



INTERNATIONAL HYDROGRAPHIC ORGANIZATION
NATIONAL REPORTS FROM COLOMBIA TO THE MACHC18

Reference: IHO Resolution 2/1997 as amended

Executive summary

1. Hydrographic Office / Service:

- a) *Dirección General Marítima - DIMAR*
Centro de Investigaciones Oceanográficas e Hidrográficas del Caribe - CIOH

b) Description:

It is the Colombian Maritime Authority is responsible of implementing the government policy in this matter, having a structure that contributes to the strengthening of the national maritime power, ensuring the maritime integral safety, the protection of human life in the sea, the promotion of maritime activities and the scientific and technological development of the nation.

It exercises its functions throughout the Colombian maritime jurisdiction; 928,660 km² (358,557 sq mi), equivalent to 44.85% of the national territory, and in the 2,900 km (1,802 mi) of coastlines (Pacific and Caribbean coasts), in addition to the main rivers located in the border zones, and in the Magdalena River in the final 27 kilometers (17 miles) which flow into the sea.

Additionally, its jurisdiction goes beyond the Exclusive Economic Zone (EEZ) in respect of their actions within the concept of Flag State.

c) Submitted by:

Commander HERMAN AICARDO LEÓN RINCÓN jefcioh@dimar.mil.co

2. Surveys 2017:

a) Coverage of new surveys:

Caribbean

<i>No.</i>	<i>Nombre</i>
203	<i>Cayo Alburquerque</i>
204	<i>Cayo East Southesast</i>

208	<i>Cayos Serranilla</i>
253	<i>Rio Magdalena</i>
414	<i>Islas de San Andrés, Cayos de Alburquerque y Cayos de East Southeast (Este Sudeste)</i>
416	<i>Quitassueño</i>
419	<i>Isla Cayo Serranilla</i>
420	<i>Isla Cayo Roncador</i>
879	<i>Sapzurro</i>
860	<i>Turbo</i>
	<i>Escarpe Hess</i>

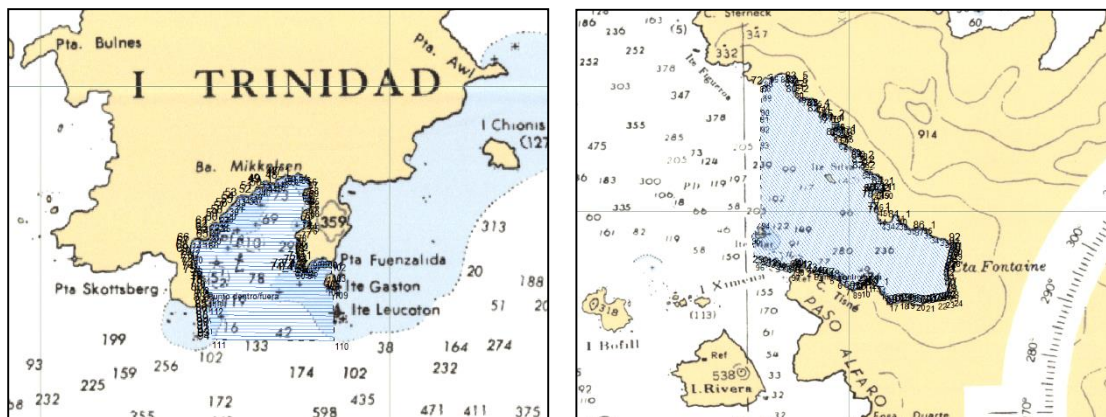
Pacific

<i>No.</i>	<i>Nombre</i>
146	<i>Rio Mataje</i>
150	<i>Bahía Málaga</i>
154-155	<i>Bahía de Buenaventura “Postdragado”</i>
	<i>Apoyo municipio Olaya Herrera</i>

It is highlighted that the hydrographic surveys in the Colombian Pacific Ocean are carried out in combination of the two research centers based in Cartagena (Caribbean) and Tumaco (Pacific).

The collection of information on fluvial hydrodynamics and hydraulic modeling in the Amazon River, CO-PE

Surveys in Mickelsen Port and Trinidad Island, and Cierva Cove in Antartic Peninsula



