

GEBCO Sheet G.06
(Central Eastern Atlantic)

**INTERNATIONAL BATHYMETRIC CHART OF THE CENTRAL
EASTERN ATLANTIC (IBCEA)**

(IBCEA Sheets 1.08, 1.09, 1.10, 1.11 and 1.12 published by the Service Hydrographique et Oceanographique de la Marine (SHOM), Paris over the period 1999 to 2001)

- Author:** Bathymetry compiled by SHOM under the guidance of the IOC Editorial Board for IBCEA
- Editorial Board:** Andre Roubertou (Chairman, France); Isabelle Niang-diop (Vice-Chairman, Senegal); Gilles Bessaro, Michel Le Gouic (France); Boubacar Diallo (Guinee); Michel Huet (IHB); Laurence Awosika (Nigeria); Jose Manuel Fialho Lourenco (Portugal); Vladim Sobolev (Russia); Director, Instituto Hidrografico de la Marina (Spain); Mensah Koffi Nutsudza (Togo); E. John W. Jones (U.K.); Troy Holcombe (U.S.A.); in collaboration with Olivier Vicaire (doctor of geophysics) (France).
- Sheet Limits:** Composite from
IBCEA 1.08: 5°11'N – 12°18'N; 21°47'W - 11°17'W (May 1999)
IBCEA 1.09: 0°31'S – 6°40'N; 20°30'W – 10°00'W (October 2000)
IBCEA 1.10: 0°31'S – 6°40'N; 10°00'W – 0°30'E (October 2000)
IBCEA 1.11: 0°31'S – 6°40'N; 0°30'E – 11°00'E (March 2001)
IBCEA 1.12: 7°42'S - 0°31'S; 3°10'E - 13°40'E (March 2001)
(publication dates of printed charts)
- Scale:** Contours compiled and digitized at a scale of 1:250,000. Printed charts published on Mercator projection at 1:1 million at 20°N.
- Horizontal Datum:** WGS84
- Contour Units:** Bathymetric depth in corrected metres
- Contours present:** 50m, 100m, 200m and at 200m intervals thereafter down to a maximum contour depth of 7800m. Also included in the digital data, but not on the printed sheets, are contours at 500m and at 1000m intervals thereafter.
- Coastline Source:** NIMA World Vector Shoreline at a scale of 1:250,000
- Digitisation:** Contours digitized by SHOM with trackline control data provided in the form of sounding points.

Note: Due to the absence of data from bathymetric surveys, some seamounts belonging to Mungo Park Seamounts (on IBCEA 1.11) and the Pierre Brazza and Paul du Chaillu Seamounts (on IBCEA 1.12), which seem characteristic, are included on the sheets based satellite altimetry data.

PREPARATION OF GEBCO SHEET G.06

The compilation and digitization of the bathymetric contours was carried out by SHOM. Available sounding data from collected soundings sheets and single and multibeam surveys were assembled into a digital database with all data corrected according to "Echo-Sounding Correction Tables" (publication NP 139, 2nd and 3rd editions, Hydrographic Office, United Kingdom). The data were plotted onto 1:250,000 sheets where they were manually contoured at intervals of both 200m and 500m. Geomorphological considerations were applied in the contouring and reference was made to satellite altimetry data, existing charts and available books, reports and archives. The contours were then digitized and submitted to BODC to form GEBCO Sheet G.06 – the trackline control was submitted in digital form expressed as sounding points for both single and multibeam data. Edgematching of the contours to surrounding areas in the GEBCO Digital Atlas was carried out at BODC.

SOURCES OF BATHYMETRIC SOUNDINGS ALONG TRACKLINES:

Bundesamt fuer Seeschifffahrt und Hydrographie, Hamburg, Rostock
Canadian Hydrographic Service, Ottawa
U.S. National Imagery and Mapping Agency (NIMA), Silver Spring, Maryland
Head Department of Navigation and Oceanography, St Petersburg
South African Naval Hydrographic Office, Cape Town
Dienst der Hydrografie Koninklijke Marine, Gravenhage
UK Hydrographic Service, Taunton
International Hydrographic Bureau, Monaco
Instituto Hidrografico, Lisboa
Instituto Hidrografico de la Marina, Cadiz
National Geophysical Data Center, Boulder, Colorado
National Ocean Service, Silver Spring, Maryland
Service Hydrographique et Oceanographique de la Marine, Paris.

