

**GEBCO Sheet G.03**  
**(Gulf of Mexico and the northern Caribbean Sea)**

**INTERNATIONAL BATHYMETRIC CHART OF THE CARIBBEAN SEA  
AND THE GULF OF MEXICO (IBCCA)**

The bathymetry of this sheet is taken from sheets 1.01 to 1.09 of the International Bathymetric Chart of the Caribbean Sea and the Gulf of Mexico (IBCCA) compiled under the guidance of the IOC Editorial Board for IBCCA (Chief Editor: Mario Alberto Reyes Ibarra, INEGI). Bathymetry for these IBCCA sheets was completed in the period 1997 to 2001 while the data sets were submitted to BODC in 2002.

Authors (Scientific Coordinators):

IBCCA Sheets 1.01 to 1.04 and 1.09 compiled by the US National Geophysical Data Center (NGDC) (Troy L. Holcombe);

IBCCA Sheets 1.05 and 1.06 compiled by Instituto Nacional de Estadística, Geografía e Informática (INEGI), Mexico (Jose Luis Frias Salazar);

IBCCA Sheets 1.07 and 1.08 compiled by Agencia de Cartografía Náutica, Cuba (Rolando Feito Sarduy)

Sheet Limits: 15°N to 33°N; 101°W to 69°W (and to 61°W from 15°N to 24°N)

Limits of individual IBCCA Sheets:

24°-33°N, 101°-93°W(1.01); 93°-85°W(1.02); 85°-77°W(1.03); 77°-69°W(1.04)

15°-24°N, 101°-93°W(1.05); 93°-85°W(1.06); 85°-77°W(1.07); 77°-69°W(1.08); and 69°-61°W(1.09)

Scale: contours compiled and digitized on Mercator sheets at a scale of 1:500,000

Horizontal Datum: WGS-84

Contour Units: bathymetric depth in corrected metres

Contours present: standard contours at 0m, 20m, 40m, 60m, 80m, 100m, 200m, and at 200m intervals thereafter down to 8,400m. Also included as standard are contours at 500m and at 1000m intervals thereafter. Intermediate contours appear frequently on the sheets; thus many areas include contours at 100m intervals, and some areas include more frequent shallow water contours up to 200m. Some of the abyssal floor areas also have contours at 10m-20m intervals.

Coastline Source: NIMA World Vector Shoreline (full resolution)

Published Chart: For up to date information on IBCCA chart products please refer to website [www.ngdc.noaa.gov/mgg/ibcca](http://www.ngdc.noaa.gov/mgg/ibcca). Sheets 1.04 and 1.09 have already been published in hard copy form.

### **PREPARATION OF GEBCO SHEET G.03**

The bathymetry of the individual IBCCA sheets was compiled and digitized on standard plotting sheets at a scale of 1:500,000. The digital contours for sheets 1.01 to 1.04 were submitted to BODC by Lisa Taylor of NGDC while the contours and trackline control for sheets 1.05 to 1.09 were submitted in digital form by Jose Luis Frias Salazar of INEGI. For sheets 1.01 to 1.04 the trackline control was provided in the form of a data source diagram – the tracklines and survey box outlines were digitized from this diagram by BODC.

In order to maintain seamless bathymetry at the standard GEBCO depths (i.e. 200m, 500m and at 500m intervals thereafter) checks were made by BODC to ensure conformation in the IBCCA contours, particularly at 500m, 1500m, 2500m etc (non-standard depths within IBCCA). Missing contours at these levels were interpolated by BODC with the aid of a gridded version of the bathymetry, followed by manual adjustment as appropriate, and included in the data set. As a result of this, about one third of the 500m, 1500m, 2500m etc contours on IBCEA Sheets 1.01 to 1.04 were generated by BODC with about two-thirds generated for Sheets 1.05 to 1.09.

For large areas of IBCCA sheets 1.01, 1.02, 1.03, 1.05 and 1.09, trackline control is shown in terms of survey boxes rather than as individual sounding points or tracklines. These are areas of high sounding density and occur particularly in the northern half of the Gulf of Mexico, around the Yucatan peninsula and the Atlantic seaboard off Florida. Further information on these survey areas may be found in the GEBCO Digital Atlas.

### **DATA SOURCES**

#### **IBCCA SHEET 1.01**

Scientific Coordinator: Troy L. Holcombe (MGG, NGDC)

Compiler: Lisa A. Taylor (MGG, NGDC).