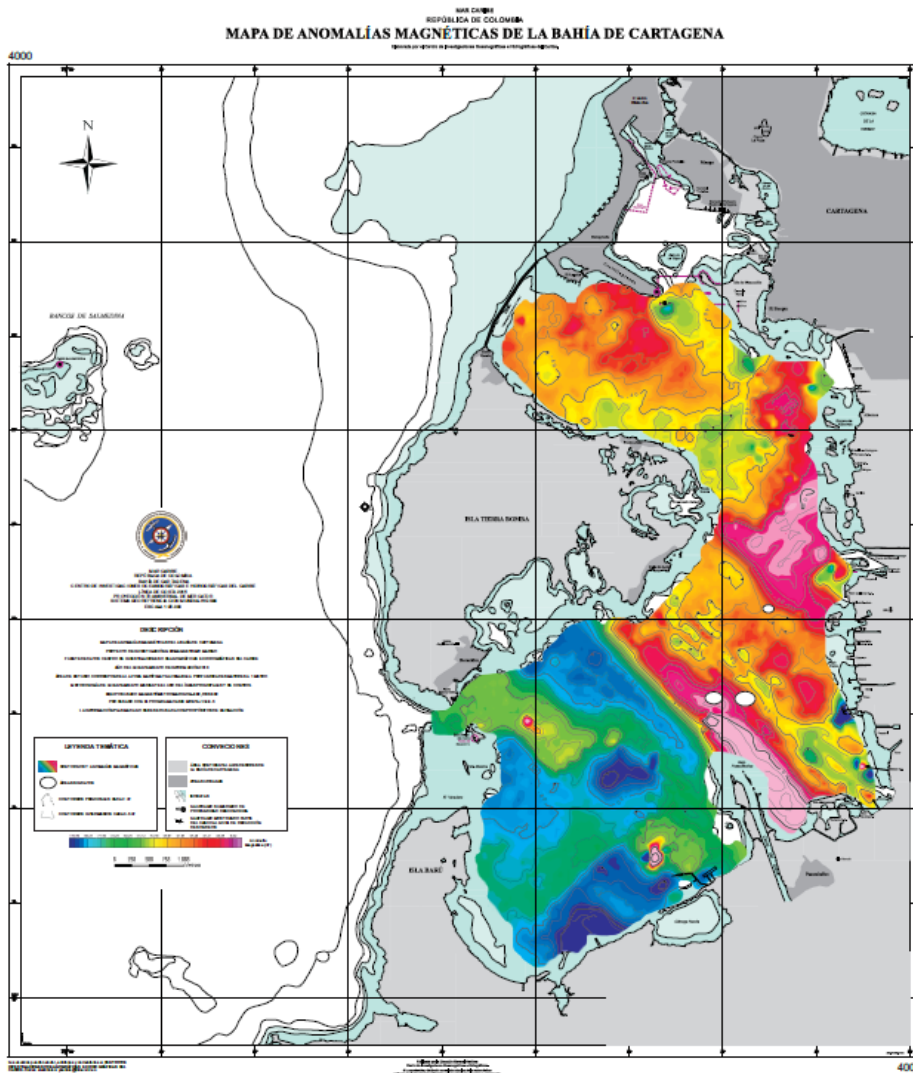
Third Research Expedition to Antarctic in Austral summer 2017-2018

Lidar project with NOAA

- b) New technologies and /or equipment

The information was collected through the Post MV V5 system of Applanix, which has an IMU sensor (Inertial Movement Unit) and an advanced GNSS receiver system allowing greater accuracy in position, altitude and synchronization.

Methodology of survey and processing of the information collected by the magnetometry method and for which the marine magnetometer G-882 was used.



Thematic chart of magnetic anomalies of the bay of Cartagena

c) New ships

Anyone

d) Problems encountered

Anyone

3. New charts & updates:

a) ENCs

CO500770 *Puerto de Tumaco*
 CO500730 *Puerto de Buenaventura*
 CO400153 *Aproximación al Puerto de Buenaventura*
 CO400109 *Aproximación a Bahía Solano*
 CO400146 *Boca Río Mataje*
 CO500804 *Bahía de Santa Marta*
 CO500253 *Rio Magdalena*
 CO500229 *Bahía Portete*
 CO400603 *Aproximación a Bahía Portete*
 CO400611 *Ciénaga a Isla Aguja*
 CO400613 *Galerazamba a Punta Morro Hermoso*
 CO500261 *Bahía de Cartagena*
 CO600843 *Bahía de Cartagena*
 CO500822 *Puerto Velero*

The captured ENC's are updated with the warnings to permanent navigators that affected them. The affected cells were:

003 (019)	008 (039)	020 (004)	021 (018)	022 (019)	023 (013)
024 (016)	025 (012)	026 (010)	301 (000)	302 (003)	306 (016)
310 (003)	150 (004)	153 (010)	201 (007)	222 (002)	502 (002)
514 (000)	515(000)	517 (004)	520 (005)	521 (000)	603(001)
604 (003)	605 (001)	606 (008)	608 (000)	611 (001)	612 (002)
615 (005)	618 (004)	624(002)	625 (007)	660 (002)	662 (000)
200 (011)	202 (002)	203 (002)	204 (002)	211 (001),	213 (002)
218 (012)	227 (002)	229 (003)	237(000)	242 (001)	246 (001)
253 (004)	255 (002)	261 (043)	267 (001)	710 (001)	730 (013)
770 (000)	804 (002)	808 (000)	848(000)	843 (013)	879 (003)

b) ENC Distribution method

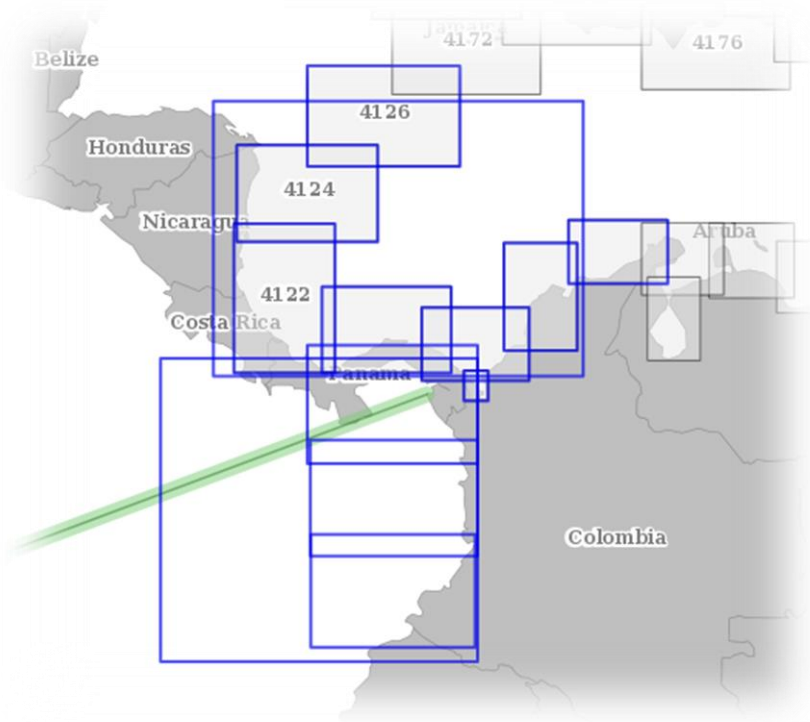
The Colombian ENC are distributed under agreement with the RENC IC-ENC

c) RNCs

Anyone

d) INT charts

The INT Charts of both the Caribbean (09) and the Pacific (04) under the responsibility of Colombia, are already published and are currently being updated.