SOURCES OF DETAILED BATHYMETRIC SURVEYS:

Bureau Gravimetrique International
Institut National des Sciences de l'Univers (INSU)
Institut Francais de Recherche Scientifique pour le developpement en cooperation (ORSTOM): JEAN CHARCOT (1971, 1979)
Institut Francais de Recherche de l'Exploitation de la Mer (IFREMER): JEAN CHARCOT (1988,1990), SUROIT (1983), ATALANTE (1992 to 1995)

Institute of Oceanographic Sciences (IOS): DISCOVERY (1983)
Lamont-Doherty Geological Observatory: VEMA (1961 to 1973), CONRAD (1973)
Scripps Institution of Oceanography: GLOMAR CHALLENGER (1975)
Texas A & M University: JOIDES RESOLUTION (1986)
US Geological Survey (1971)
Woods Hole Oceanographic Institute: CHAIN (1961 to 1973), ATLANTIS II (1973)
SHOM: Mission Hydrographique de la cote Ouest d'Afrique (MHCOA), LEON COURSIN (1958 to 1960), chasseur P699 (1960) et BEAUTEMPS BEAUPRE.

CHARTS CONSULTED:

Bathymetrie - Carte Bathymetrique: ERAP - IFP - COTE D'IVOIRE - Mission REINE POKOU Juin 1968 - Ech 1:1,000,000 - VALERY.

Bathymetric Map of the West African Continental Margin: Dakar – Monrovia – April 1978 – E.J.W. Jones and C.F. Stuart – Department of Geology, University College, London, England.

West Africa – Senegal and the Gambia – Bathymetry. Canadian Hydrographic Service – Ottawa – Canada, 1977.

Sierra Leone, Guinee & Guine Bissau, West Africa: Offshore free-air gravity anomaly map. E.J.W. Jones & C.C.S. Mgbatogu – University College, London, England, 1979.

Sierra Leone, Guinee & Guine Bissau, West Africa: Offshore total field magnetic anomaly map. E.J.W. Jones & C.C.S. Mgbatogu – University College, London, England, 1979.

Monti, S. and Mercier, H. (1991). Romanche fracture zone. Scale 1:1,000,000. Publication IFREMER.

Gravimetrie – Anomalies a l'air libre (pour IBCEA), d'apres le modele Smith, W.H.F. & Sandwell, D.T., J. G R. 99, 1997, SHOM – PARIS – FRANCE, 1997,1998.

Topographie (pour IBCEA) predite a partir de donnees altrimetriques et bathymetriques. (Modele Smith, W.H.F. & Sandwell, D.T., J. G R., 99, 1994). SHOM – PARIS – FRANCE, 1997.

BIBLIOGRAPHY

Allen, J.R.L. (1964). The Nigerian continental margin: bottom sediments, submarine morphology and geological evolution. *Marine Geology*, 1, 289-332.

Allen, P.M. (1969). The geology of part of an orogenic belt in western Sierra Leone, West Africa. *Geol. Rund.*, 58, 588-620

Arens, G., Delteil, J.R., Valery, P., Damotte, B., Montadert, L. and Patriat, P. (1971). The continental margin off the Ivory Coast and Ghana. In F.M. Delany (Ed.), *The Geology of*

the East Atlantic Continental Margin, Vol. 4, Africa. ICSU/SCOR Working Party 31 Symp. Cambridge, Rep. No. 70/16, Inst. Geol. Sci., London, 64-78.

Andrews-Jones, D.A. (1971). Structural history of Sierra Leone. In *Tectonics of Africa*. UNESCO, Paris, 205-7.

Baker, C.O. and Bott, M.H.P. (1961). A gravity survey over the Freetown basic complex of Sierra Leone. *Overseas Geol. Min. resources*, 8, 260-78.

Basile, C., Mascle, J., Auroux, C., Bouillin, J.P., Mascle, G., Goncalvez De Souza, K. et le groupe Equamarge (1989). Une marge transformante type, la marge continentale de Cote d'Ivoire-Ghana: resultats preliminaires de la campagne Equamarge II, mars 1988. *C.R. Acad. Sci. Paris*, 308 (serie 11), 997-1004.

Basile, C., Brun, J.P. and Mascle, J. (1992). Structure et formation de la marge transformante de Cote d'Ivoire-Ghana: apports de la sismique reflexion et de la modelisation analogique. *Bull. Soc. geol. France*, 163 (3), 207-216.