Digital soundings from the U.S. National Geophysical Data Center Global Trackline Geophysical Data Base (GEODAS). Collecting institutions include the Institute for Geophysics, University of Texas; Lamont-Doherty Earth Observatory of Columbia University; U. S. Coast Survey; and the U.S. Naval Oceanographic Office.

Sources of detailed surveys and bathymetric contours:

1. Soundings from surveys conducted by the U.S. National Oceanic and Atmospheric Administration/National Ocean Service/Coast Survey. Track spacing varies with depth:

- 0.1 to 0.8 km track spacing for depths from 0 to 200 meters
- 0.8 to 1.6 km track spacing for depths from 200 to 900 meters
- 3.2 km track spacing for depths from 900 to 2750 meters
- 8.0 km track spacing for depths over 2750 meters

Digital contours from the U. S. Geological Survey CONMAP data base, derived from U.S. Coast Survey 1:250,000 scale bathymetric maps, were used in some areas to fill in small data gaps.

2. Contours digitally generated from multibeam surveys conducted by the U.S. Coast Survey ships WHITING and MOUNT MITCHELL from 1988 to 1992.
3. Contours provided by William R. Bryant of Texas A & M University; from industry surveys compiled at a scale of 1:192,000. Track spacing from 0.45 to 0.9 km.
4. Multibeam data collected by R.V. Gyre

### **IBCCA SHEET 1.02**

Scientific Coordinator: Troy L. Holcombe (MGG, NGDC)

Compiler: Lisa A. Taylor (MGG, NGDC).

Digital soundings from the U.S. National Geophysical Data Center Global Trackline Geophysical Data Base (GEODAS). Collecting institutions include the Institute for Geophysics, University of Texas; Lamont-Doherty Earth Observatory of Columbia University; U. S. Coast Survey; and the U.S Geological Survey.

Sources of detailed surveys and bathymetric contours:

1. Soundings from surveys conducted by the U.S. National Oceanic and Atmospheric Administration/National Ocean Service/Coast Survey. Track spacing varies with depth:
  - 0.1 to 0.8 km track spacing for depths from 0 to 200 meters
  - 0.8 to 1.6 km track spacing for depths from 200 to 900 meters
  - 3.2 km track spacing for depths from 900 to 2750 meters
  - 8.0 km track spacing for depths over 2750 meters

Digital contours from the U. S. Geological Survey CONMAP data base, derived from U.S. Coast Survey 1:250,000 scale bathymetric maps, were used in some areas to fill in small data gaps.

2. Contours digitally generated from multibeam surveys conducted by the U.S. Coast Survey ships WHITING and MOUNT MITCHELL from 1988 to 1992.
3. Surveys conducted by the National Imagery and Mapping Agency (NIMA) ships BARTLETT and KANE from 1983 to 1985. Track spacing 1.8 km.

4. Contours digitally generated from a three arc second gridded five beam subset of multibeam surveys conducted by the Scripps Institution of Oceanography ship ATLANTIS II in 1986.

Imagery from the side-scanning sonar system (GLORIA-II), obtained by the U.S. Geological Survey, was employed in the interpretation of bathymetric contours along portions of the Florida Escarpment.

### **IBCCA SHEET 1.03**

Scientific Coordinator: Troy L. Holcombe (MGG, NGDC)

Compiler: Lisa A. Taylor (MGG, NGDC).

Digital soundings from the U.S. National Geophysical Data Center Global Trackline Geophysical Data Base (GEODAS). Collecting institutions include the Woods Hole Oceanographic Institution; Lamont-Doherty Earth Observatory of Columbia University; U. S. Geological Survey; and the U.S. Naval Oceanographic Office.

Sources of detailed surveys and bathymetric contours:

1. Soundings from surveys conducted by the U.S. National Oceanic and Atmospheric Administration/National Ocean Service/Coast Survey. Track spacing varies with depth:

0.1 to 0.8 km track spacing for depths from 0 to 200 meters

0.8 to 1.6 km track spacing for depths from 200 to 900 meters

3.2 km track spacing for depths from 900 to 2750 meters

8.0 km track spacing for depths over 2750 meters

Digital contours from the U. S. Geological Survey CONMAP data base, derived from U.S. Coast Survey 1:250,000 scale bathymetric maps, were used in some areas to fill in small data gaps.

2. U.S. Naval Oceanographic Office bathymetric contour sheet 805 (NA-9), scale 1:1,000,000, compiled by F.H. Sorenson in 1984 (100 meter contour approximated).
3. Surveys conducted by the U.S. Naval Oceanographic Office ships USS Sheldrake, USS Prevail and USS Pursuit from 1959 to 1964. Trackline spacing from 0.3 to 1.8 km.
4. Contours digitally generated from a three arc second gridded five beam subset of multibeam surveys conducted by the Scripps Institution of Oceanography ship ATLANTIS II in 1986.