e) National paper charts

No.	Title	Edition
611	<i>Ciénaga a Isla Aguja</i>	<i>1ra Edition</i>
418	<i>Islas Cayos de Bajo Nuevo</i>	<i>2da Edition</i>
213	<i>Cayo Serrana</i>	<i>2da Edition</i>
201	<i>Isla de San Andrés</i>	<i>5ta Edition</i>
261	<i>Bahía de Cartagena</i>	<i>8va Edition</i>
415	<i>Islas de Providencia y Santa Catalina</i>	<i>1ra Edition</i>
416	<i>Isla Cayos de Quitasueño</i>	<i>3ra Edition</i>
417	<i>Isla Cayos de Serrana</i>	<i>1ra Edition</i>
414	<i>Islas de San Andrés, Cayos de Alburquerque y Cayos de East Southeast (Este Sudeste)</i>	<i>1ra Edition</i>
211	<i>Isla Cayos de Roncador</i>	<i>2da Edition</i>
253	<i>Río Magdalena (Bocas de Ceniza – Puente Laureano Gómez)</i>	<i>6ta Edition</i>
420	<i>Aproximación a Isla Cayos de Roncador</i>	<i>1ra Edition</i>
154	<i>Bahía de Buenaventura (Bahía Externa)</i>	<i>2da Edition</i>
155	<i>Bahía de Buenaventura (Bahía Interna)</i>	<i>2da Edition</i>
710	<i>Bahía interior de Solano</i>	<i>1ra Edition</i>
310	<i>Punta Isla de Cascajal a Río Mataje</i>	<i>3ra Edition</i>

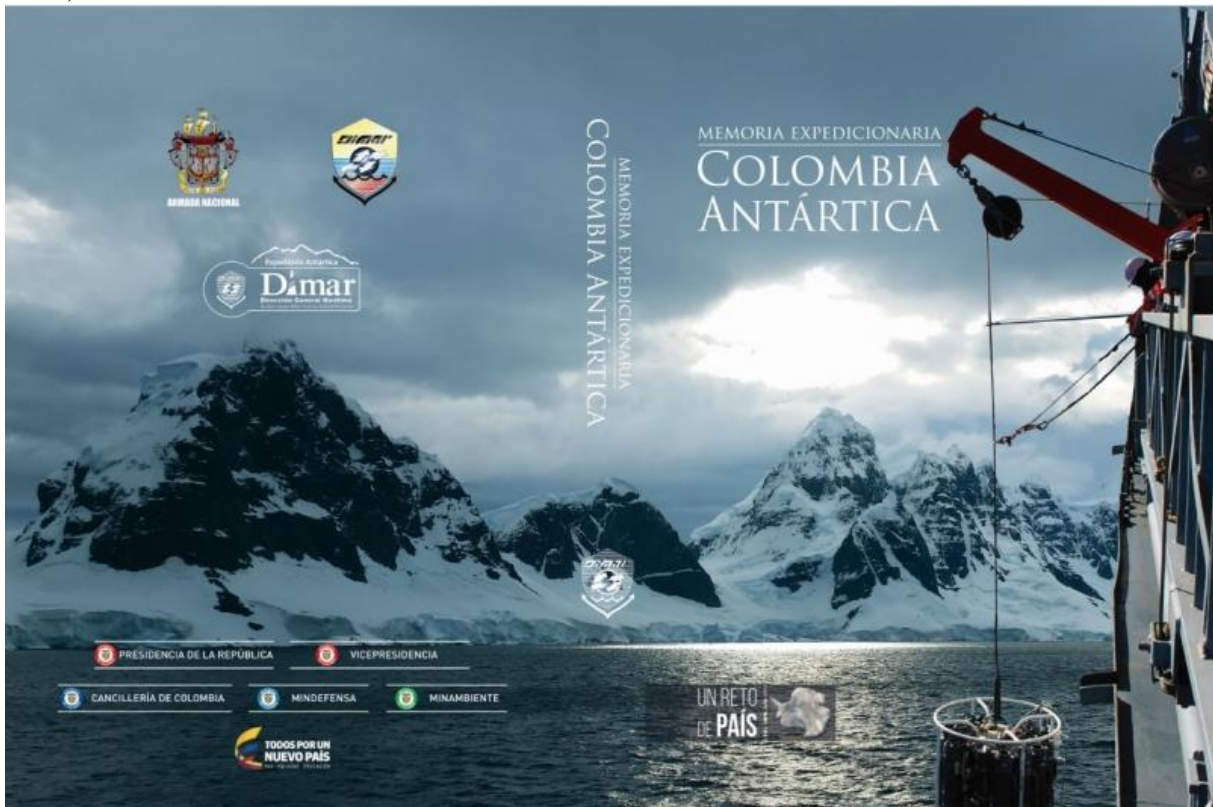
f) Other charts, e.g. for pleasure craft