Basile, C., Mascle, J., Popoff, M., Bouillin, J.P. and Mascle, G. (1993). The Ivory Coast-Ghana transform margin: a marginal ridge structure deduced from seismic data. *Tectonophysics*, 222, 1-19.

Basile, C., Mascle, J., Sage, F., Lamarche, G. and Pontoise, B. (1996). 3. Pre-cruise and site surveys: a synthesis of marine geological and geophysical data on the Cote d'Ivoire-Ghana transform margin. In Mascle, J., Lohmann, G.P., Clift, P.D. et al. *Proceedings of the Ocean Drilling Programme, Initial Reports*, Vol. 159, 47-60.

Behrendt, J.C., Schlee, J., Robb, J.M. and Silverstein, M.K. (1974). Structure of the Continental Margin of Liberia, West Africa. *American Association of Petroleum Geologists Bulletin*, 85, 1143-58.

Blarez, E. (1986). La marge continentale de Cote d'Ivoire-Ghana: structure et evolution d'une marge continentale transformante. Ph. D. Thesis: Universite Pierre et Marie Curie, Paris, 188 p.

Blarez, E. and Mascle, J., and the shipboard scientific team (1986). Les marges continentales transformantes ouest-africaines (Guinee-Sierra Leone, Cote d'Ivoire-Ghana): Campagne Equamarge I (janvier-fevrier 1983). *Campagnes Oceanographiques Francaises. Publications IFREMER* 3, 292 p.

Blarez, E., Mascle, J., Affaton, P., Robert, C., Herbin, J.P. and Mascle, G. (1987). Geologie de la pente continentale ivoiro-ghaneeenne: resultats de dragages de la campagne Equamarge. *Soc. geol. France* (8), t. III, no. 5, 877-885.

Bonvrelot, S., Pontoise, B., Mascle, J. (1989). Structure profonde de la marge continentale sud-guineene: apport des donnees gravimetriques. *C.R. Acad. Sci., Paris*, t.309, 1915-22.

Burke, K. (1972). Longshore drift, submarine canyons and submarine fans in development of Niger delta. *American Association of Petroleum Geologists Bulletin*, 56 (10), 1975-1983.

Cochonat, P., Droz, L., Geronimi, C., Guillaume, J., Loubrieu, B., Ollier, G., Peyronnet, J.P., Robin, A., Tofani, R. and Voisset, M. (1993). Morphologie sous-marine du secteur oriental du delta du Niger (golfe de Guinee). C.R. Acad. Sci. Paris, 317 (serie II), 1317-1323.

Chauveau, E. (1994). Les marges continentales de Guinee et de Cote d'Ivoire orientale. Etude de geomorphologie sous-marine. These de Doctorat d'Universite, Paris IV - Sorbonne, 343 p.

Egloff, J. (1972). Morphology of the Ocean Basin Seaward of Northwest Africa: Canary Island to Monrovia, Liberia. American Association of Petroleum Geologists Bulletin, 56, 694-706.

Emery, K.O., Uchupi, E., Phillips, J., Bowin, C. and Mascle, J. (1975). Continental Margin off Western Africa: Angola to Sierra Leone. American Association of Petroleum Geologists Bulletin, 59, 2209-65.

Equipe Guinness I (1993). Morphologie sous-marine du secteur oriental du delta du Niger (golfe de Guinee). C.R. Acad. Sci., Paris, Ser. II, 317, 1317-1323.

Fail, J.P., Montadert, L., Delteil, J.R., Valery, P., Patriat, P. and Schlich, R. (1970). Prolongation des zones de fractures de l'Ocean Atlantique dans le Golfe de Guinee. Earth and Planetary Science Letters, 7, 413-9.

Giresse, P., Kouyoumontzakis, G. (1973). Cartographie sedimentologique des plateaux continentaux du Sud Gabon, du Congo, du Cubinda et du Zaire. Cah. ORSTOM, Paris, Ser. Geol., V (2), 235-257.

Giresse, P. (1981). Les sedimentogeneses et les morphogeneses quaternaires du plateau et de la cote du Congo en fonction du cadre structural. Bull. I.F.A.N., Dakar, Ser. A. 49 (1-2), 43-68.

Giresse, P., Kouyoumontzakis, G., Moguedet, G. (1979). Le quaternaire superieur du plateau continental congolais. Exemple d'evolution paleoceanographique d'une plate forme depuis environ 50 000 ans. In: Van Zinderen Bakker, E.M. and Coetzee, J.A. (eds). "Palaeoecology of Africa and the surrounding islands", A.A. Balkema, Rotterdam, Vol. 10/11, 193-217.