Imagery from the side-scanning sonar system (GLORIA-II), obtained by the U.S. Geological Survey, was employed in the interpretation of bathymetric contours along portions of the Florida Escarpment.

## **IBCCA SHEET 1.04**

Scientific Coordinator: Troy L. Holcombe (MGG, NGDC)

Compiler: Lisa A. Taylor (MGG, NGDC).

Sources of Bathymetric Data and Bathymetric Contours:

Numbers correspond to numbered areas shown on the printed chart.

1. U.S. National Oceanic and Atmospheric Administration/National Ocean Service surveys. (Track spacing for this area is 0.25 to 2.8 km)
2. U.S. National Oceanic and Atmospheric Administration/National Ocean Service surveys. (Trackline spacing for this area is 0.25 to 1.5 km)
3. U.S. Naval Oceanographic Office survey, trackline spacing 0.8 to 1.0 km. The survey was completed by the USS Prevail in 1962.
4. U.S. Naval Oceanographic Office survey, trackline spacing 0.8 to 1.0 km. The survey was completed by the USS Sheldrake in 1961.

Bathymetry for survey areas 1 and 2 was derived from surveys conducted between 1983 and 1984. Most of the surveys were conducted by the U.S. National Oceanic and Atmospheric Administration/National Ocean Service survey ship WHITING.

Tracklines shown for the remaining area are from:

- Digital data files of the U.S. National Geophysical Data Center. Primary sources include the U.S. Navy, Woods Hole Oceanographic Institution, Lamont Doherty Geological Observatory, Scripps Institution of Oceanography, U.S. Geological Survey and the Defense Mapping Agency.
- Random tracks from the U.S. Naval Oceanographic Office.
- Mid-Ocean Dynamics Experiment, MODE-I Region Bathymetry, Chart 1, at a scale of 1:500,000 compiled by Patricia A. Bush, published by the National Oceanic and Atmospheric Administration, National Ocean Service for the Environmental Research Laboratories, Atlantic Oceanographic and Meteorological Laboratories, 1976. (Tracks confined to the area 69° to 77°W, 26° to 29°N)
- Bathymetric chart of the Blake Escarpment at a scale of 1:1,000,000, Universal Transverse Mercator compiled by William P. Dillon of the U.S. Geological Survey (unpublished).

Imagery from the side-scanning sonar system (GLORIA-II), obtained by the U.S. Geological Survey for the Blake Escarpment was employed in interpretation of bathymetric contours. The GLORIA-II imagery was custom photographed to scale and provided by William P. Dillon of the U.S. Geological Survey.

U.S. Naval Oceanographic Office bathymetric contour sheet 805(NA-9), at a scale of 1:1,000,000 compiled by F.H. Sorensen in 1984, provided supplementary information in

areas of sparse track control, particularly in the area of 24°N to 24°30'N, 74°30'W to 76°30'W.

### **IBCCA SHEET 1.05**

Scientific Coordinator: Jose Luis Frias Salazar (DGG, INEGI)

Compilers: Marcos Aguilar Benitez, Manuel Cruz Pineda (DGG, INEGI)

Digital soundings from the U.S. National Geophysical Data Center Global Trackline Geophysical Data Base (GEODAS).

Sources of detailed surveys and bathymetric contours:

1. (Southern area of the Bay of Campeche) Bathymetric contours taken from the 1:200,000 scale maps 'Marbella' and 'Coatzacoalcos' produced from Mexican Petroleum's Marine Seismology Program. The spacing between sounding lines is approximately 4km.
2. (Survey off Pacific coast of Mexico) Soundings from surveys of the Middle America Trench, conducted by the University of Texas between 1977 and 1978 from the research vessel *Ida Green* and also from surveys conducted by Scripps Institution of Oceanography (University of California) from the research vessel *Thomas Washington* in 1972. The spacing between sounding lines is variable between approximately 2km and 4km.

The coastline is based on the US NIMA's World Vector Shoreline updated with data of the coastline generated from the cartographic series of Mexico (topographic maps at a scale of 1:250,000 scale) from the DGG of the INEGI.

### **IBCCA SHEET 1.06**

Scientific Coordinator: Jose Luis Frias Salazar (DGG, INEGI)

Compilers: Marcos Aguilar Benitez, Manuel Cruz Pineda (DGG, INEGI)

Digital soundings from the U.S. National Geophysical Data Center Global Trackline Geophysical Data Base (GEODAS).