g) Problems encountered

Anyone

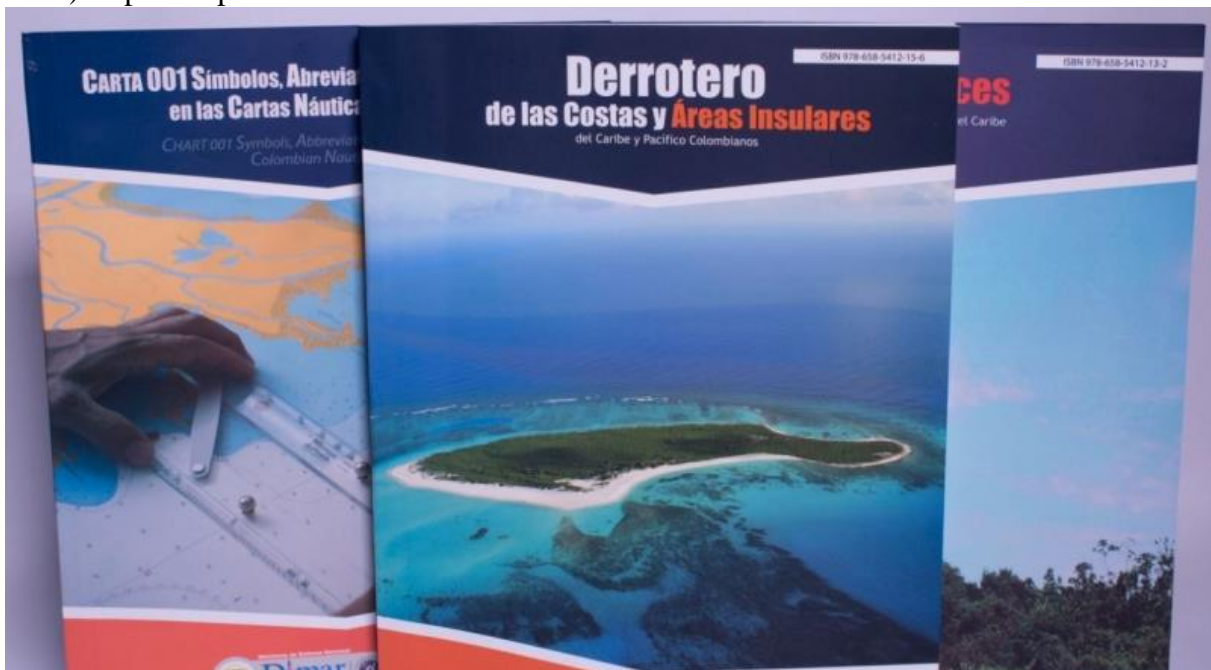
4. New publications & updates:

a) New Publications



Dimar presents in the first place its expeditionary memory "Colombia Antártica: a challenge of the country", a volume composed of five chapters, in which the historical review of Antarctica is reported, apart from the I, II and III Antarctic expeditions, the institutions and research groups that have participated in them.

b) Updated publications





Magazine "Country of seas" of the General Maritime Directorate with chapter about "Hydrography, sovereignty and development through science", "Exploring new capabilities on board oceanographic vessels in Colombia"

c) Means of delivery, e.g. paper, digital

All nautical publications are available for distribution on the web www.dimar.mil.co and www.cioh.org.co

d) Problems encountered

Anyone

5. MSI

a) Existing infrastructure for transmission

The Hydrographic Service has the Nautical Section. It is the area in charge of collecting and providing the information for the nautical radio announcements to the national NAVTEX coordinator, which operates from the DIMAR headquarters (Bogotá) in charge of transmitting the messages from radio stations for the Caribbean from Santa Marta and the Pacific Colombian from Punta Soldado.

Transmisor NAVTEX	Carácter (B₁) de Identificación del Transmisor	Horas (UTC) de Inicio de las Transmisiones	Hora Colombiana (UTC-5) de Inicio de las Transmisiones
Zona Caribe Santa Marta Estación Norte	518 kHz – Carácter [C] Charlie	0020, 0420, 0820, 1220, 1620 y 2020	0320, 0720, 1120 y 1520, 1920 y 2320
	490 kHz – Carácter [K] Kilo	0140, 0540, 0940, 1340, 1740, 2140	0040, 0440, 0840, 1240, 1640 y 2040
Zona Pacífico Punta Soldado Estación Oeste	518 kHz – Carácter [O] Oscar	0220, 0620, 1020, 1420, 1820 y 2220	0120, 0520, 0920, 1320, 1720 y 2120
	490 kHz – Carácter [C] Charlie	0020, 0420, 0820, 1220, 1620 y 2020	0320, 0720, 1120 y 1520, 1920 y 2320

b) New infrastructure in accordance with GMDSS Master Plan

In development

c) Problems encountered

The NAVTEX Station of Punta Soldado in the Pacific, is out of service.

DIMAR will move the station to Naval Isla. This project finish in January 2018

6. C-55

The table with the latest information to update IHO Publication C-55 (*Status of Hydrographic Surveying and Charting Worldwide*) is provided in Annex B.

7. Capacity Building Offer of and/or demand for Capacity Building

a) Training received, needed, offered

Fact

Workshop offshore surveys (geophysical analysis and identification of seamounts)

Course administration of navigation aids level I. National.