Heezen, B.C., Bunce, E.T., Hersey, J.B. and Tharp, M. (1964). Chain and Romanche fracture zones. Deep-Sea Research, 11, 11-33.

Hobart, M.A., Bunce, E.T. and Sclater, J.G. (1975). Bottom Water Flow through the Kane Gap, Sierra Leone Rise, Atlantic Ocean. Journal of Geophysical Research, 80, 5083-8.

Honnorez, J., Mascle, J., Basile, C., Tricart, P., Villeneuve, M. and Bertrand, H. (1991). Mapping of a segment of the Romanche Fracture Zone: a morphostructural analysis of a major transform fault of the equatorial Atlantic Ocean. Geology, 19, 795-798.

- Hospers, J. (1971). The geology of the Niger delta area. In F.M. Delany (Ed.), *The Geology of the East Atlantic Continental Margin, Vol. 4, Africa*, ICSU/SCOR Working Party 31 Symp. Cambridge, Rep. No. 70/16, Inst. Geol. Sci., London, 124-142.
- Jansen, J.H.F., Giresse, P., Moguedet, G. (1984). Structural and sedimentary geology of the Congo and Southern Gabon continental shelf; a seismic and acoustic reflection survey. *Netherlands J. Sea Res.*, 17 (2-4), 364-384.
- Jones, E.J.W. and Mgbatogu, C.C.S. (1982). The structure and evolution of the West African continental margin off Guine Bissau, Guinea and Sierra Leone. In R.A. Scrutton and M. Talwani (Eds), *The Ocean Floor*, 165-202.
- Jones, E.J.W. (1987). Fracture zones in the equatorial Atlantic and the breakup of western Pangea. *Geology*, 15, 533-36.
- Jones, E.J.W., Goddard, D.A., Mitchell, J.G. and Banner, F.T. (1991). Lamprophyric volcanism of Cenozoic age on the Sierra Leone Rise: Implications for regional tectonics and the stratigraphic time scale. *Marine Geology*, 99, 19-28.
- Jones, E.J.W. and Mgbatogu, C.C.S. (1982). The structure and evolution of the West African continental margin off Guine Bissau, Guinea and Sierra Leone. *The Ocean Floor*, 165-202.
- Krause, D.C. (1963). Seaward extension and origin of the Freetown layered basic complex of Sierra Leone. *Nature (London)*, 200, 1280-1.
- Krause, D.C. (1964). Guinea fracture zone in the Equatorial Atlantic. *Science*, 146, 57-9.
- Lancelot, Y., Seibold, E., Cepek, P., Dean, W.E., Eremeev, V., Gardner, J., Jansa, L.F., Johnson, D., Krashninnikov, V., Pflaumann, U., Rankin, J.G., Trabant, P. and Bukry, D. (1977). Site 366: Sierra Leone Rise. In *Initial Reports of the Deep Sea Drilling Project*, Vol. XLI, 21-161.
- McMaster, R.L., Lachance, T.P., Ashraf, A. and de Boer, J. (1971). Geomorphology, structure and sediments of the continental shelf and upper slope off Portuguese Guinea, Guinea and Sierra Leone. In F.M. Delany (Ed.), pp 109-19.
- McMaster, R.L., de Boer, J. and Ashraf, A. (1970). Magnetic and seismic reflection studies on continental shelf off Portuguese guinea, guinea and Sierra Leone, West Africa. *American Association of Petroleum Geologists Bulletin*, 54, 158-67.
- McMaster, R.L., Christofferson, E. and Ashraf, A. (1975). Structural framework of continental shelf and slope off southwestern Sierra Leone, West Africa. *American Association of Petroleum Geologists Bulletin*, 59, 2161-71.
- McMaster, R.L. Ashraf, A. and de Boer, J. (1973). Transverse continental margin fracture zone off Sierra Leone. *Nature (London)*, 244, 93-94.
- Martin, L. (1971). The continental margin from Cape Palmas to Lagos: bottom sediments and submarine morphology. In F.M. Delany (Ed.), pp 82-95.