Sources of detailed surveys and bathymetric contours:

1. Soundings from surveys conducted by the University of Hawaii (SOEST) Hawaii Institute for Geophysics in 1989 from the research ship *Moana Wave*.
2. (Campeche Bank and west of Yucatan Basin) Soundings from marine geophysical surveys carried out by Oregon State University and the Navy Secretariat of Mexico in 1985 from the research ship *Altair*.
3. (Northern edge of Campeche Bank) Surveys carried out by the U.S. National Imagery and Mapping Agency (NIMA) between 1983 and 1985 from the research vessels *Bartlett* in the western section and *Kane* in the eastern section of this area. The spacing between sounding lines is 1.8km.

4. Bathymetric contours taken from the map by Jacobs et al. (Jacobs, C.L., Edgar, N.T., Parson, L.M., Dillon, W.P., Scanlon, K.M., and Holcombe, T. L. (1989). A revised bathymetry of the Mid-Cayman Rise and the Cayman trough using long-range side-scan sonar. Institute of Oceanographic Sciences, Deacon Laboratory, report no. 272, 11p., map).

The coastline is based on the US NIMA's World Vector Shoreline updated with data of the coastline generated from the cartographic series of Mexico (topographic maps at a scale of 1:250,000 scale) from the DGG of the INEGI.

### **IBCCA SHEETS 1.07 AND 1.08**

Documentation not available at the time of going to press with the GEBCO Digital Atlas

### **IBCCA SHEET 1.09**

Scientific Coordinator: Troy L. Holcombe (MGG, NGDC)

Compilers: Lisa A. Taylor, Jason Maddox, Robert Mandzi, Dan Metzger  
(MGG, NGDC)

Sources of detailed surveys and bathymetric contours:

(Numbers correspond to numbered areas shown on the printed chart)

1. U.S. Naval Oceanographic Office surveys, trackline spacing generally 1-10 km. Adapted from bathymetric contours by Joseph P. Flanagan, Joseph G. Gilg, Charles R. Jones, Francis L. Marchant, Robert R. Murchison, Jack H. Rebman, Lavern W. Snodgrass, Frederick H. Sorenson, and Joseph C. Whitney, compiled at scale 1:1,000,000 and published by the National Oceanic and Atmospheric Administration 1980, Bathymetric Chart of the Caribbean, scale 1:2,500,000.
2. U.S. Naval Oceanographic Office surveys, trackline spacing 1-10 km. Adapted from bathymetric contours by James E. Matthews and Troy L. Holcombe, compiled at a scale of 1:1,000,000 and published at a scale of 1:2,000,000 in Matthews, J.E. and Holcombe, T.L., 1976, Regional Geological/ Geophysical Study of the Caribbean Sea (Navy Ocean Area NA-9), 1. Geophysical Maps of the Eastern Caribbean, U.S. Naval Oceanographic Office Reference Publication Rp-3.
3. U.S. Naval Oceanographic Office surveys, trackline spacing 1-10 km.
4. U.S. Naval Oceanographic Office surveys, trackline spacing 0.05 to 2 km.

Bathymetry for survey areas 3 and 4 is adapted from bathymetric contours by Julian C. Cooley, 1978, in Structure and Stratigraphy of the Offshore Margin of the Dominican Republic, unpublished M.S. Thesis, University of Southern Mississippi.

5. U.S. National Oceanic and Atmospheric Administration/National Ocean Service surveys, trackline spacing 0.025 to 0.3 km.

6. U.S. National Oceanic and Atmospheric Administration/National Ocean Service surveys, trackline spacing 0.3 to 0.6 km.
7. U.S. National Oceanic and Atmospheric Administration/National Ocean Service surveys, trackline spacing 0.6 to 1.5 km.

Bathymetry for survey areas 5, 6, and 7 is derived from 159 surveys conducted between 1900 and 1988. Most of the surveys were conducted between 1968 and 1988 by the U.S. National Oceanic and Atmospheric Administration/National Ocean Service survey ships PEARCE, WHITING, and MONT MITCHELL. Locally these surveys were supplemented by trackline bathymetry from the files of the U.S. National Geophysical Data Center.