Received

Workshop on Bathymetry Data Base PE
Bathymetry training course using RTK technology BR
Digital Photogrammetry with satellite images AR
Data Management WORKSHOP. UY

Offered

MSDI. 2018

- b) Status of national, bilateral, multilateral or regional development projects with a hydrographic component. (In progress, planned, under evaluation or study)

In the development of Agreements between national navies, training sessions, advisories and assesment are coordinated with:

SHOA	CL
DHN	PE
INOCAR	EC
NOAA	USA

- c) Description of requests to be considered by the IHO/CBSC

ENC VALIDATION	2019
AtoN REQUIREMENTS AND MANAGEMENT.	2020

8. Oceanographic activities

a) General

- *Production of operational oceanography information necessary for the planning and development of naval operations.*
- *Generation, processing and analysis of information on meteorological conditions in the Pacific and the Colombian Caribbean*
- *Generation, Processing and analysis of oceanographic conditions in the Pacific and the Colombian Caribbean*
- *Homologation and standardization of techniques and methods of marine oceanographic and meteorological research.*
- *Know the physical -chemical and biological dynamics of oceanic and coastal currents characteristic of the Colombian Pacific and Caribbean Basin.*
- *Implement a system composed of an instrumental database, numerical models and remote sensing products that simulate, in a diagnosis and forecast mode, the variations of the general atmospheric ocean conditions and at the local scale of the Colombian Pacific and Caribbean Basin.*
- *Tidal forecasts*
- *Monitoring ENOS Central and Eastern Pacific Conditions*

- *Tsunami Warning Center*
- *ERFEN Project*



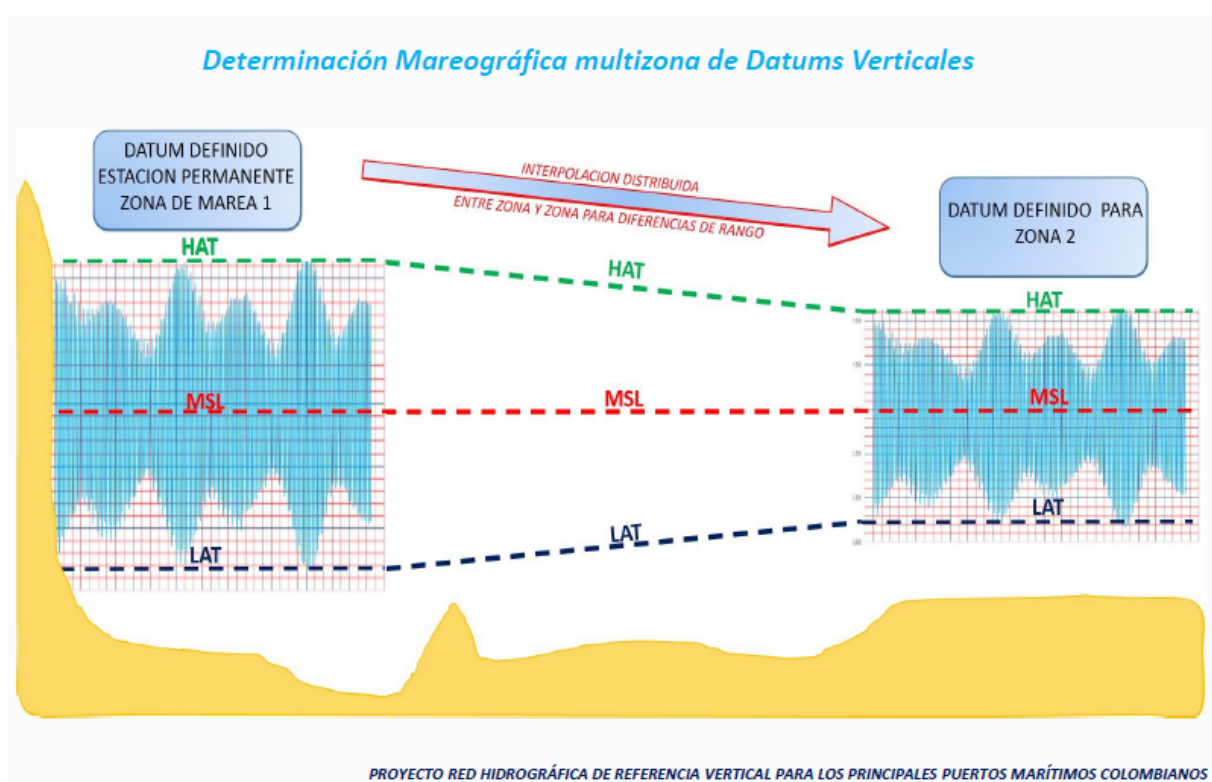
Dirección General Marítima (Dimar) finalized the oceanographic component of its research project, led by the Center for Oceanographic and Hydrographic Research (CIOH) in the Caribbean during the fourth Seaflower scientific expedition, on Cayos de Serranilla Island. The expedition plans to analyze the oceanographic, hydrographic and biological characteristics of the study area to integrate them into the studies that have been carried out in the Archipelago of San Andrés, Providencia and Santa Catalina, during the last years.

b) GEBCO/IBC's activities

Coordination with IBCCA projects
Coordination with IBCSEP projects

c) Tide gauge network





A network of permanent gauge stations is available in the Pacific, Caribbean and Insular regions. All digitally interlaced via intranet under the administration of DIMAR.

- d) New equipment
- e) Problems encountered

9. Other activities

- a) Participation in IHO Working Groups

Member MICC-MACHC
 Member Council IHO
 Chariman SEPHC
 Member HCA

- b) Meteorological data collection

DIMAR collect meteorological data in the Pacific, Carribean and Insular Colombian cost lines. We are encouraged to regional forecast in conjunction with IDEAM Government institution of this issue.