- Masclé, J., Bornhold, B.D. and Renard, V. (1973). Diapiric structures off Niger delta. *American Association of Petroleum Geologists Bulletin*, 57 (9), 1672-1678.
- Masclé, J., Marinho, M. and Wannesson, J. (1986). The structure of the Guinean continental margin: implications for the connection between the Central and South Atlantic Oceans. *Geologische Rundschau*, 75, 57-70.
- Masclé, J., Blarez, E. and Marinho, M. (1988). The shallow structures of the Guinea and Ivory Coast-Ghana transform margins: their bearing on the Equatorial Atlantic Mesozoic evolution. *Tectonophysics*, 155, 193-209.
- Masclé, J., Auroux, C. and the shipboard scientific team (1989). Les marges continentales transformantes ouest-africaines (Guinée, Côte d'Ivoire-Ghana) et la zone de fracture de la Romanche: Campagne Equamarge II (février-mars 1988). *Campagnes Oceanographiques Françaises. Publications IFREMER* 8, 150 p.
- Masclé, J., Equanaute (1994). Les marges continentales transformantes ouest-africaines: Côte d'Ivoire, Ghana, Guinée. *IFREMER, Serie Reperes Ocean* 5, 125 p.
- Masclé, J., Guiraud, M., Benkhelil, J., Basile, C., Bouillin, J.P., Masclé, G., Cousin, M., Durand, M., Dejoux, J. and Moullade, M. (1998). A geological field trip to the Côte d'Ivoire-Ghana transform margin. *Oceanologica Acta*, 21 (1), 1-20.
- Masclé, J., Guiraud, M., Basile, C., Benkhelil, J., Bouillin, J.P., Cousin, M. and Masclé, G. (1993). La marge transformante de Côte d'Ivoire-Ghana: premiers résultats de la campagne Equanaute (juin 1992). *C.R. Acad. Sci. Paris*, 316 (serie II), 1255-1261.
- National Ocean Sediment coring Program, National Science Foundation. Initial Reports of the Deep Sea Drilling Projects, Vol. XLI, Jan. 1978: - Site 366: Sierra Leone Rise, 21-29; - Site 367: Cape Verde Basin, 163-169.
- Popoff, M., Raillard, S., Masclé, J., Auroux, C., Basile, C. et le groupe Equamarge (1989). Analyse d'un segment de la marge transformante du Ghana: résultats de la campagne Equamarge II (mars 1988). *C.R. Acad. Sci. Paris*, 309 (serie II), 481-487.
- Quemeneur, P. (1996). Evaluation des causes d'instabilité des sédiments sous-consolidés du talus continental gabonais. *J. Rech. Oceanographique*, 21 (1-2), 59-64.
- Robb, J.M., Schlee, J. and Behrendt, J.C. (1973). Bathymetry of the continental margin off Liberia, West Africa. *Jour. Research U.S. Geol. Survey*, 1 (5), 563-567.
- Robert, L., McMaster, Thomas, P., Lachance and Asaf Ashraf. (1970). Continental Shelf Geomorphic Features off Portuguese Guinea, Guinea and Sierra Leone (West Africa). *Marine Geology*, 9 (1970) 203-213.
- Searle, R.C., Thomas, M.V. and Jones, E.J.W. (1994). Morphology and tectonics of the Romanche transform and its environs. *Marine Geophysical Research*, vol. 16, 427-453.
- Sheridan, R.E., Houtz, R.E., Drake C.L. and Ewing, M. (1969). Structure of Continental Margin off Sierra Leone, West Africa. *Journal of Geophysical Research*, 74 (1969) 2512-30.

Templeton, R.M.S. (1971). The geology of the continental margin between Dakar and Cape Palmas. In F.M. Delany (Ed.), pp 47-60.

Tricart, P., Mascle, J., Honnorez, J., Basile, C., Villeneuve, M., Bertrand, H. et le groupe Equamarge (1989). Etude morphostructurale de la zone de fracture de la Manche entre 17deg et 18deg W: premiers resultats de la campagne Equamarge II (1988). C.R. Acad. Sci. Paris, t. 309, Serie II, 1797-1802.

Tricart, P., Mascle, J., Basile, C., Henkelil, J., Clais, G., Villeneuve, M. (1991). La tectonique d'inversion medio-cretacee de la marge sud-guineenne (campagne EQUAMARGE II). Bull. Soc. Geol. France, Paris, t.162, No. 1, 91-99.

Uchupi, E., Emery, K.O., Bowin, C. and Phillips, J.D. (1976). Continental Margin off Western Africa: Senegal to Portugal. American Association of Petroleum Geologists Bulletin, 60, 809-878.

Vannev, J.R., Mascle, J. (1992). Un canyon sous-marin revisite: le trou sans fond de Cote d'Ivoire. Ann. geo. 562, 43-67.