pillar is an assessment of IAS and other ocean stressors in the CCLME to be published as part of the IOC Technical Series.

- A collaborative assessment of IAS and other ocean stressors will be produced. It will build on **published scientific articles and grey literature for the region**.

- A series of **meetings** and drafting sessions will be **organized to facilitate the scientific discussions**.

- The review of IAS records in relevant existing databases such as IOC's Ocean Biodiversity Information System (OBIS) will allow the compilation of a **regional database on IAS**.

- The project will facilitate the development of a proposal for an action/contribution under the Ocean Decade

The Project: Pillar II

The intended output of this pillar is reinforced scientific capacities in the CCLME through improved access to scientific data, information and knowledge gathered and produced.

- Mentoring sessions will be organized.

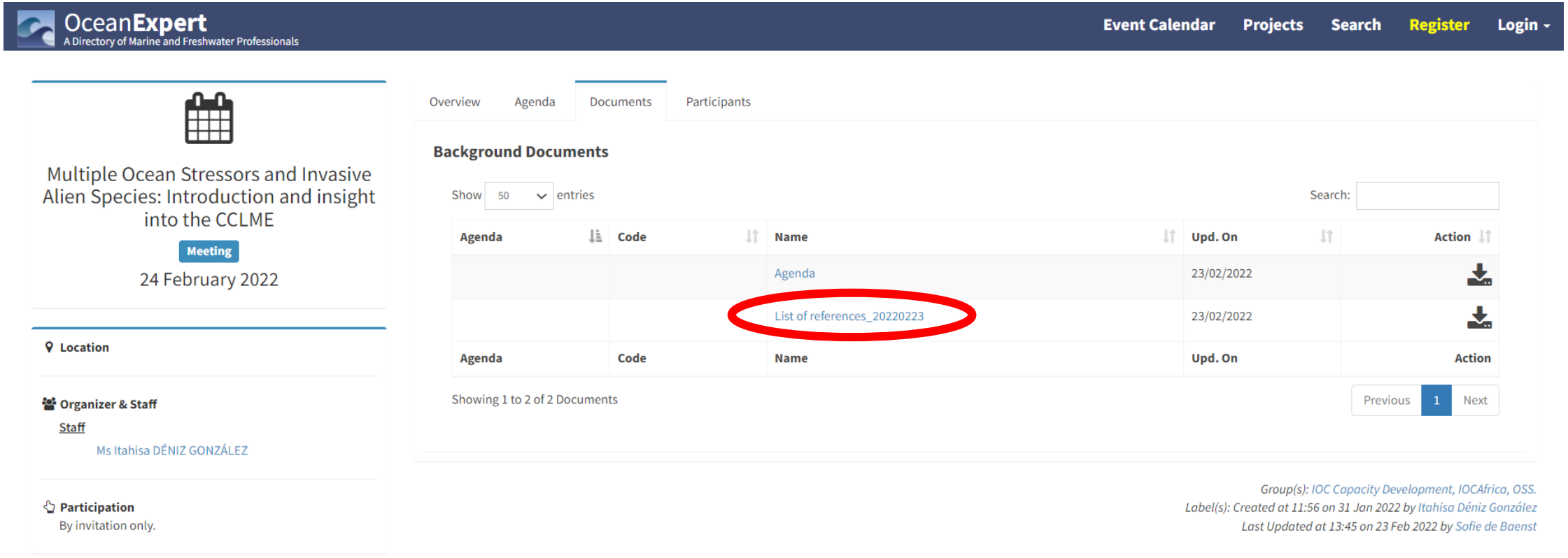
- A network of IAS experts in the region will be established.

- CCLME Eco-GIS Viewer will be reviewed and upgraded.
  Data and information compiled within the project will be made available.
  Within project phase III: **primary production database;**
  list of **graduate and post-graduate training programmes**
  (in connection with IOC Clearing House Mechanism)
  Within project phase IV: **regional database on IAS**

- A tailored communication plan for the project will be produced.

Draft list of scientific references

https://oceanexpert.org/document/30109



THANK YOU

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