In this MoU (DIMAR-IDEAM) we are collecting tide levels and publishing sea level forecasts

- c) Geospatial studies

HPD and Bathy Data Base are implementing

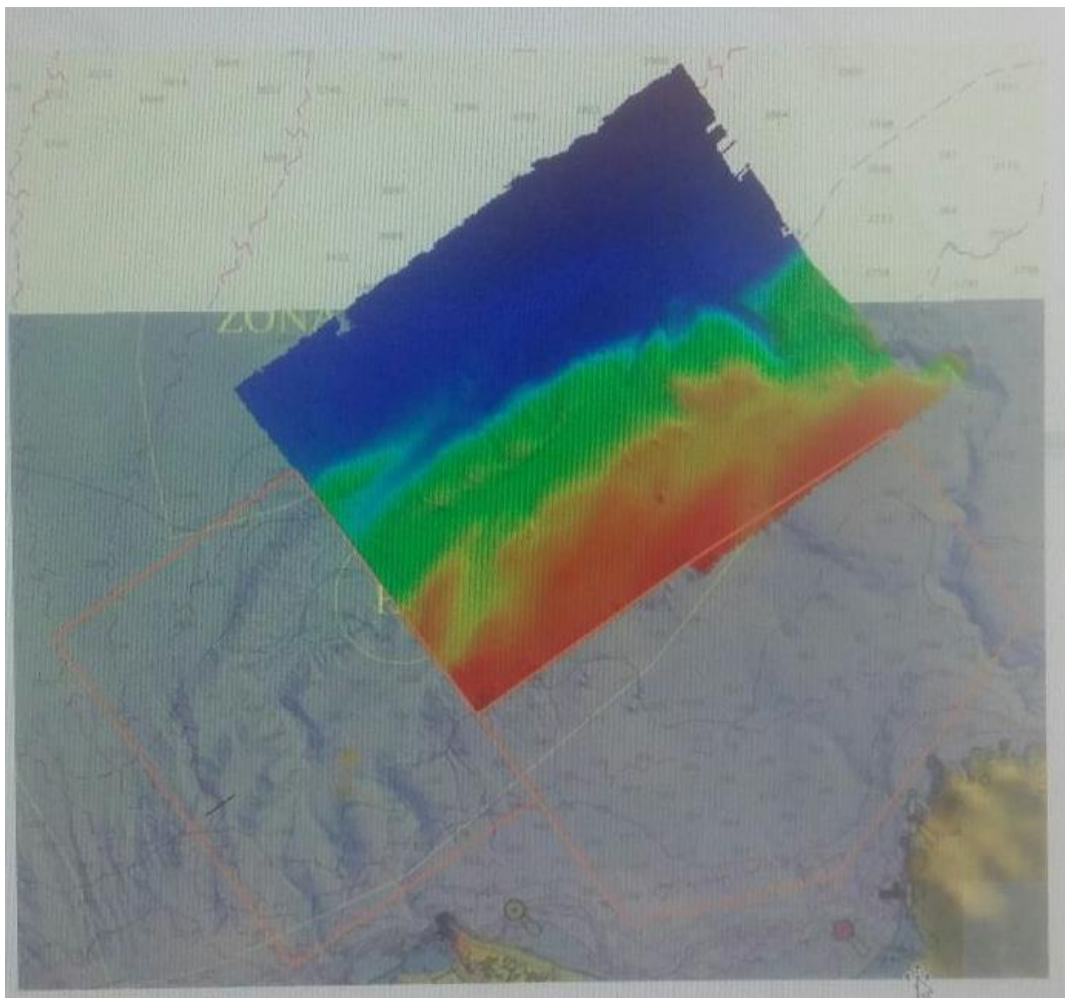
d) Disaster prevention

DIMAR has a tsunami prevention system formed by monitoring offices-station in the Pacific, Caribbean and Central Headquarters, personal trained to alert in the shortest possible time in case of Tsunami. The Hydrographic Service is preparing a post-disaster plan for hydrographic activities to begin measuring the affected bays in order to position the navigation obstructions for the subsequent clearing of the channel and thus allow the safe navigation of the ships with humanitarian aid.

These offices receive information from 22 sea level stations: 13 in the Caribbean and 9 in the Pacific and one Tsunami buoy.

Flood charts are planned for the coastal populations of the Colombian Pacific and began work to evaluate the Caribbean

In the last XIII SEPHC meeting the MS could share his experiences in this kind of circumstances... the principal problem suffer was the fails in the communication's



Searching the landslide undersea

e) Environmental protection

Both Research Centers carry out the “Ballast water” project, which reduces the risk of the entry of invasive species into our ecosystems.

Through this project, support has been provided to the Harbor Masters in both the Caribbean and the Colombian Pacific

f) Astronomical observations

Not

g) Magnetic/Gravity surveys

The First in the Cartagena bay

h) MSDI Progress

Cartographic data source Antarctic expedition Shared service with data sources .csar
<http://dimar.maps.arcgis.com/apps/MapSeries/index.html?appid=4587ab3618ec425497db95d045f10e77>

i) International

Around IHO, IALA, IMO

10. Conclusions

a) Areas of significant achievement

Great achievements have been achieved, such as the incorporation of the ARC multipurpose hydrographic vessel "Roncador", the training, the beginning of bathymetric surveys under the control of the Pacific Hydrographic Research Center and the taking of magnetometry data.

b) Areas of particular concern

*Depth survey to define geofoms in the Colombian territory.
 Surveys in navigable rivers of Colombia*

c) Any other matters of interest to the RHC

Support the growth of the Hydrographic Service of Panama

The full support and attention is requested to the development of the tasks and commitments acquired by the Chair of the Commission before the IHO, the different Committees and Subcommittees and the representation before the International Hydrographic Council.