8. Bathymetric Chart of the Eastern Caribbean at a scale of 1:1,000,000 compiled by P. Bouysse (1984), and published in Philippe Bouysse, Patrick Andreieff, Maryannick Richard, Jean-Claude Baubron, Alain Mascle, Rene-Charles Maury, and Denis Westercamp, 1985, *Geologie de la Ride d'Aves et des Pentes Sous Marines du Nord des Petites Antilles*, Documents du BRGM no. 93, 146 p., maps. In addition to the trackline shown, data from draft bathymetry at a scale of 1:100,000 west of Guadeloupe from the Atlantic Oceanographic Mission (B.H. d'Entrecasteaux, Service Hydrographique et Oceanographique de la Marine), contributed in 1981 by H. Got of the University of Perpignan, as well as miscellaneous navigation charts of the Hydrographic Offices of France, U.S.A. and the United Kingdom for certain island plateaus and submarine banks of the Lesser Antilles and the Anegada Passage, were used in the compilation of this area.
- 8a. U.S. Naval Oceanographic Office surveys, trackline spacing 1-10 km. Adapted from bathymetric contours by James E. Matthews and Troy L. Holcombe, compiled at a scale of 1:1,000,000 and published at a scale 1:2,000,000 in Matthews, J.E. and Holcombe, T.L., 1976, *Regional Geological/Geophysical Study of the Caribbean Sea (Navy Ocean Area N.A.-9)*. 1. Geophysical Maps of the Eastern Caribbean, U.S. Naval Oceanographic Office Reference Publication RP-3.
- 8b. Multibeam surveys from the ARCANTE 2 - THERMOSITE expedition, published in Bouysse, P., Robert, S., Guennoc, P. and Monti, S., 1963. *Bathymetrie detaillee (seabeam) et anomalies magnetiques dans les Antilles Francaises*, Documents du B.R.G.M., no 63, 78 p.
- 8c. Multibeam survey from the SEACARIB 1 expedition, R/V Conrad, 1985.
9. Bathymetric contours from Troy L. Holcombe, Cynthia G. Fisher, and Frederick A. Bowles, 1989, *Gravity-Flow Deposits from the St. Croix Ridge: Depositional History*, *Geomarine Letters*, v.9, p.11-18. Trackline spacing ranges from 0.2km to 2 km.

Tracklines shown for the remaining area are from the digital data files of the U.S. National Geophysical Data Center. Trackline control from Matthews, J.E. and Holcombe, T.L. 1976, *Regional Geological/Geophysical Study of the Caribbean Sea (Navy Ocean Area NA-9)*, 1. Geophysical Maps of the Eastern Caribbean, Naval Oceanographic Office Reference Publication RP-3, was also incorporated in the Venezuelan Basin area.

Imagery from the side-scanning sonar system (GLORIA-II), obtained by the U.S. Geological Survey for the areas shown in the inset map, was employed in interpretation of bathymetric contours. Published GLORIA-II images appear in: EEZ-SCAN 85 Scientific Staff (1987). Atlas of the U.S. Exclusive Economic Zone, Gulf of Mexico and Eastern Caribbean Areas, U.S. Geological Survey Miscellaneous Investigations Series I-1864-A, B. Additionally, tectonic sketches by Kathryn Scanlon based on GLORIA-II imagery in Masson, D.G. and Scanlon, K.M. (1991). The neotectonic setting of Puerto Rico, Geological Society of America Bulletin, v.103, p. 144-154, were used to interpret bathymetric contours.

Other reference information used in compilation was derived from the following publications:

Case, J.E. and Holcombe, T.L. (1980). Geologic-tectonic map of the Caribbean Region, U.S. Geological Survey Miscellaneous Investigations Series map no. I-1100.

Forsthoff, G.M. and Holcombe, T.L. (1987). Quaternary turbidities of the Muertos Trough, northeastern Caribbean Sea, composition, source and dispersal patterns, in Transactions of the Tenth Caribbean Geological Conference, Cartagena, p. 353-367.

McCann, W.R. and Sykes, L.R. (1984). Subduction of aseismic ridges beneath the Caribbean Plate, implications for the seismic potential of the northeastern Caribbean, Journal of Geophysical Research, v. 89, p. 4493-4519.

Ewing, M., Lonardi, A.G. and Ewing, J.I. (1965). The sediments and topography of the Puerto Rico Trench and Outer Ridge, in Transactions of the Fourth Caribbean Geological Congress, Trinidad, p. 325-334.

Tucholke, B.E. and Ewing, J.I. (1974). Bathymetry and sediment geometry of the Greater Antilles Outer Ridge and vicinity, Bulletin of the Geological Society of America, v. 85, p. 1789-1802.

Numbered source documents described above (except for items 5, 6, 7 and 9) were contoured in units of uncorrected metres. It was necessary to recontour in units of corrected metres using the echo sounding correction tables (3rd edition) published in 1980 by the Hydrographic Department of the British Admiralty.