Continue with the cooperation and exchange of experiences among the Member States

Input to the IHO Publication P-5 (*Yearbook*)Country: COLOMBIAOrganization: **Dirección General Marítima Centro de Investigaciones Oceanográficas e Hidrográficas del Caribe**

Contact information/ Informations de contact / Información de contacto	
-National Hydrographer or equivalent -Directeur du service hydrographique ou équivalent -Director del Servicio Hidrográfico o equivalente	Director General Marítimo RADM Paulo Guevara Rodríguez Postal address: Cra.54 No.26-50, CAN BOGOTA D.C., Colombia Tel: +57 1 220 2511 E-mail: dimar@dimar.mil.co
-Head of the Hydrographic Office (if different from the person indicated above) -Directeur du Service Hydrographique (si différent de la personne indiquée ci-dessus) -Director del Servicio Hidrográfico (si diferente de la persona indicada anteriormente)	Coordinador Asuntod Internacionales, PD Paula Carolina Pérez Monroy Tel: +57 1 220 0490 (PBX) Ext 2440 E-mail: pperez@dimar.mil.co Asesor Grupo Internacional, Alonso NAVARRO Tel: +57 1 220 0490 Ext 2444 E-mail: anavarro@dimar.mil.co Centro de Investigaciones Oceanográficas e Hidrográficas del Caribe (CIOH) Dirección postal: Isla de Manzanillo, Escuela Naval "Almirante Padilla", CIOH Tel: + 57 5 669 4427 Fax: + 57 5 669 4390 Movil: +57 311 531 1243 E-mail: shn@dimar.mil.co
-Other point(s) of contact -Autre(s) point(s) de contact -Otros punto(s) de contacto	JT (RA) Dagoberto Uriel DAVID VITERI Advisor Hydrographic and Cartographic CIOH E-mail: ddavid@dimar.mil.co y ddavidviteri@gmail.com
-Web site -site web -sitio web	www.dimar.mil.co www.cioh.org.co www.cccp.org.co
Country information / Informations sur le pays/ Información sobre el país	
-Declared National Tonnage -Tonnage national déclaré -Tonelaje Nacional Declarado	Tonnage: 124159 Date: 16th February 2017
-National day -Fête nationale -Fiesta nacional	20 th July
-Date of establishment and Relevant National Legislation -Date de mise en place et législation nationale pertinente -Fecha de constitución y	Independence Day

legislación nacional pertinente	
-Date first joined IHO -Date d'adhésion à l'OHI -Fecha de adhesión a la OHI	23rd February 1996
-Date ratification Convention -Date de ratification de la Convention -Fecha de ratificación de la Convención	28th October 1997
-Remarks on membership -Remarques sur l'adhésion -Comentarios sobre la adhesión	MS 67
Agency information/ Information sur l'agence/ Información sobre la agencia	
-Top level parent organisation -Organisme mère -Organización asociada de nivel superior	Ministerio de Defensa Nacional, Armada Nacional de Colombia
-Principal functions of the organisation or the department -Attribution principales de l'organisme ou du département -Principales funciones de la Organización o departamento	<p>https://www.dimar.mil.co/en/content/roles-and-responsibilities</p> <p>Provide guidance to the Government in the adoption of policies and programmes related to maritime activities and implement them within the confines of its jurisdiction.</p> <ul style="list-style-type: none"> • Direct, regulate, control, and promote the development of the Merchant Navy, marine scientific research and use of marine resources. • Coordinate maritime traffic control along with the Colombian Navy. • Install and maintain navigation aids in service; perform hydrographic surveys and produce national nautical cartography. • Regulate, direct, and control activities related to general navigation safety, safety of human life at sea, maritime search and rescue and establish ship personnel requirements. • Establish anchoring areas for vessels and naval craft. <p>https://www.cioh.org.co/index.php/quienes-somos/funciones.html</p> <ul style="list-style-type: none"> • Study and execute research projects and evaluation of oceanographic, hydrographic and marine pollution

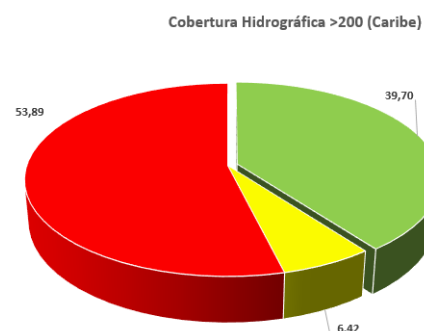
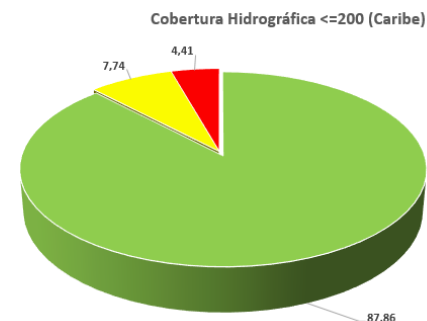
	<p>phenomena, according to the programs of the General Maritime Directorate.</p> <ul style="list-style-type: none"> • Make known, according to the corresponding security classification, the results of executed projects, through the SIG; and the web pages of the center and the DIMAR. • Provide teaching collaboration to the Naval Officer School "Almirante Padilla" in the field of oceanography and hydrography, for undergraduate, postgraduate and courses on specific topics in these areas. • Perform as academic sub-office of the Naval School of Petty Officers of Barranquilla, developing the academic programs corresponding to the last module (semester) of the oceanography and hydrography technologies. • Provide technical-marine support services, oceanographic and hydrographic data, physical, chemical and biological analysis, equipment metrology and laboratory elements for research and other maritime activities. • Prepare research projects and products that support the functions of the Public Force. • Support the Port Captaincies in the preparation of technical studies of jurisdiction when requested. • Collaborate and participate jointly with national or foreign organizations in projects and / or research and development studies of National interest in the scientific areas of their competence. • Contribute to the general programs of preservation and conservation of the marine environment. • Control, monitor and manage the measurement systems of oceanographic, meteorological parameters of the entity in its jurisdiction. • - Provide technical and scientific advice to both the General Maritime Directorate, as well as the services provided to other public or private entities that require it
<p>-Annual operating budget -Budget annuel -presupuesto anual</p>	<p>\$ 2.000.000.00 COP in 2017</p>
<p>-Total number of staff employed -Effectifs totaux -Número total de personal empleado</p>	<p>46</p>
<p>-Number of INT charts published -Nombres de cartes INT publiées -Número de cartas INT publicadas</p>	<p>13</p>

-Total number of paper charts published-Nombre total de cartes papier publiées-Número total de cartas de papel publicadas	128			
-Number of ENC cells published -Nombres de cellules ENC publiées -Número de células ENC publicadas	68			
-Number of Other charts -Nombre d'Autres cartes -Número de Otras cartas	6			
-Type of publications produced -Type d'ouvrages produits -Tipo de publicaciones producidas	Paper and ENC Charts Sailing Directions List light Thematic Charts INT Chart 001			
-Detail of surveying vessels/ aircraft -Détail des bâtiments hydrographiques / aéronefs -Detalle de los buques hidrográficos / aeronaves	-Name -Nom -Nombre	-Displacement -Déplacement -Desplazamiento	-Date Launched -Date de mise en service -Fecha de botado	-Number of crew -Nombre de l'équipage -Tripulación
	ARC Malpelo	1157	1981	39
	ARC Providencia	1157	1981	38
	ARC Roncador	503	2016	28
	Lancha Hidrográfica SERRANA	25	2015	3
	Lancha Hid. ISLA FUERTE	25	2015	3
	Lancha Hid. ISLA CASCAJAL	25	2015	3
-Other information of interest -Autres informations utiles -Otra información de interés	Centro de Investigaciones Oceanográficas e Hidrográficas del Caribe (CIOH) www.cioh.org.co Centro de Investigaciones Oceanográficas e Hidrográficas del Pacífico (CCCP) www.cccp.org.co			

Input to the IHO Publication C-55 (*Status of Hydrographic Surveying and Charting Worldwide*)

Country: **COLOMBIA C2 Area**

C-55 Summary for:				Comments on Charts:
Country:	Colombia			
Country Iso Code:	CO			
Country SubCode:	COL			
INT Region:	B y C2			
Country/Depend:				
Last updated:	18 de agosto de 2017			
Provided by:	JT (RA) Dagoberto DAVID VITERI y Jancy PARODI			
Chart coverage	Passage (%)	Coastal (%)	Port (%)	
INT	100	100	0	Comments on Surveys: There are project to survey the deph water and increment the surveys in Magdalena and Amazonas River
RNC	0	0	0	
ENC	100	100	100	
Status of Paper Charts				
Paper charts with depths in meters (%)				
Paper charts referenced to a satellite datum (%)				
Status of surveys	Adequate (%)	Resurvey (%)	No survey (%)	
0-200m	86,86	7,74	4,41	
> 200m	39,1	6,42	53,89	



MSI	Y/N	Comments on MSI:
Local warning	Yes	
Coastal warning	Yes	
Nav warning	Yes	
Port warning	Yes	
GMDSS	Y/N	Comments on GMDSS:
Master Plan	Not	In project of implementation
Area A1	Yes	
Area A2	Yes	
Area A3	Not	
NAVTEX	Yes	
SafetyNet	Yes	

National MSI Self-Assessment

Country: COLOMBIA
 Organization: **Dirección General Marítima Centro de Investigaciones Oceanográficas e Hidrográficas del Caribe**

1. Maritime area

[C2 Caribbean Area]

2. Operational Points of Contact for the National Coordinator

INSTITUTION	TELEPHONE	FACSIMILE	EMAIL
DIMAR Sede Central Fabián Restrepo	+57 3137784125		navtex@dimar.mil.co
Julián Sepúlveda			jsepulveda@dimar.mil.co

3. GMDSS Master Plan

[Report on the status of the GMDSS Master Plan: Is it up to date? When was the last update?]

[Specifics of equipment used and software version with date up-dated]

Equipment Type for Ports and Local Area	Software Version	Date of Up-date
Nautel	Transoceana	2016

[Detail the number of warnings identified as immediate priority (requiring transmission within 30 minutes) and the average elapsed time for passing to NAVAREA coordinator, as reported to the last RHC meeting]:

Year Y-2016		Year Y-2017		Year Y	
Total	Average elapsed time	Total	Average elapsed time	Total	Average elapsed time
12	30	25	30	xx	xx.x Mins

4. NAVTEX Coverage:

*Zona Caribe, Santa Marta. Estación Norte. 518 KHz Carácter (C) Charlie
490 KHz Carácter (K) Kilo*

*Zona Caribe, Santa Marta. Estación Norte. 518 KHz Carácter (O) Oscar
490 KHz Carácter (C) Charlie*

5. Operational Issues:

[In Implementation]

6. Contingency Planning

The NAVTEX Station of Punta Soldado in the Pacific, is out of service.

DIMAR will move the station to Naval Isla. This project finish in January 2018

7. Capacity Building

Required MSI capacitation

8. Other Activities

MICC-MACHC Member

Council IHO Member

SEPHC Chariman

HCA Member

IMO Member

IALA member

9. National Maritime Website

10. <https://www.dimar.mil.co/content/mensajes-de-navegacion-maritima-navtex>

11. Recommendations

Continue the support in Capacity Building

12. Summary

The Hydrographic Service of Colombia in charge of the Center for Oceanographic and Hydrographic Research of the Caribbean under the Direction of the Maritime General Directorate and in conjunction with the Oceanographic and Hydrographic Research Center of the Pacific will continue to increase the Hydrography nationally and internationally in order to seek to meet the objectives of the International Hydrographic Organization and the International Maritime Organization and all other national and global organizations that seek to preserve the environment.



Sign

Commander **HERMAN AICARDO LEON RINCON**

Director Centre Hydrographic and Hydrographic Research of Caribbean
Hydrographic Service